

Chapter 2

Recent communication policy developments*

This chapter notes recent policy developments in fixed and mobile communications. In view of the “smartphone” effect which is shaping communication markets, it devotes special attention to spectrum policy and wireless technology evolution. It also looks at traffic prioritisation and interconnection issues, both in mobile and fixed markets, and at the emergence of new areas relevant to policy makers such as connected televisions. Finally, it summarises trends in key partner countries (Brazil, China, India, Indonesia and South Africa).

* All tables associated with this chapter are available online only. See www.oecd.org/sti/broadband/communications-outlook.htm.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law. This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

All stakeholders now consider communication infrastructures and services to be critical for economic and social development. Governments, in particular, are increasingly aware that widespread availability of broadband networks, including fixed and wireless broadband networks, is crucial for competitive economies and the creation of opportunities across all types of social and civic activity.

Information and communication technologies (ICTs) are a general purpose technology. In other words, they constitute a fundamental infrastructure supporting economic and social activities, similar to the continuing role played by various transportation and energy networks. From a public policy perspective, broadband communication networks, and the services provided over them, not only support existing economic and social activities, but also hold potential for tremendous innovation in these areas and others created in the future.

To take advantage of these opportunities, policy makers need to ensure effective competition, wherever possible, to allow markets to drive these developments. The decision by OECD governments to open markets for telecommunication competition has brought tremendous innovation and benefits across their economies and societies. This was emphasised and reinforced at an OECD high-level meeting (HLM), “The Internet economy: Generating innovation and growth”, held in June 2011, where ministers and other stakeholders encouraged the extension of broadband infrastructures to reach maximum national coverage and provide access at affordable prices. They recognised that fostering the use of the Internet in critical areas (health, education, transport, energy) could increase efficiency and enable people to enjoy better lives.

The HLM highlighted two further areas for attention. One was the need for governments to benchmark developments in broadband networks and quantify the Internet’s effects on the economy, so as to facilitate evidence-based policies. The second concerned the critical role to be played by all stakeholders in this and other areas. This was subsequently developed into an OECD Council Recommendation on Principles for Internet Policy Making, which encourages countries to follow a number of basic principles to ensure that the Internet remains open and dynamic.

A key message from the HLM and the Council Recommendation, for policy makers in this area, is the need to ensure a multi-stakeholder approach and, where possible, avoid regulation. As a decentralised network of networks, the Internet has achieved global interconnection without the development of any international regulatory regime. The development of a formal regulatory regime, they noted, could risk undermining its growth.

The Internet’s openness to new devices, applications and services is a key feature in its success and, consequently, its rapid adoption. In turn, this has enabled service providers and users to develop and adapt new features and capabilities to meet their requirements. There is continuously evolving interaction and independence among the Internet’s various technical components, enabling collaboration and innovation, even while they operate independently from one another. This independence permits policy and regulatory

changes in some components without requiring changes in others or effecting innovation and collaboration.

A key outcome of the Internet's openness is the long-predicted convergence among networks and services, such as telecommunications (telephony) and cable television (video), through increasing use of the Internet Protocol (IP). Today, the outcomes of this convergence can be witnessed over broadband networks: telephone calls are increasingly provided via data; over-the-top (OTT) video services are gaining customers in many countries; and IPTV is the primary form of television provision in others, such as France. Moreover, convergence over devices, applications and services is occurring in areas that were perhaps less obvious candidates. One example is the success of e-books following the launch of the Amazon Kindle in the United States. Not only have purchases of e-books surpassed physical books, for Amazon, but the company was also able to integrate the communication capabilities of mobile networks and Cloud services to synchronise a user's experience across multiple devices and platforms.

With regard to mobile communications, 3G networks and especially LTE (or 4G) technology provide a platform for the convergence of voice, SMS/MMS and data services over a single data connection. In some ways this can be threatening for service providers, as new providers enter markets in a manner that can be disruptive to traditional business models, but it also creates opportunities. Voice and SMS services, for example, are still responsible for the bulk of revenue for many mobile operators. On the other hand, some operators are exploring new ways to tariff mobile services that treat such services no differently from any other data service over their network. In 2012, Swisscom introduced a tariff scheme that charges users a flat rate for all domestic services provided over their LTE network, but offers that differentiated pricing options for customers depending on the speeds they choose. In addition, most mobile operators are exploring new services. In 2012, Telefonica created a unit to develop opportunities around "big data", while mobile operators in Turkey have introduced mobile payments, money transfers and so on, using SIM cards and Near Field Communications (NFC), in a number of cases leading the world.

The number of active communication service providers in OECD countries remains high (Table 2.1), and the market share of new entrants is increasing continuously (Table 2.2). All communication service providers listed in the tables here are, of course, not equally significant at the national or international level in terms of their competitive footprint. Many cable or telecommunication operators, for example, provide service only on a local or regional basis and some MVNOs may provide service to a relatively small number of users, compared with some of the larger mobile operators which serve hundreds of millions of customers in different OECD countries.

Limited spectrum and the increasing demand for data services mean that mobile networks will strive to offload traffic to fixed networks. At the same time, policy makers and regulators need to ensure enough supply to maintain sufficient backhaul for wireless networks, especially if there is insufficient fixed access network competition. In addition, governments in countries such as the United Kingdom and the United States are exploring innovative ways to make more spectrum available, from greater use of "white spaces" through to incentive auctions. Other countries (e.g. Mexico) are moving towards improving the legal framework for rights of way or making available government buildings for network deployment.

All these challenges mean that OECD countries are exploring different models to encourage the development of competitive choice where possible. One example is the continuing use of unbundling local access networks where there is insufficient facilities-based competition. In other areas, such as in Australia and New Zealand, governments are funding structurally separated national broadband networks. In still others, they are subsidising infrastructure, such as in rural areas, making available government sites for network deployment, or encouraging shared use of facilities (e.g. from ducts and towers to spectrum and cables).

For their part, many network operators are requesting greater flexibility in network management as they explore different business models. In terms of the Internet model for traffic exchange, all the available evidence indicates an efficient and highly competitive market where commercial negotiations are possible and the norm. In other words, the model works well without regulation and most agreements to exchange traffic are made on a “handshake” basis in recognition of the mutual benefits. In such cases, the level of regulatory oversight needs to be concomitant. Issues around traffic prioritisation, sometimes more commonly referred to as “network neutrality”, in access networks, come to the fore where there may be insufficient competition for one or more market segments. They are less prevalent where regulators judge there is sufficient competition and where relevant network management practices are transparent for consumers.

Several OECD countries, such as Chile, the Netherlands and Slovenia have introduced “network neutrality” legislation and others have provided non-binding guidelines. Some believe that this issue will draw greater attention in the coming years as policy makers seek to create an environment attractive for investment as well as maintaining effective competition. The two are not, of course, incompatible. In many cases, such as in the field of 4G, competition drives investment and there is no evidence that lack of competition stimulates investment in network infrastructure. Indeed, faced with greater competition in one country, it is likely that operators will invest in those locations prior to those where competition does not push them to do so. On the other hand, there will be cases where, for whatever reason, there will be insufficient competition in some locations or market segments.

Major questions about the level of competition and adequate investment to roll out fixed network infrastructures will remain at the forefront of policy and regulatory concerns. The market-driven separation of “transport with apps and services”, witnessed with the arrival of smartphones, will be just as influential for fixed networks. From the perspective of an increasing proportion of consumers, the devices, applications and services they use to connect to fixed networks are the same as those they use to access mobile connectivity. Just as smartphones have taken on the features of computers, so too have computers become more like mobile telephones through the rapid evolution and development of tablets with 3G and 4G connectivity. Fixed networks have, in effect, become the backhaul for mobile and wireless devices with some studies claiming that 80% of data used on mobile devices is received via Wi-Fi connections to fixed networks.

This chapter emphasises the importance of wireless communications, as some of the most significant policy and regulatory development are taking place in this field. Questions surrounding spectrum, new wireless broadband devices and services, competitive backhaul (i.e. fixed networks such as fibre, DSL, cable) and new business models are the key issues facing policy makers and regulators. To these can be added the need to make

competitive infrastructures and services available across borders. For this reason, the OECD Council adopted a recommendation, in 2012, aimed at making international mobile communications more competitive. Governments have been increasingly active in the areas of international mobile roaming and mobile termination rates as ineffective competition and its outcomes, such as high prices, act as a barrier to efficient trade and travel. Consequently, all OECD countries are increasingly undertaking action in this area. It could be assessed as being a significant market failure that users switch off devices when they cross borders, as opposed to the increasing use they make of these devices in domestic situations that reflect a functioning competitive market.

