OECD Communications Outlook 2011

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Foreword

This report, the eleventh in a biennial series, was prepared in the context of the OECD's work on the analysis of communication policy in member countries.

This edition of the OECD Communications Outlook *was drafted by the staff working in the OECD Directorate for Science, Technology and Industry, including Sam Paltridge, Agustín Díaz-Pínes, Karine Perset, Pierre Montagnier, Kayoko Ido, Frédéric Bourassa, Cristina Serra-Vallejo and Alejandro Mantecón Guillén as well as John Houghton from Victoria University who drafted Chapter 6 on broadcasting and audiovisual content. They are grateful for the contribution of information by telecommunication carriers and to national delegations which responded in 2010 to an OECD questionnaire relating to industry regulation and data.*

The assistance of Geoff Huston from APNIC, André Lange from the European Audiovisual Observatory, Screen Digest, CISCO, Netcraft, the International Telecommunication Union, ZookNIC, Akamai and CAIDA is gratefully acknowledged where they provided data. The pricing comparisons are undertaken in co-operation with Teligen Ltd. and quarterly updates of some pricing indicators using the OECD methodology are available directly from Teligen Ltd. Many of the other indicators in this report are available in electronic format from the OECD Telecommunications Database 2011, *covering the period 1980-2010.*

The draft of this report was presented to the OECD Working Party on Communication and Information Services Policy at its meeting on 6-7 December 2010. The Committee for Information, Computer and Communications Policy subsequently recommended that the report be made available to the general public.

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50th OECD Anniversary

Communication Technologies: From Luxury to Ubiquity

In 2011 the OECD celebrates its 50th anniversary, and to mark the occasion this chapter looks briefly at how the communications sector has evolved over these years, how the OECD contributed to this evolution, and the issues emerging in the 21st century.

In 1960, only three countries – Canada, Sweden and the United States – had more than one phone for every four inhabitants. For most of what would become OECD countries a year later, the figure was less than 1 for every 10 inhabitants, and less than 1 in 100 in a couple of cases. At that time, the 84 million telephones in OECD countries represented 93% of the global total. Half a century later there are 1.7 billion telephones in OECD countries and a further 4.1 billion around the world. More than two in every three people on Earth now have a mobile phone.

The transformation of access to communication services during the lifetime of the OECD has been little short of extraordinary. When the Organisation was established in 1961, telephones were widely considered a luxury, and even if a business or a consumer had a line, they were expensive. Long distance or international calls were even rarer. In fact when CANTAT, the transatlantic telephone cable between Canada and Britain, was inaugurated in 1961, the event was considered so historic that the first call made was from Canadian Prime Minister John Diefenbaker to Queen Elizabeth.

In most countries, services were provided by a postal, telegraph and telephone (PTT) arm of government. Investment in these networks competed for capital with other calls on public expenditure, such as health and education. Faced with these higher priorities, governments not only under-invested, but frequently treated their monopolies of telecommunication services as a source of income that could be exploited instead of direct taxes.

There were dissenting opinions, and studies showing that telecommunication networks could be associated with economic growth. It was also noted that two of the three countries with the highest penetration of telephones, Canada and the United States, had private ownership of operators and greater incentives to re-invest revenue earned from providing services. However, seeking greater efficiencies in expanding services was not always the basis of government policy and there were strong entrenched interests opposing necessary reform.

In 1969 William Melody, an economist at the United States' Federal Communications Commission, suggested at an OECD meeting that countries introduce competition to increase market efficiency – with little support around the table. It would take over a decade and the publication in 1983 by the OECD and the International Telecommunication Union (ITU) of *Telecommunications for Development*, for liberalisation of telecommunications markets to gain wider support.

The report challenged thinking that had dominated in the 1960s and 1970s, exemplified by the so-called Jipp curve. The curve, derived by Siemens engineer August Jipp in 1963, shows the relationship between per capita income and telephone penetration. To paraphrase its conclusion: if countries were above the curve, they had invested too much and if they were below the curve they had invested too little in their networks. Poorer countries did not have to invest as much as richer countries in telephony; they had to wait until the per capita income increased. Presenting the curve like this does not do justice to Dr Jipp's insights, but that was how his work was used by policy makers.

The OECD and ITU looked at selected countries around the world and showed that viewing telecommunications as a luxury needed to change, and that increasing the number of telephones would have significant benefits for economic and social development. The study stated that the question facing planners in most countries, and especially in the developing countries, was not so much that of deciding how much to invest, but what would be the price of under-investing.

In the early 1980s, the first countries to move on liberalisation were the United States, followed closely by Japan and the United Kingdom. All three countries liberalised long distance and international telecommunication markets – although monopolies largely remained for local services. At that stage, while most governments were not yet prepared to open basic services to competition they were willing to liberalise what were then called "value added" services. This proved critical for the development of data services and laid the foundation for demand that would eventually lead to the commercialisation of the Internet.