Overall trends in competition

Developments in fibre networks

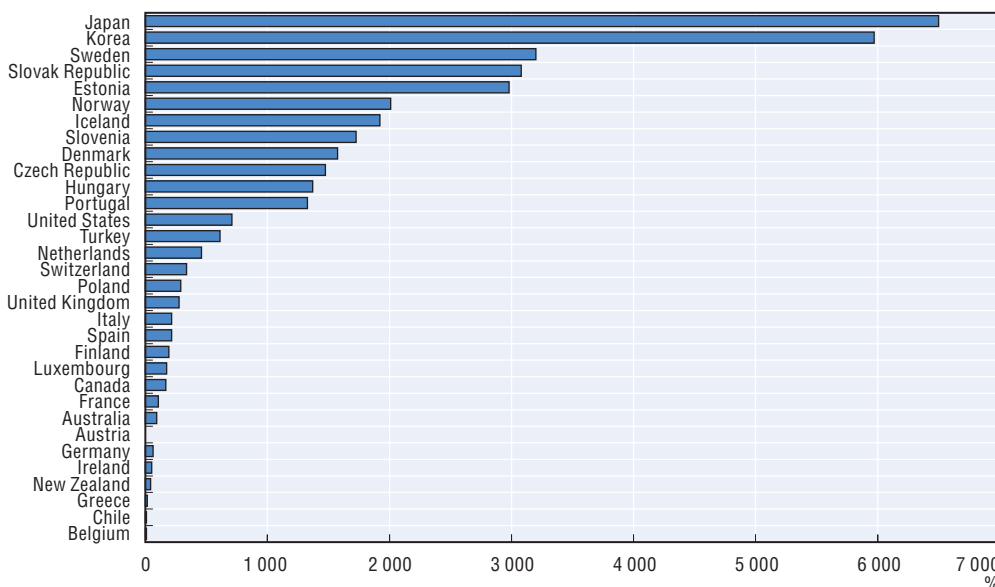
Irrespective of the labels applied to fixed networks, such as fibre-to-the-curb, DSL, cable DOCSIS 3 and so on, a common characteristic they all share is the increasing deployment of fibre optic cables deeper into those networks. Infrastructure with fibre deployed closer to the premises has been an ongoing process in all OECD countries for many years. More recently, the main decision taken by network operators has concerned whether to bring fibre directly to a premise or to a nearby point and use existing or upgraded DSL and cable infrastructure. As of June 2012, the majority of fixed wired broadband connections were provided over DSL (54.8%) and cable modem (30.4%) technologies. In 2011, the share of direct fibre connections in the OECD area was 14.2%, up from 11.1% in December 2009.

Fibre's share of direct connections to premises, while still much smaller than DSL or cable, is increasing at a faster pace than the market's overall growth. Between 2009 and 2011, the number of fibre connections increased by 36.2%, from 31.6 million to 43 million (45.7 million in June 2012), in contrast with a mere 11.1% increase in the number of fixed wired broadband subscriptions. Japan and Korea have by far the largest proportion of fibre connections (Figure 2.1).

Australia and New Zealand have taken decisions to publicly fund national fibre networks. Like neighbouring Singapore, Australia and New Zealand have chosen to structurally separate the provision of access facilities from the provision of retail services. All three countries have indicated that the pace of communication infrastructure deployment prior to taking these initiatives was not sufficient to meet their policy objectives. In Australia, a public owned company, NBN Co., is building a national broadband network which will provide access to high-speed broadband to 100% of Australian premises. It will connect 93% of homes, schools and businesses to a high-speed fibre network, with the remaining 7% of premises served by a combination of next-generation fixed wireless and satellite technologies. In November 2011, NBN Co. published its Wholesale Broadband Agreement which, as its Standard Form of Access Agreement, sets out the terms and conditions for the supply of wholesale products to retail providers. NBN Co.'s terms and conditions are subject to regulation by the competition regulator. According to NBN Co., the construction of the fibre network had commenced or been completed for around 784 592 premises by the end of 2012 and is planned for around 3.5 million homes and businesses by mid-2015.

In New Zealand the government has put in place two initiatives to improve broadband services: the Ultra-Fast Broadband Initiative and the Rural Broadband Initiative. Together,

Figure 2.1. **Percentage of fibre connections in total broadband subscriptions, June 2012**



StatLink  <http://dx.doi.org/10.1787/888932798506>

these programmes aim to cover 97.8% of the population. By 2020, the goal is to connect 75% of the population to fibre networks. Schools, hospitals and 90% of businesses will be connected by 2015. Homes and the remaining 10% of businesses will be connected by 2019. Meanwhile, the aim of the Rural Broadband Initiative is to deliver broadband to 252 000 rural households at prices and levels of service comparable with urban areas. In rural areas a combination of copper and fixed wireless infrastructures will be used.

In the Netherlands the incumbent, KPN, has formed a joint venture with Reggefiber, a new entrant focused on deploying fibre networks. The joint venture was cleared, in early 2012, by the Dutch authorities, which incorporated some undertakings in order to maintain sufficient competition, such as transparency and non-discrimination conditions (e.g. the obligation to include a reference offer), as well as access for third parties on regulated terms. More recently, KPN has announced for the first time that it will cease operation of a DSL network in one specific town, which means that DSL customers in that town will have to be migrated to fibre service before the end of 2012.

In some countries, such as Denmark, Norway and Sweden, the deployment of fibre networks has been driven largely by local and regional utilities, which leverage their existing infrastructure and customer relationships to provide broadband services over their networks. The incumbent, TeliaSonera, is deploying fibre to single dwelling units, and is facing competition from these local or regional networks. This demonstrates that alternative models to those of incumbent telecommunication and cable operators deploying nationwide infrastructure may be an option in some areas. Nevertheless, the Nordic experience is based on inherited models and these may not be readily replicated in other countries that lack such local or regional utilities.

In other countries new fibre deployments are underway or operators have expressed a preference to use new technologies for the “local loop”. With very-high-speed digital

subscriber line (VDSL) fibre is rolled out to a point near the customer's premises. The CEO of Deutsche Telekom announced, in September 2012, that they would extend VDSL coverage to cover 24 million households, twice as much as its current footprint. Vectoring technology potentially enables operators to double the rates achieved on VDSL, up to 100 Mbit/s download and 40 Mbit/s upload speeds, for supported distance. It consists of noise cancellation techniques that reduce interference between copper pairs within the same bundle of lines, and thus increase speeds. One of the factors significantly affecting the performance of DSL lines is "crosstalk". Vectoring seeks to reduce this, thereby enabling clear transmission of IP traffic.

There are different approaches in OECD countries to the regulatory requirements for new fibre networks, or other upgraded high-speed infrastructures. Historically, many countries have used a combination of tools such as functional separation and unbundling of copper local loops to provide more competitive outcomes, where there would otherwise be limited choice for consumers, and continue to do so. Some countries, particularly those investing in new national fibre networks, have adopted structural separation of wholesale and retail business to remove, by structural means, the incentive and ability of integrated operators, generally of monopoly infrastructure, to favour downstream operations over those of competitors that need to use the network. A further group of countries use a combination of tools such as functional separation and unbundling of copper local loops to provide more competitive outcomes, where there would otherwise be limited choice for consumers. The challenge, for these countries, is that the use of unbundling may prove difficult with new fibre networks. Moreover, if technologies such as vectoring are used in copper local loops connected to fibre, unbundling may also be problematic compared to traditional approaches.

While infrastructure competition is preferred this may not be possible in all locations or in all markets. In Korean cities and in Hong Kong, China, there are a substantial number of residential apartments that lend themselves to competing fibre networks connecting to the basements of buildings. As a result these locations have some of the most competitive outcomes for consumers in the world. In countries that have traditional cable television networks there can also be competitive pressure. In Switzerland, Swisscom is actively engaged in partnerships with utilities in different cities and places to deploy fibre networks, mainly as a competitive response against the growing success of cable operators.

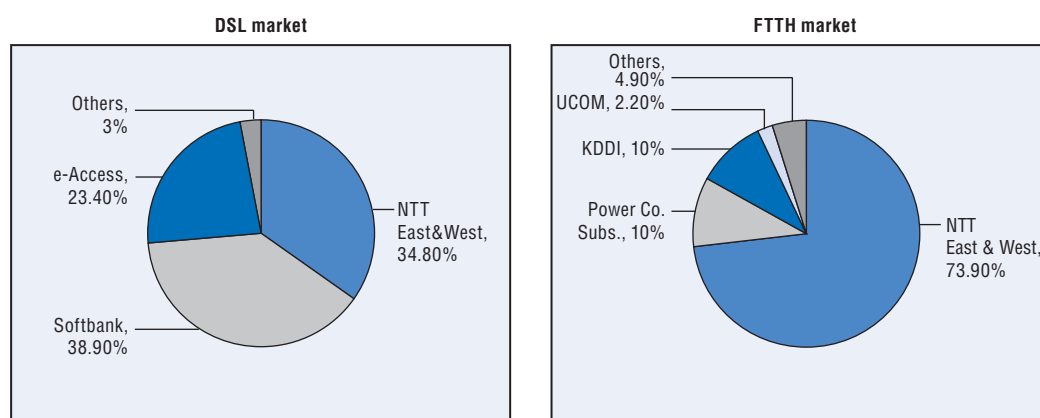
Where there is insufficient infrastructure competition to drive new network investment, policy makers face the difficult choice of taking an approach such as in Australia and New Zealand, or finding ways to increase private investment to meet their policy objective or some middle path. Understandably, all operators say that they will not invest in upgraded fixed broadband networks unless they can fully benefit from returns on these investments. They and investors may have different views, however, about the nature of these returns: whether they resemble long-term and stable utility-like returns or the higher rates associated with greater risk. Today, different OECD countries are progressing with a variety of approaches which depend on factors such as the performance or otherwise realignment of current market settings.

For their part, most new entrants, including some mobile operators, contend that new fixed network facilities should also be regulated, as copper networks were, in order to avoid abuse of dominant positions. Nonetheless, in those areas where mandated wholesale access is the rule and a key driver for competition, such as in the European Union area,


some say that the current framework does not provide sufficient incentives for investment in fibre-to-the-premises. In that respect, the European Commission has recently presented a draft recommendation on consistent non-discrimination obligations and costing methodologies, in order to promote competition and enhance the broadband investment environment.

Japan is one of the few OECD countries where fibre networks have been widely deployed. It is also noteworthy that fibre unbundling has been in place since 2001, and investment in fibre access has taken place since the late 90s. However, Japan's authorities have expressed concerns about the excessive market power of the incumbent for fibre-based services, as its market share is far higher for fibre than for DSL services (Figure 2.2). This has raised the question of whether change in the regulated access conditions, to these networks, should be undertaken.

Figure 2.2. **Broadband market shares for DSL (left) and FTTH (right) in Japan**



Source: Ministry of Internal Affairs and Communications (MIC), Government of Japan.

StatLink  <http://dx.doi.org/10.1787/888932798525>

Mobile markets

Policy makers and regulators face numerous challenges in maintaining the competition that drives innovation and investment. In mobile markets the scarce nature of spectrum and the need to ensure adequate supply is foremost among these challenges. Availability of spectrum enables authorities to ensure competitive supply and enables operators to pioneer new business models and new services. In France and Israel, for example, new facilities-based mobile entrants entered these markets in 2012, an occurrence less common in OECD countries in recent years particularly after penetration rates rose above 100 mobile telephones per 100 inhabitants and the proliferation of MVNOs. In both countries the market outcomes were more competitive offers for users and greater innovation, just as occurred in New Zealand following the introduction of a new operator in 2009.

In other OECD countries the ability to introduce new operators where there is deemed to be insufficient competition is frequently limited by the availability of spectrum. In the Netherlands a spectrum auction enabled a new entrant (Tele2) to enter the market, adding to the existing three operators. It might be noted that the push to introduce “network neutrality” legislation followed a move by the largest Dutch mobile operator to react to perceived loss of market share to OTT providers of SMS services in that country. Clearly, a

key factor for policy makers and regulators is the number of facilities-based providers. At the same time, spectrum for 4G services has enabled incumbents like Swisscom to trial new business models that are potentially beneficial for both infrastructure providers and OTT service providers.

The number of players present in mobile markets in OECD countries has remained relatively stable in recent years (Table 2.3). Existing players show a willingness to consolidate, which brings significant benefits in terms of economies of scale and access to a competitor's spectrum. Mergers among small players may also make them more effective competitors to larger players. Nevertheless, the number of operators is a key factor in ensuring a competitive market and, from the consumers' perspective, increased consolidation may result in lower competition. Few would argue, for example, that the market in the Netherlands is more competitive with three facilities-based operators than in earlier years when it had five. Meanwhile, increased competition is readily evident in countries such as France and Israel that have recently introduced new operators.

Such considerations have been uppermost in the minds of regulatory authorities when considering mergers or the introduction of new entrants. While circumstances vary in each OECD country, it is noteworthy that several large countries arrived at four nationwide facilities-based providers from different starting points. These are France (an increase from three to four), the United Kingdom (a decrease from five to four) and the United States (maintained four).

Starting with the United Kingdom, arguably one of the most competitive mobile markets in the OECD area, authorities allowed Orange (France Télécom) and T-Mobile (Deutsche Telekom) to form the joint venture Everything Everywhere. This represented a merger between the third and fourth largest operators in the United Kingdom by market share. The two operators have subsequently launched the first LTE network in the United Kingdom. In France, a fourth operator was introduced in 2012, with evident benefits for consumers, discussed elsewhere in this *Communications Outlook*.

In the United States, in 2012, regulatory authorities blocked a proposed purchase of the fourth largest operator (T-Mobile) by the second largest operator (AT&T). Regulators determined it would seriously harm competition and would not be in the public interest. One of the main arguments used by AT&T was that the merger would give it access to more spectrum, while critics noted that much of the innovation and choice in this market had in recent years come from smaller players. In October 2012, Japan's Softbank announced that it would bid for Sprint Nextel, the third largest operator in the United States, a move expected to strengthen competition.

There have been a number of changes in smaller markets in OECD countries. In Australia, the third and fourth largest operators merged in order to compete more effectively with the two largest networks. In New Zealand, the previous duopoly was disrupted by the entry of the long-awaited third operator providing immediate benefits for consumers. In 2012, Israel also experienced the same results with the entry of greater competition in its market, following the introduction of a new facilities-based operator (Golan Telecom) and the entry of a cable company which uses the facilities of a previous entrant and leased facilities (Hot Mobile). While both operators offered significantly lower prices, Golan Telecom attracted attention by following a similar pricing structure to Iliad/Free in France.

In Chile and Spain, recent spectrum auctions have resulted in new mobile operators. They have mostly been already active in fixed communications. In Chile, the largest cable operator, VTR, started providing mobile services in 2012. In both countries it is expected that the ability of the fixed operators to gain spectrum will enable them to launch convergent quadruple-play offers. In all countries that have recently introduced new operators, or are about to do so, mobile number portability has proven essential and remains an essential precursor for ensuring competition (Table 2.4).

As discussed in Chapters 3 and 4, the transport of data is now the major source of growth for network operators. While there are significant new opportunities in new services, such as mobile payments, essentially they involve the transport of data in association with partners such as credit companies. Arguably the exploitation of “big data” is one of the largest opportunities for mobile operators, but this is also derived from the transport and location of data. Few expect there to be growth in traditional services such as telephony or SMS as measured by their share of revenue. Revenues corresponding to data services are growing at double-digit rates in most OECD countries, with some exceptions, like Japan, which experienced earlier growth and where data revenues represent the highest share of mobile revenue in the OECD.

Appstores and the emergence of new business models

The ecosystems and business models around broadband networks are extremely dynamic. The smartphone ecosystem is unrecognisable from little more than five years ago. Apple’s App Store was launched in just mid-2008 and was quickly followed by many others. Today, an abundance of service providers from Netflix to Spotify and Skype provide OTT services. At the time of the previous *Communications Outlook* the number of mobile operators that permitted Skype over their 3G networks was extremely limited. Hutchison’s 3 in Europe and Verizon in the United States were notable exceptions in welcoming Skype. Just two years later an increasing number of operators are adapting tariff options to take into account the availability of VoIP services. They offer flat-rate voice options or charges for data usage metred by speed or downloads and treat VoiP no differently from any other use made by their customers.

App stores have played a critical role in these developments, making OTT services widely available around the world, including in countries where operators have not permitted use of some applications on their 3G networks. Coupled with the wider availability of Wi-Fi, the mere accessibility of these applications and over-the-top use makes the issue of why such services would be blocked a moot one for all stakeholders. The onset of 4G simply increases focus on this question.

Laptop computers increasingly offer 3G or 4G slots for SIM cards. Devices such as Google and Samsung’s Chromebook not only include 3G connectivity, but also shift some of the traditional capabilities found in computers to the Cloud and provide these services over broadband networks. Commentators noted that the Chromebook, launched in October 2012, used a chip previously only employed in mobile telephones as opposed to one developed for a laptop. At the same time, they include apps that provide the traditional features of mobile phones. For consumers, services are provided in a seamless manner and may have no direct relationship to the infrastructure provider.

Noteworthy are the different business models being attached to attract consumers. One of the first service providers to bundle connectivity with a device was Amazon for its

Kindle. The so-called Whispersync capability enables users (with Kindles that incorporate a SIM card) to access the Kindle store and download e-books without a direct subscription with a mobile provider. Amazon recoups the cost for this connectivity through the sale of products and services and in turn pays network providers such as AT&T or Vodafone. In turn these providers pay other networks if users roam.

In the United States, Samsung's Chromebook includes two years of access to Verizon's 3G network for up to 100 MB per month. While Chromebook users can purchase additional data from Verizon, for the most part they are expected to connect via Wi-Fi access to fixed networks (some of the devices lack an Ethernet connection). The difference in price between the Wi-Fi-only and 3G-enabled Chromebook is USD 80 (USD 249 versus USD 329). In other words, a vendor such as Samsung is including 100 MB of data per month for USD 3.33 per month over the two-year period.

Taxation issues

During the monopoly era, when public ownership was common, communication services represented a significant source of revenue for some governments. In those countries, this frequently resulted in lower re-investment in network expansion and, as a result, low penetration rates. In countries with privately owned monopolies, penetration rates were much higher, at least in OECD countries, but there was a tendency for over investment (so called gold plating) based on the incentives provided under rate of return regulation. The reforms that separated telecommunication operators and regulation from government departments, as well as those that introduced privatisation and competition, make today's market very different. For one thing, telecommunication revenues, in many cases underpinned by artificially high prices for some services (e.g. international calls), were replaced by overall growth of services, private investment, and more efficient management and operation of networks. Today most OECD countries take the wide availability of services for granted though the requirements of users are ever changing. Revenue for general public expenditure is raised through taxation of communication services. Most countries operate value added taxes (VAT) or goods and services taxes (GST) on the final household consumption of most goods and services, including telecommunication services.

In recent years, a relatively resilient telecommunication industry during the global financial crisis has once again become a potential source for additional revenue in some countries. Spectrum auctions are still a significant source of revenue, though the prices paid in auctions are much lower than during the years of the "dotcom bubble". The most important feature and benefit that auctions brought was the ability to introduce a transparent and explainable tool to promote market entry and, therefore, competition to benefit consumers. Auctions were not or at least should not have been about maximising revenue if that meant artificially distorting the level of competition. If they are about maximising revenue they simply become taxation by other means because virtually everyone uses mobile communications.