Meanwhile, reform was gathering pace in other OECD countries but more was required. Countries with PTTs began by splitting management and operations from government departments, as well as separating the responsibilities for posts and telecommunications. Policy remained the responsibility of a Ministry, but with the introduction of competition, an independent regulator was established in countries with no tradition of private sector operators. Along with liberalisation, a growing number of countries also privatised the telecom entity that had come from the PTT as a means to attract more investment.

Still, the price of an international call continued to be very high and needed to be addressed at the international level. For example, the rates telecommunication operators charged each other to complete call connections were far above cost, but could not be addressed by a national government or regulator. For the OECD the barriers to trade and travel were self-evident, though one of the first challenges was to reach a consensus that telecommunications were a traded service.

Market liberalisation

In the 1990s, liberalisation was extended to include local services. Here, policy makers took advantage of the convergence between telecommunication and cable television networks to introduce competition. They also recognised that mobile wireless services, which had largely been a business tool, was beginning to be increasingly adopted by consumers. In analyses like the 1996 "OECD Reflections on the Benefits of Mobile Cellular Telecommunication Infrastructure Competition", the OECD argued something that seems obvious now: by ending monopolies and allowing different service providers to compete, prices would fall and technological progress would be encouraged. This turned out to be the case, and proved crucial in the development of the Internet, the greatest disruption the telecommunications world would experience in more than a century of existence.

The Internet had been an academic experiment that slowly but steadily connected more and more universities, research establishments and then companies. In many ways, it was the antithesis to the policies pursued by telecommunication operators, who were designing and building systems with their own networks at the core, determining what services could be run over these networks. New applications or equipment could only be offered after the telephone company had approved them and made any necessary changes to installations. The Internet pioneers assumed that the network would have to be "dumb" and not make any assumptions as to what type of traffic it was carrying or who the user was to be. This allowed anybody with the technical know-how to design a new service and to test it.

Internet technology would have had much less impact if it had not been for liberalisation of the telecommunications sector – first value-added services and then infrastructure. Liberalisation allowed companies to lay infrastructures that competed with existing networks and gave firms access to each other's territory. As a result, when computers and modems had become fast and cheap enough to be able to support Internet services like the World Wide Web, there was already an infrastructure in place that was able to support it and competition between the providers of these networks.

The first Internet access plans had pricing that mirrored phone calls – sometimes with separate clocks ticking for a range of pricing elements. Competition created more attractive packages and drove the technological developments that have brought us the always-on, broadband Internet. The effect has been so great that today 20 households with average usage generate as much traffic as the entire Internet carried in 1995.

Today, anyone who wishes to publish content or offer a service can use any type of business model. This can be contrasted to some early information services that put the network owner in charge of regulating who could offer content and under what terms. Innovators can now reach large customer groups on a global scale, without having to negotiate access to "walled gardens". This allowed the creation of global brands and services like Skype, Google, eBay, YouTube and countless others.

One of the reasons these initiatives proved so successful is that the OECD had prepared the ground beforehand with all stakeholders. In respect to infrastructure, this included work on domain names and IP addresses, peering and transit, as well as a range of public policy issues related to Internet governance.

The OECD and the Government of Canada organised a Ministerial Conference on electronic commerce in Ottawa in 1998, just a year after Amazon issued its initial public offering of stock and before most of today's biggest sites went public. Governments from the then 29 OECD countries and 11 non-members, the heads of major international organisations, industry leaders, and representatives of consumer, labour and social interests, came together to clarify their respective roles, discuss priorities, and develop plans to promote the development of global electronic commerce.

At the Ottawa Ministerial, the business community acknowledged a process that had started with the recognition of telecommunications as a traded service and carried this approach to its logical conclusion with the completion of a World Trade Organisation (WTO) agreement in 1997. OECD work had significantly contributed to knowledge and understanding of the economics of telecommunication markets, thereby facilitating the successful conclusion of the WTO Agreement.

Broadening the future

Broadband plays a key role in supporting the growth of the Internet economy, providing the access ramps to the Internet. Policy makers have placed high priority on attaining national coverage of broadband using a range of different policies and technologies. In such an innovative, fast evolving domain, timely, comparable information on experiences and best practices is vital in moving forward, but little or no objective information existed. With this in mind, the OECD started designing indicators to track developments and gathered evidence to assist governments in benchmarking performance, leading to a recommendation on broadband development in 2004.

Metrics will continue to play an important role in assessing the effectiveness of policies. In particular, the ability to benchmark national developments against similar developments in other countries can help put domestic growth and economic activity in perspective and can assist in better understanding the effects of the Internet on the economy.

As the data in this Communications Outlook show, the pace in broadband growth has been exceptional. New developments resulting from the convergence of broadcasting and the Internet, the emergence of cloud computing and the eventual shift to "smart" infrastructures will place further pressure on existing resources. Stimulating private investment to ensure that sufficient capacity is made available and affordable will be fundamental step, though not without challenges in areas with low population densities.