In some OECD countries, such as Hungary, concerns have been raised regarding additional taxes on telecommunication services, over and above the general taxes applied across an economy, which may hinder the development of the sector. In Mexico, for example, some stakeholders have requested the withdrawal of a special tax of 3% on telecommunications services (IEPS), as it may harm the development of the sector and impose an additional burden on consumers, including those that do not have service. In

other countries, fees have been levied on telecommunication operators for funding public television broadcasters, such as in France and Spain. Policy makers say that the introduction of specific taxes in areas such as mobile or fixed communication networks brings them into line with ownership of televisions and they are therefore technologically neutral. These cases lie now before the European Court of Justice as they may not be in line with European law. Nevertheless, some content, such as e-books or online newspapers, is in principle subject to the standard VAT rate in the European Union whereas their physical equivalents may benefit from preferential rates. Moreover, given the additional features of e-books and newspapers (e.g. text to speech used by some with impaired vision or reading challenges), differences between taxation policies can seem inequitable and contrary to other policy objectives.

Questions over taxation in relation to communication services are, of course, a global phenomenon. In many developing countries there is also a temptation to apply additional taxes on telecommunication services. In these countries, it may be challenging to collect taxes through other means and applying regular taxation is entirely appropriate. Conversely, there is a recent trend in some countries to discriminate between international traffic termination and domestic traffic termination for the purposes of applying taxation. This results in double taxation for international traffic, as taxes in one country get applied on taxes in another country. There is growing evidence that not only are these policies ineffective, but that they also result in an overall welfare loss for consumers in those countries. In the area of VAT/GST, the OECD is developing International VAT/GST Guidelines to minimize risks of double taxation and unintentional non-taxation.

While some special industry levies or fees may be justified for specific purposes, such as funding the sector regulator or contributing to universal service goals, additional tax burdens on the telecommunication sector may harm both consumers and the industry itself, which is a key driver for economic and social development in ways that will result in larger revenue from general taxation and lower and more efficient public expenditures.

Foreign direct investment restrictions and state ownership

Legal limitations on foreign direct investment in telecommunication operators continue to exist in some countries (Table 2.5). In 2012, Canada, Israel, Korea and Mexico maintained certain restrictions on foreign investment in telecommunication operators. Other countries, such as Greece, Japan, New Zealand or Switzerland, maintain limitations on the ownership of the incumbent operator. Some progress has been made in certain countries with a view to removing these barriers. For example, in March 2012, the Canadian government announced that it would lift the current limit for foreign investment in small telecommunication operators, which was previously set at 47.6%. This change affects local telecommunication companies that have less than 10% of market share. In Mexico, the new telecommunication reform will remove previous limits (49%) to foreign ownership of fixed-line and satellite telecommunication operators. In Korea, following the enforcement of a free trade agreement (FTA) with the United States and the European Union, the Korean government will allow a government or a person from those regions to participate in indirect acquisitions of 100% of facilities-based suppliers of public telecommunication services, on the condition that the KCC examines whether the acquisition harms the public interest, as specified by a Presidential decree.

A few OECD governments own a share in domestic incumbent operators (Table 2.6). The governments of Belgium, Luxembourg, Norway and Switzerland own majority stakes in their domestic incumbent operators, while Austria, France, Germany, Greece, Japan, Portugal, the Slovak Republic and Turkey own minority stakes (sometimes as high as 49% as in the Slovak Republic). The governments of Finland and Sweden jointly hold 49% of TeliaSonera, the respective incumbent operators in these two countries. It can be further noted that the creation of government-owned companies to build and manage structurally separated national broadband networks reintroduces public ownership into that segment of the market in these countries. Examples inside the OECD area include Australia and New Zealand. In Australia, legislation provides for the eventual sale of the network company subject to a clear and robust inquiry process following completion of the network build.

Regulatory trends

Open access for fixed broadband networks

Competition in fixed networks continues to be strongly influenced by regulatory oversight in most OECD countries. A recent OECD report, *Broadband Networks and Open Access*, pointed out that the arrangements surrounding wholesale access to fixed networks (e.g. LLU, bitstream, line-sharing) contribute significantly to shaping the industry's dynamics by promoting service-based competition (Tables 2.7 and 2.8).

Among the countries to more recently join the OECD (Chile, Estonia, Israel and Slovenia), local loop unbundling at mandated, regulated prices, is not available in Chile and Israel. The Israeli authorities are in the process of developing framework conditions for mandated access to the incumbent's networks. They are also promoting the entry of the Israeli Electric Company (IEC) into the market, as a carriers' carrier, setting up a subsidiary that will have access to IEC's infrastructure and which aims to roll out a FTTH network within seven years.

Traffic prioritisation (network neutrality)

In the past two years, the debate around traffic prioritisation or network neutrality seems to have expanded from North America to other parts of the world, such as Asia, Europe and South America. There is worldwide interest in the issue and some countries, such as Chile, the Netherlands and Slovenia, have enacted network neutrality rules in legislation. These developments are generally not new but the rapid evolution of the ecosystems, particularly around mobile services, throws up some features worth noting. It is also true that an increasing number of countries are launching public consultations on network neutrality or have developed guidelines, stemming from these processes (Table 2.9).

The main issues at question are not necessarily novel – whether ISPs are permitted by regulators to exclude, slow down or prioritise certain types of traffic for OTT services that compete with their own services, in an absence of sufficient overall market competition. Examples have included restrictions of VoIP services through to apps that enable tethering. As noted, in a growing number of countries competitive forces have encouraged operators to develop tariff options that do not exclude these capabilities and services demanded by customers. All stakeholders, in large part, accept that ISPs should be able to conduct reasonable network traffic management to provide service commensurate with what

consumers pay for and expect. While the Internet is a best-effort network these practices should be transparent where they involve rival OTT services.

Following a Europe-wide consultation, the European Commission issued a statement, in November 2010, reporting that a near consensus had been achieved in favour of the importance of preserving the openness of the Internet. The European Commission further noted that the consultation had not suggested a need for additional regulation, over and above a new regulatory framework adopted in 2009. It added the caveat that additional guidance may be needed in the future. It can be noted that the new European rules allow national regulators to set minimum quality of service (QoS) requirements in order to promote network neutrality, as well as additional requirements for information that needs to be provided in contracts, such as traffic management techniques.

The regulatory authority in the United Kingdom, Ofcom, issued a statement in November 2011 following a multi-stakeholder consultation. It raised the concern that “best-effort” Internet access could not coexist with managed services unless sufficient capacity was left available for “best-effort” services. Under these circumstances, Ofcom said it would be willing to act to guarantee a minimum quality of service, should such a case arise. That being said, Ofcom said it believed there is generally sufficient competition in the market in the United Kingdom to discourage discriminatory blocking or unreasonable network management practices. Ofcom’s guidance also set out a list of necessary elements in terms of technical information on traffic management practices and transparency, surrounding services blocked or discriminated against.

ARCEP, the regulator in France, conducted a consultation on network neutrality and published its conclusions in September 2010. The regulator set out a list of 10 proposals that it said were aimed at ensuring a dynamic and long-lasting balance in the ecosystem. Among other principles, ARCEP said there was a need to promote increased transparency for end-users, to monitor ISPs’ traffic management practices, and to conduct regular evaluations of quality of service. According to these rules, service blocking (e.g. VoIP, P2P) should no longer be undertaken on mobile networks.

In September 2012, following its legal obligations, ARCEP responded to a request of the French Parliament on the status of network neutrality. ARCEP noted a decrease in discriminatory traffic management practices, which it attributes to increasing competition, and especially on mobile networks, where it said they had been more frequent in the past. ARCEP is also working towards the development of a framework of QoS indicators for fixed Internet access. These are common in a number of other OECD countries (Table 2.10). Moreover, ARCEP has recently requested all electronic communications providers registered in France to submit information, on a biannual basis, regarding the 20 most important interconnection agreements they have engaged in. With this decision, ARCEP intends to monitor Internet interconnection markets more closely. This decision took into account remarks from stakeholders, notably those arguing that the number of agreements is so high that information filing can represent an unreasonable burden on them, especially given the overwhelming number of such agreements closed on a handshake basis. Some also said that reporting on some agreements may discourage them from entering into them.

In December 2011, KCC (the Korea Communications Commission) announced its “Guidelines for Network Neutrality and Internet Traffic Management”. These contain basic principles on network neutrality and traffic management practices. The guidelines include

provisions on transparency in traffic management and a rejection of unreasonable discrimination or blocking, while recognising the need for reasonable network practices.

In France, in January 2013, an incident arose when Free, the second largest broadband network, enabled a default setting in its most recent set-top box that blocked some online advertising associated with OTT services. As in Korea, the authorities in France are examining what further action, if any, may be required.

Other countries have also undertaken specific initiatives surrounding network neutrality, either by enacting them by law or by adopting principles and guidelines. Examples include Canada (2009), Chile (2010), the United States (2010), Norway (2009), Luxembourg (2011), Japan (revised in 2010) and Italy (only public consultation, 2011). Most other OECD countries are monitoring developments. In the case of Chile, one of the rationales for the development of the legislation was to enable the possible development of OTT service providers, in addition to the factors mentioned above. In December 2012, the Slovenian Parliament passed a new electronic communications law, which also enforces network neutrality principles.

Internet interconnection models

Data on the increasing amount of traffic carried over the Internet are presented in Chapter 5. All entities with a connection to the Internet pay for that connection. If they are service providers they build their own networks and either peer or pay transit to other networks to reach the rest of the Internet. Some network access providers believe that other networks should contribute to the cost of carrying or terminating traffic to their customers. Others believe that it is the customers of these networks, including those that request this traffic, that should pay. Such discussions form part of the natural to and fro of commercial negotiations under the Internet's model for traffic exchange.

What everyone accepts is that video traffic has increased and may constitute the largest single type of Internet traffic. Nowadays, video traffic provided by entities such as YouTube, Dailymotion and Netflix represents a significant and growing share of Internet traffic in OECD countries. This has triggered reactions from some network operators who say that entities that provide video content should pay them to terminate that traffic. These companies say that OTT providers of services should contribute to financing their communication network infrastructure, as otherwise the necessary investments will not take place. Operators taking this view say that they should be able to provide higher levels of quality of service to OTT providers willing to pay for those services with others receiving best effort services.

In 2012, this issue came to a head when the association of European Telecommunications Network Operators (ETNO) – whose largest members include Orange, Deutsche Telekom, Telefónica and Telecom Italia – put forward a proposal to amend Article 3 of the International Telecommunications Regulations with language that would entail OTT service providers paying them to terminate traffic. ETNO stated that this would be consistent with the principle “sending party network pays” used in some telecommunication services for the Internet, and would ensure the sustainability of the Internet ecosystem and allow all stakeholders to invest and innovate.

Critics of the ETNO proposal, including other network operators in Europe, as well as North America and Asia, opposed the ETNO proposal stating that the existing Internet model for traffic exchange provides the ability and flexibility for commercial negotiations

to take place. Over-the-top service providers were, not surprisingly, also critical of the proposal. They said that customers of network operators request the data under discussion and should therefore be responsible for payment. They also argued that they make significant investment to carry traffic to local exchange points or pay content delivery networks to undertake that task for them. Finally, critics from the Internet technical community said that quality of service is not possible over the best effort Internet, and can be guaranteed only on intranets.

The OECD report *Internet Traffic Exchange: Market Developments and Policy Challenges* argues that the current model for Internet traffic exchange has worked extremely well. It has allowed substantial price reductions since the commercialisation of the Internet, and has underpinned dramatic increases in the number of Internet users. For these reasons a number of policy makers have spoken out against the ETNO proposal, which they say would require an enforcement mechanism overseen by regulatory authorities. They also believe that the ETNO model would not be practical, particularly at the international level, and may conflict with their guidance on network neutrality.

Connected televisions and convergence

Mobile telephones, tablets, laptops and other devices are increasingly using video services over the Internet. For their part, device manufacturers such as LG, Samsung and Sony are making televisions capable of connecting to the Internet. This can enhance users' experience in watching video services such as premium video content, short clips or video on demand (VoD). By way of example, Samsung and LG have launched app stores for connected televisions, which resemble the stores serving users of smartphones. The apps can include well-known OTT services from other providers, depending on the country, such as Netflix, Hulu or the BBC's iPlayer. Digital televisions can also be connected to the Internet by a large number of devices such as Apple TV and Western Digital's Media Player, or may incorporate features such as Google TV.

A preliminary discussion of some of the issues surrounding connected televisions can be found in Chapter 6. They are complex and as a result policy makers and regulatory authorities around the world are closely considering their approach in these areas. Some issues resemble closely those between network operators and OTT service providers. Others relate to broadcasting regulation and the objectives for public policy in this area – from the protection of children online to traditional concerns including cultural diversity and a level playing field for competition if regulation were imposed on some providers and not others.

In this area, distinct regulatory frameworks applied to communication and broadcasting services may result in conflicts arising from, on the one hand, outmoded obligations being imposed on innovative services thus limiting their development and, on the other hand, increased difficulties in applying proportionate regulations to achieve other public policy objectives. The emergence of connected televisions will likely provide further impetus to the trend towards “converged regulators” for all communication services, and an increase in harmonisation of legal frameworks applied for telecommunication and broadcasting, which are in many cases managed by different regulatory agencies.

Role and structure of regulators

Some OECD countries are undertaking organisational changes in regulatory agencies for telecommunication and broadcasting services to reflect convergence. This brings them into line with countries that have regulatory authorities dealing with all communication services. In addition, some countries are merging one or more communication regulators with the general competition authority. In 2013, in the Netherlands, the regulator OPTA will be merged with the competition authority. Meanwhile, in Spain, a draft bill put forward by the government is being discussed in Parliament and proposes to merge all sector regulators together with the competition authority into a single body (the National Commission for Competition and Markets). Reducing public expenditure is one of the primary reasons behind this move towards the consolidation of regulatory bodies.

Merging the roles of *ex-ante* communication regulators and competition authorities was envisaged as a positive outcome of telecommunication and cable liberalisation and of competitive markets, although most OECD countries still acknowledge the need for a sector-specific regulator. New Zealand relied for some time on competition law only, but later recognised the need for a more specialised agency, which would provide closer monitoring of the sector and the required expertise.

Some countries like the United Kingdom or the United States provide their sector regulator with some antitrust and merger review powers, at least for the communications and media sectors, and Germany's Bundesnetzagentur has responsibility over many different network industries (e.g. energy, transport, telecommunications). Nevertheless, the experience of a macro-regulator with *ex-post* and *ex-ante* responsibility over all sectors is rare in OECD countries.

The world goes wireless

Mobile broadband services

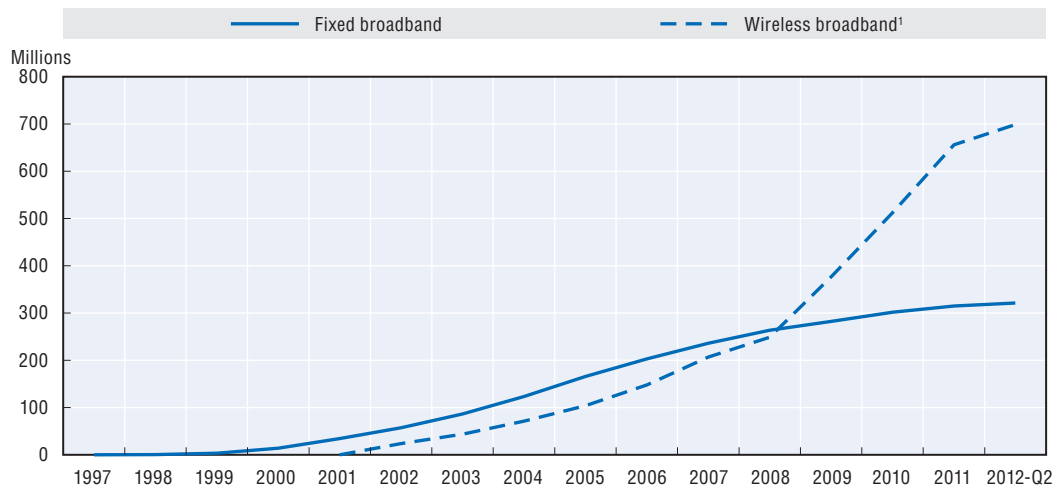
Just after the turn of the century a number of OECD countries auctioned spectrum for, so-called, 3G services. Some of the large sums paid reflected an expectation that mobile Internet access would become very popular. It took some years, however, before there was significant demand for mobile Internet access among users. At the time, most users had feature phones with additional limited capabilities on some devices such as email on Blackberry mobile telephones. Some of the first smartphones, such as the original iPhone released in 2007, were launched using 2G or pre-3G devices, such as General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE). Arguably, therefore, the initial attraction was the new capabilities of smartphones rather than bandwidth.

The dramatically enhanced capabilities of smartphones were matched by the innovation of the "app" market place. The agreement between AT&T and Apple, around the introduction of the iPhone, separated the sale and management of some applications from provision by the infrastructure provider. Undertaken for commercial rather than regulatory reasons this has stimulated breathtaking innovation to the extent that five years after its introduction more than half the population of the United States had a smartphone. The same model has been adopted by other ecosystems (i.e. mobile operators and providers of other operating systems such as Android, Blackberry and Windows Phone). In turn, the take up of smartphones stimulated ever-increasing use of 3G and has created a driver for the introduction of "4G".


The evolution of mobile communication technology has enabled the seamless provision of wireless broadband services, facilitated by the extended use of smartphones. Adding mobility has substantially expanded the range of possible applications that can be provided over a broadband connection. Services such as e-health applications, mobile instant messaging or geo-location services need an efficient mobile data connection. Smartphone uptake has been very rapid in OECD countries and more affordable smartphones are being sold, with considerable expansion in the potential customer base. The prices for smartphones and tablets are falling rapidly, opening them to a wider market, including in developing countries.

Wireless broadband overtook the number of fixed broadband subscriptions in 2008. In June 2012, wireless broadband accounted for 698.7 million subscriptions and is growing at two-digit rates (Figure 2.3). Fixed broadband subscriptions, while still growing, are not expected to match wireless broadband growth. That being said, the majority of these wireless devices will remain connected by Wi-Fi at work places and home residences.

Figure 2.3. **Wireless and fixed broadband subscriptions in OECD countries**

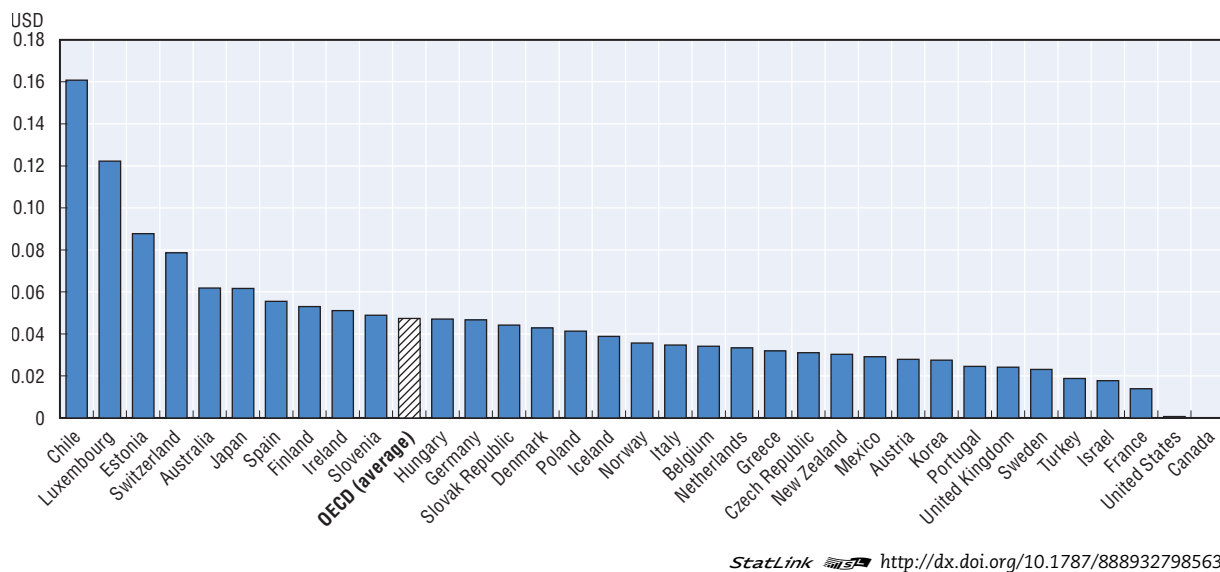
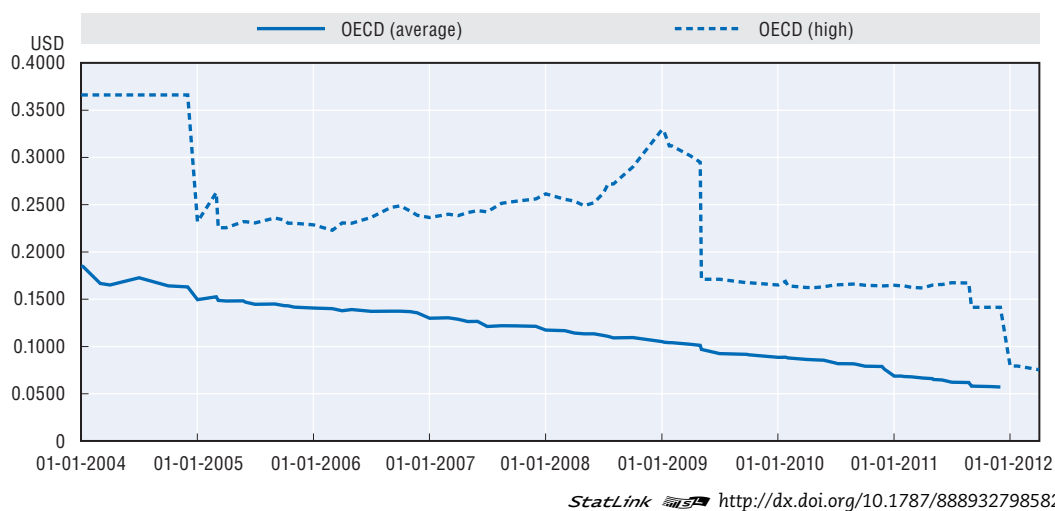


1. Data for Wireless broadband from 2001 to 2007 are estimates.

StatLink  <http://dx.doi.org/10.1787/888932798544>

Mobile termination rates

Reductions in mobile termination rates (MTRs), witnessed in previous years in OECD countries, have continued. Implementation of the 2009 Recommendation of the European Commission, as well as increased regulatory attention to MTRs, have contributed to this trend. In that decision the European Commission said that mobile termination rates should be based on the real costs of efficient operators. These costs, they determined, should be calculated on the basis of forward-looking long-run incremental costs (LRIC) whereby only the efficiently incurred costs in providing that service are included. Recent OECD work has also recognised that innovation and greater flexibility in business models is more likely if termination rates are set low or at zero. The current level of MTRs in the OECD area, as of October 2012, and the downward trend since 2004 are evident (Figures 2.4 and 2.5). Examination of the rates for October 2012 shows that there is scope for further reductions in MTRs (Table 2.11) as the current OECD average is just above USD 0.04.

Figure 2.4. **MTRs in OECD countries, USD, 25 October 2012**Figure 2.5. **Average (blue) and maximum (red) MTR in OECD countries**

The decline in MTRs has already proven beneficial for competition and innovation in some markets. The entry of Free Mobile (Iliad) has considerably altered the market in France. The company gained 3.6 million customers in the first six months of operation – a much faster pace than new entrants in recent years. One of the components of Free’s offer is unlimited calls to fixed and mobile lines in France, plus some international destinations. In Israel, Golan Telecom has adopted the same model. Undoubtedly, such competitive market entry would not have been possible without the substantial reduction in mobile termination rates in recent years.

Policy makers and regulators are becoming increasingly aware of the importance of empowering consumers with tools that can facilitate switching their service provider in a seamless and inexpensive manner, such as number portability. The amendment of a European Union Directive, enacted in 2009, that provides consumers with the right to

switch mobile providers within one working day, has proven critical to market competitiveness in that area.

International mobile roaming

International mobile roaming services have attracted increasing attention from policy makers and regulators in recent years. Even though prices have experienced decreases, extremely high prices remain relative to domestic services for some international routes, especially for data services.

In February 2012, OECD countries adopted the OECD Council Recommendation on International Mobile Roaming Services, which set out a list of measures that countries can consider in order to achieve a more reasonable level of roaming prices and improve competition dynamics. Some of the measures proposed in the Recommendation are: to promote awareness of roaming services, their prices and of possible substitute services, for example, on the risk of uncontrolled data roaming connections or on available financial limits; to facilitate trans-national networks and alliances; to improve transparency in wholesale roaming markets; and, in the event that other measure do not work, to implement wholesale and/or retail price regulation.

National regulators lack the jurisdiction to regulate wholesale prices charged by foreign operators and, sometimes, have little motivation to do so regarding wholesale charges in their home countries, as this may only benefit foreign roaming roamers in that country. As a result, a surge of international mobile roaming agreements, or initiatives to explore whether these agreements are possible, can be observed (Table 2.12). These include the joint market investigation conducted by Australia and New Zealand, the Gulf Co-operation Council and South-East Asian Economic Co-operation (ASEAN), or agreements between Finland, Poland and Russia.

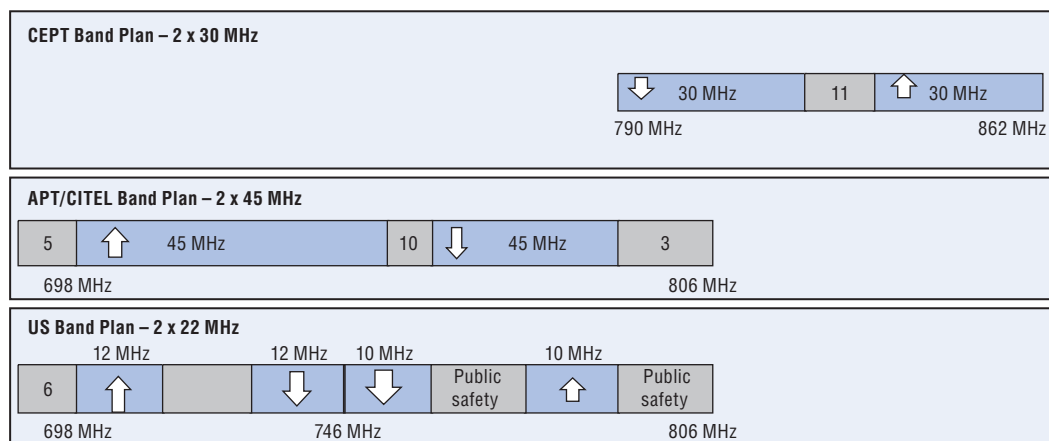
The roaming regulation of the European Union constitutes the most comprehensive set of provisions developed to date. In 2012, the European authorities amended this Roaming Regulation for the second time. It now includes regulation on voice and SMS as well as data roaming services, setting a price cap both on retail and wholesale prices. As such, in 2012, retail data roaming prices have been regulated for the first time. The new European regulation acknowledges the lack of competitive dynamics for roaming services and that there were little incentives for market players to launch competitive offers. This is reflected in the results with actual prices being set at, or very close to, price cap levels. In that regard, the new regulation included some structural measures, such as allowing MVNOs to benefit from regulated wholesale prices. In addition, the European Union took the decision to implement unbundling of roaming services from the mobile bundle, to take place in 2014. It also took the decision to allow a higher mark-up, in relative terms, between the regulated retail and wholesale prices.

In the changes made by the European Union it is noteworthy that provisions for separate sale of roaming services include obligations to allow MNOs in the visited countries to offer data services, based on the local break-out (LBO) mechanism included in 3GPP specifications for local data offloading, directly to visiting European customers. This means that roamers will have the possibility to choose a local provider of data services in the visited country. These measures are expected to bring more competition to roaming markets within the European Union area, and the experience will be followed closely by other parts of the OECD area.

Spectrum policy: Main trends

Spectrum resources, previously used for broadcasting, are currently being re-allocated for use in mobile communications and, especially, for wireless broadband services. This “digital dividend” has been examined by the International Telecommunications Union (ITU) in an attempt to harmonise the use of frequencies all over the world. In that respect, in Europe, the European Conference for Postal and Telecommunications Administrations (CEPT) has already attributed the 790-862 MHz band (800 MHz) band to wireless communication services. There are another two alternative frequency arrangements, for the use of mobile communications, corresponding to the APT/CITEL band plan and the United States band plan (Figure 2.6).

Figure 2.6. **Band plans for the digital dividend**

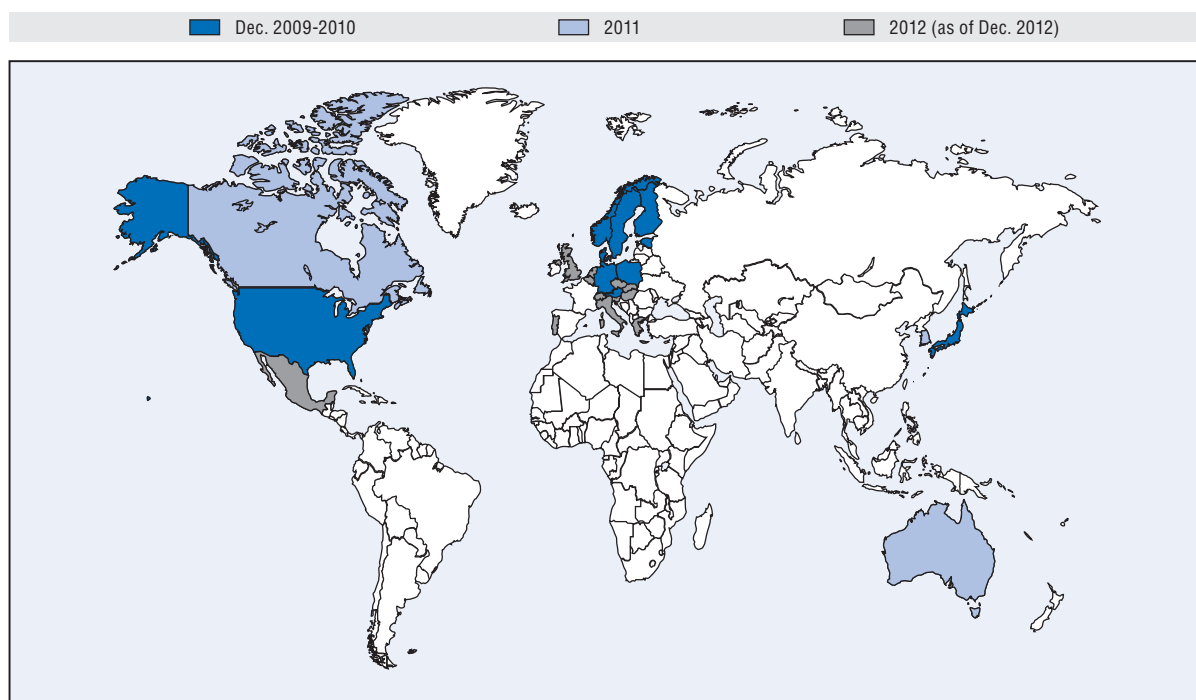


Source: GSMA.

StatLink  <http://dx.doi.org/10.1787/888932798601>

There is significant interest in making more spectrum available for mobile use in the UHF bands used for broadcasting, although this has to be balanced with continued demand for spectrum for broadcasting. Key decisions were taken at the ITU World Radiocommunications Conference (WRC-12), which took place in Geneva in early 2012, in relation to the 700 MHz band and discussions are ongoing in preparation for WRC-15. The availability of more spectrum for mobile in this frequency range would be beneficial for consumers, recognising the need for balance with broadcasting requirements, and increased harmonisation would be beneficial in terms of economies of scale for network devices and terminal equipment.

Notwithstanding this pending harmonisation work, LTE networks are being deployed and, in many cases, commercial services are already operational. According to the Global mobile Suppliers Association (GSA), there are to date 145 commercial networks operating in 66 countries, and 381 operators are investing in LTE networks in 114 countries. The state of deployment of LTE networks, including the starting date of commercial services for OECD countries can be shown (Figure 2.7). As of December 2012, 25 OECD countries have commercial LTE networks in service. Many more are expected to provide these services soon, depending on the availability of spectrum. In the United Kingdom, for example, Everything Everywhere (EE) has recently been allowed to “refarm” its 1 800 MHz spectrum to provide LTE services, given the availability of terminal devices that support LTE technology on that spectrum band.

Figure 2.7. **Launch date of commercial LTE services, OECD countries**

Note: This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Source: GSMA and OECD.

StatLink  <http://dx.doi.org/10.1787/888932798620>

A high number of spectrum tenders are being conducted in OECD countries. The aim is for the digital dividend frequencies and additional bands to be made available for mobile communications, with wireless broadband services at the forefront. A list of processes to award spectrum that have been initiated, completed or are in the course of being finalised can be shown (Table 2.13). These tenders do not only affect bands within the digital dividend, but also other bands that will be used for wireless communications, such as the 2.6 GHz band in Europe (2.5 GHz band in other regions), the 850 MHz, 1.9 GHz and 1.7/2.1 GHz bands in Australia and North America, or the 900 MHz band. Most countries have also undertaken refarming processes, thereby confirming their support for the technology neutrality principle and liberalising the adoption of different technologies for the bands involved (2G, 3G or 4G).

Between 2010 and 2012, virtually all OECD countries launched spectrum tenders. Austria, Germany and Mexico completed their auctions in 2010, while Belgium, Estonia, France, Greece, Hungary, Italy, Portugal, Poland, Spain and Sweden conducted spectrum auctions in 2011. Chile, Denmark and Japan, Switzerland tendered spectrum in 2012. Finally, Australia, Canada, Czech Republic, Finland, New Zealand, Norway, Slovak Republic and the United Kingdom are in different stages of the process of tendering spectrum resources, either at the assessment phase or at various milestones throughout the design and execution process.

It should be noted, however, that in many of these cases the bands will not be fit for use until their current licensees are migrated to other bands or somehow “refarm” the frequencies currently assigned to them, which may take some time. For example, even

though the Spanish spectrum auctions were completed in 2011, the 800 MHz band will not be ready for use for wireless communications services until 2014-15.

Spectrum trading is widely perceived as a useful mechanism that can allow more efficient use of this scarce resource. Although trading is increasingly permitted, market mechanisms have not always been used, as some entities prefer not to sell or lease unused spectrum resources. This is possibly because it is perceived as a strategic asset or because there was previously no incentive to do so. Some recent examples show this may be changing. In August 2012, Verizon completed a USD 3.9 billion purchase from several large cable companies of unused frequencies. The FCC and the Department of Justice (DoJ) cleared the transaction after substantial amendments to the initial proposal, aimed at preserving competition in broadband markets.

The convergence towards LTE and the importance of compatibility can be highlighted. Alongside traditional handset/operating systems manufacturers, new players such as Amazon, Apple, Google and Microsoft want to be able to take advantage of economies of scale and produce products demanded by global markets. Accordingly, if operators cannot support the most popular handsets demanded by customers they will risk losing market share to competitors. There may, of course, be other factors at work in different countries. The fees paid for spectrum licenses for 4G have been much lower than those paid during the years of the “dot-com bubble”. In Germany, for example, operators bid just over 10 times less for 4G than 3G spectrum licenses. Significantly, governments have not moved away from holding auctions, as a transparent tool for allocating spectrum. Rather, many believe that the market there has resulted in a more rational assessment of the value of spectrum. Ironically, demand for bandwidth is far more evident now than was the case for 3G auctions.

Whether lower spectrum fees have led to earlier investment, as argued by many industry players, is undoubtedly a consideration as they take decisions based on traditional risk and reward parameters. High license fees are likely most associated with risk, but so too can be the dangers of not proceeding in a competitive market. In addition the potential for rewards are sometimes undervalued.

Developments in selected countries

Brazil

Brazil’s telecommunications industry structure is partly a result of the liberalisation policy, which created three regional local telephone providers plus one long-distance operator. As a result, international long-distance services are dominated by Embratel (now owned by America Movil), while most national long-distance services are provided by TIM, Embratel and other carriers like Telefonica and Oi.

Brazil’s mobile telephony penetration is in line with OECD countries (119.2% as of end-2011) and the mobile market is dominated by four operators, most of which are owned by foreign companies: Vivo (Telefonica), Tim (Telecom Italia), Claro (América Móvil) and Oi (participated in by Portugal Telecom), all with market shares between 25% and 30%, except for Oi (19%). Cable television services in Brazil had long been underdeveloped, largely due to stringent licensing rules and a ban on telephone providers from providing cable television services, which constrained their development. Anatel, the industry regulator, removed these limitations in 2010 on the grounds of unmet demand for these services, and penetration has recently increased.

In 2012, Anatel imposed a ban on three mobile operators (TIM, Claro and Oi) from selling new mobile services, suggesting that they had underinvested and provided an unacceptable level of quality of service. These operators presented proposals on planned network deployments and upgrades to guarantee quality of service and Anatel lifted the ban. The Brazilian mobile market has been growing steadily in past years. In August 2012, Anatel launched a programme for measuring fixed broadband QoS, defining a set of indicators which have to be reported by operators with more than 50 000 active connections.

Brazil is playing a major role in the region's effort to improve backbone connectivity. It has put forward an initiative to deploy a regional fibre backbone ring, which has been submitted to UNASUR (Union of South-American Nations) and ECLAC (UN Economic Commission for Latin America and the Caribbean) for discussion. The plan could enable a significant improvement in international Internet connectivity. The project will include a 10 000 km-long fibre ring and will be managed by state-owned companies of the member countries of UNASUR. The aim is to overcome the present situation, where 80% of international Internet traffic, between countries in the region, has to be routed through third countries. It is projected that the new network could reduce cost and increase performance. The initiative should also decrease international connectivity prices for other countries in the region, such as Chile. In turn, this could contribute to reducing retail broadband prices and increasing broadband take-up, and to the development of high-speed broadband supply.

An important aspect of the Brazilian telecommunication market is the high level of taxes that are imposed on services. The Minister of Communications has expressed concerns about a tax burden as high as 43% for certain services. Changing the tax system in Brazil can be challenging as there needs to be an agreement between the federal governments and the states. For example, the ICMS (special) state tax may amount up to 35% of total phone bills. The Ministry argues that this burden prevents the industry from growing faster and being available to more users.

China

In terms of size and macroeconomic performance China is playing an increasingly important role in the world's economic landscape. The significance of its telecommunication industry is rising too. China is home to the world's largest mobile operator, China Mobile, with over 700 million customers. Every year, nearly 30 million new subscribers sign up for a fixed broadband subscription. This is about twice as many as the OECD area, though penetration rates are low compared to most OECD countries.

As in many countries, Chinese broadband customers have expressed displeasure regarding speeds and prices for services. In 2008 China passed an antitrust law, which is now being applied to the two largest fixed operators, China Telecom and China Unicom. This was the first antitrust probe for relevant state-owned enterprises (SOE). In November 2011, the National Development and Reform Commission (NDRC) launched an inquiry into these two operators, emphasising margin squeeze practices and underperforming interconnection services. As a result, both operators have committed to address these problems, improve performance and decrease prices. These inquiries were conducted by the antitrust authority. Responsibilities for interconnection agreements also fall under the powers of the Ministry of Industry and Information Technology (MIIT).

Since 2011, competition among international roaming services provided by China's three operators has increased substantially. China Mobile, for example, decreased its international roaming fee six times between 2010 and 2011. China's consumers roaming in many OECD countries can make local calls at prices lower or equivalent to those paid by local users. Prices to call back to China from these countries can be 10 times less expensive than a call in the opposite direction for a consumer from an OECD country. MIIT say that the lower prices are the result of successful negotiation with foreign operators to reduce wholesale rates. This may reflect increasing travel by consumers from China, but raises the question as to why similar rates seem unavailable between OECD countries with large amounts of travel. It also begs the question of why the benefits of these lower rates are not evident for OECD consumers travelling to China, given that the wholesale rates are likely to be reciprocal.

In March 2012, the local telecommunication authority of Zhejiang province directed China Unicom, Zhejiang branch, to refrain from offering and advertising its 2G free call service, which allows unlimited calls within its network. The operator's behaviour was said to be contrary to current regulations that prohibit price discrimination between on-net calls and off-net calls in China. This suggests that larger Chinese operators may be facing difficulties in retaining customers, in part due to regulation designed to assist smaller operators. In this context, international roaming services may be a tool to attract and retain customers if other instruments are not feasible.

India

India's telecommunication market is the second largest in the world in terms of total subscriber numbers. As of 2012, there were some 930 million mobile telephone subscribers and 31.5 million fixed line subscribers. The mobile market is among the most competitive with some 15 operators providing services and among the lowest prices globally. Broadband penetration is still low, however, at 1.2%.

There remains an extremely large divide between telephone densities in urban and rural areas in India. As of December 2011, there were 167.2 telephones per 100 inhabitants in urban areas but only 37.52 in rural areas. The government plans to take various measures under the Universal Service Obligation Fund (USOF) to extend networks to rural areas. The expansion of rural telephones is increasingly based on mobile technology.

By December 2011, 97.11% of Indian villages were covered by the Village Public Telephone (VPT) facility, some replacing the previous Multi Access Radio Relay (MARR), installed before 2002. Under an infrastructure-sharing scheme 7 353 towers have been set up across 500 districts in 27 states.

In November 2011, the government approved the National Optical Fibre Network project, which aims to provide broadband connectivity to 250 000 municipalities over approximately two years at a cost of USD 3.8 billion. This scheme will provide some 900 000 wireline broadband connections to consumers and government institutions and set up 28 672 kiosks by 2014. Wireless broadband infrastructure will provide broadband coverage to about 500 000 communities at 512 Kbit/s. In parallel, the government will provide broadband backhaul connectivity and plans to deploy a network available to third-party service providers on a non-discriminatory basis.

India has a vigorously competitive market for mobile services, based on very low termination rates, which have contributed to boosting usage. In this regard, the regulator

TRAI has proposed to further reduce mobile termination rates from USD 0.037 per minute to USD 0.019 per minute in 2012, down to zero by 2014. In India, the interconnection system is based on Calling Party Pays (CPP). The low rates have enabled high usage in the range of 400 minutes per month per mobile user, largely above the OECD average of 136 minutes in 2011.

One of the latest developments in Indian telecommunications was the revocation of 122 mobile licenses awarded in 2008, including those of Unitech Wireless (participated in by Norway's Telenor), Etisalat, Russia's Sistema, Loop Telecom and Tata Teleservices. These were cancelled on the ground that the awards were arbitrary and unconstitutional. The licenses will be reauctioned by TRAI.

Indonesia

The Indonesian telecommunications industry is characterised by a highly competitive mobile market. Strong price competition, gathering momentum from 2007, has contributed to a steep rise in mobile subscription numbers per 100 inhabitants. Subscriber figures rose from 40.2 per 100 inhabitants in 2007 to 91.7 in 2010, although these numbers may include a substantial proportion of multiple SIM users, as in other countries. The government has favoured price-based competition and has implemented a series of policy initiatives, such as: lowering interconnection fees, issuing a relatively high number of mobile licenses (11 mobile operators in 2009), and promoting infrastructure sharing among operators.

Indonesia has a much lower penetration of fixed broadband access. In 2010, the ITU placed the country at 0.8 broadband subscriptions per 100 inhabitants. The geography of the country with population spread across some 6 000 islands is challenging in this respect. A severe digital divide exists between urban and rural areas.

Taking into consideration the existing challenges for Internet access, WiMAX licenses were awarded to several operators and commercial services started in 2010, with the aim of expanding broadband coverage and decreasing prices. Under the existing universal service framework, operators can receive financial aid from the government-managed universal service fund with their obligation of providing rural areas with basic telecommunications services including low-speed Internet access. The government has also initiated an optical fibre backbone development project called "Palapa Ring", consisting of 35 280 km of undersea optical fibre and 21 708 km of underground fibre optics. By 2012, the project had established seven rings covering 33 provinces and 460 districts across Indonesia.

South Africa

In South Africa, fixed-line telecommunication and broadband penetration rates are low relative to the OECD area. For fixed telecommunication lines the rate stood at 8 per 100 inhabitants in 2011, while the rate for broadband subscriptions per 100 inhabitants was 2%. By way of contrast there were 127 mobile subscriptions per 100 inhabitants. If the use of multiple SIMs is taken into account some estimates put the penetration rate at 80% of the population. GSM mobile coverage reaches 98% of the population.

In 2007 the Marwala Commission recommended the implementation of local loop unbundling (LLU). The regulator ICASA has subsequently endeavoured to develop a policy and regulatory framework that would create the necessary conditions for LLU. Throughout 2010 and 2011, ICASA advanced the process, but has encountered fierce opposition from

the incumbent and has been subject to court challenges. This is despite the fact that, at a 2% penetration rate, the copper local loops are underutilised. Some new market entrants have also filed complaints before the Complaints and Compliance Commission (CCC), an independent body related to the regulator ICASA. One complaint resulted in an instruction to ICASA to specify the terms and conditions of the Facility Leasing Regulation, one of the instruments developed as a framework for LLU. ICASA may also conduct a full market investigation on LLU implementation, but the process could take several years.

South Africa also plans to replace analogue broadcasts with digital terrestrial television by 2015. The spectrum resources released as a result of the migration process could be used for communication services such as wireless broadband. The process itself has experienced delays, but these may have certain advantages; for example, the ITU plans for digital dividend bands are becoming clearer, which would enable release of the 800 MHz and 700 MHz shortly after the analogue switch off.

Wireless broadband infrastructure may be especially important for South Africa, given the state of development of fixed communication infrastructure and the low utilisation of available facilities, such as copper local loops. In a positive development, international connectivity in South Africa has increased substantially. This is due to the development of new submarine fibre cables deployed across the East and West African coastline (e.g. EASSy SEACOM, WACS), though this process is ongoing.

The following tables are available at www.oecd.org/sti/broadband/communications-outlook.htm:

- Table 2.1. Number of communications providers by country, mid-2012
- Table 2.2. Fixed line subscriber market share of new entrants
- Table 2.3. Market share of mobile network operators in the OECD, end-2011
- Table 2.4. Number portability: number of fixed and mobile numbers ported, 2011
- Table 2.5. National treatment for foreign-controlled enterprises in telecommunications
- Table 2.6. Government ownership of public telecommunication network operators
- Table 2.7. Local loop unbundling
- Table 2.8. Number of unbundled local loops
- Table 2.9. Net neutrality
- Table 2.10. Quality of service
- Table 2.11. Mobile network interconnection
- Table 2.12. Policy developments in international mobile roaming services (since 2010)
- Table 2.13. Spectrum tendering processes



From:
OECD Communications Outlook 2013

Access the complete publication at:
https://doi.org/10.1787/comms_outlook-2013-en

Please cite this chapter as:

OECD (2013), "Recent communication policy developments", in *OECD Communications Outlook 2013*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/comms_outlook-2013-4-en

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org. Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Center (CCC) at info@copyright.com or the Centre français d'exploitation du droit de copie (CFC) at contact@cfcopies.com.