To meet the goal of national coverage, governments will also need to consider demand-side policies where their role can be significant given their ability to upgrade and invest in areas such as health and education services, using the Internet as a platform to boost efficiency. Smart electricity grids and smart transportation systems using high-speed Internet applications can also help in meeting policy objectives, while encouraging infrastructure investment.

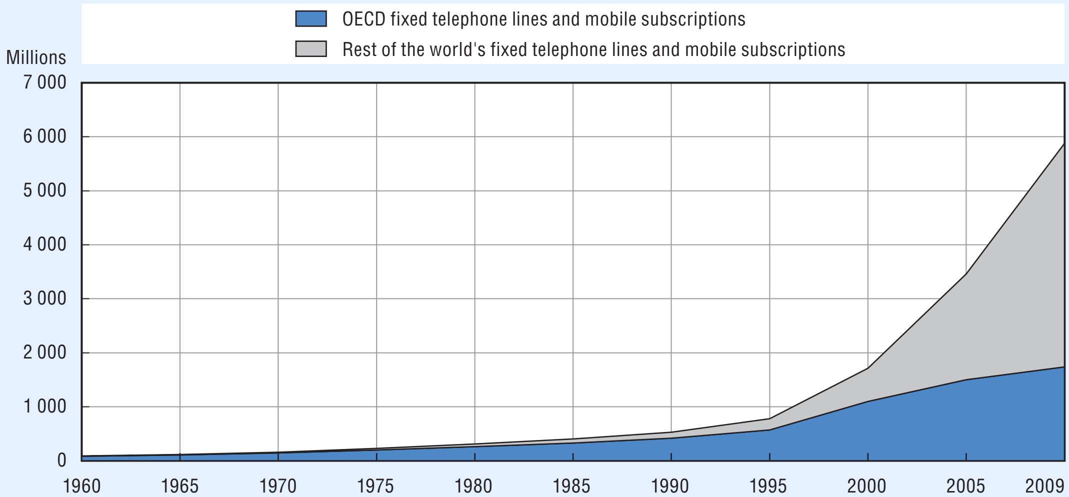
Today, there is widespread consensus that the openness of the Internet has been a key factor in stimulating innovation and economic growth, but there is also concern that openness is eroding the dynamism of the Internet and related economic activity. Industry initiatives and co-regulatory initiatives by industry and government have in many cases facilitated access to and use of the Internet. However heavy-handed government interventions can cause harm. For this reason, it is important to adopt common principles to help policy makers set the parameters for any action taken, and work towards building trust in the Internet economy both at national levels as well as in cross-border activity. This has to include Internet intermediaries, who have been important in bringing together and facilitating transactions between third parties on the Internet. It has become increasingly important to clarify their roles in the context of public policy, their legal responsibilities and related liability limitations – a task well suited to the OECD's multi-stakeholder approach.

The Internet Age

When a technology is used to characterise an era, it is either because it revolutionised production, as in the Steam Age, or because it captured the imagination, as in the Space Age. Internet does both, and has become a shorthand for describing a host of activities and applications. There is, however, much more to come. As Vint Cerf, one of its pioneers is fond of saying, 99% of applications for the Internet have yet to be invented. Some of these developments will be technical, but many of them have a strong link to policy and economics. Only in efficient markets, where businesses have flexibility and consumers are empowered, can such developments flourish.

The 2008 OECD Ministerial meeting on the future of the Internet economy organised in Seoul, Korea, recognised this. The meeting looked beyond the technical issues of the Internet itself to consider the broader social and economic trends shaping the development of ICT, and how ICT in turn could improve well-being.

By offering a platform for social media and facilitating mass communications, communications are playing a growing role in shaping world events. Indeed the Seoul Declaration, issued at the end of the 2008 OECD meeting, insists on "the free flow of information, freedom of expression, and protection of individual liberties, as critical components of a democratic society".



Note: For All OECD countries except Czech Republic, Estonia and Slovenia.

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OECD work carried out under the auspices of the Committee on Information, Computer and Communications Policies, and in particular, the Working Party on Telecommunications and Information Services has significantly contributed to knowledge and understanding of the economics of telecommunications markets, thereby facilitating the successful conclusion of the WTO Agreement.

Business Statement to the Ottawa Conference, "A Borderless World: Realising the Potential of Global Electronic Commerce", 8 October 1998.

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Executive Summary

The eleventh biennial *OECD Communications Outlook* examines recent developments in the communications sector, which has emerged from the global financial crisis (GFC) with a resilience and underlying strength reflecting its critical role in today's economies. This latest edition covers developments such as the emergence of next generation access (NGA) networks and the imminent exhaustion of unallocated IPv4 addresses, and aims to provide an overview of efforts on the part of countries to promote competition and foster innovation in communication markets through regulation. It also examines the issues surrounding broadcasting markets, Internet infrastructure, communications expenditure and use by households and businesses, and trends in trade in telecommunications services.

The telecommunications industry has proven resilient

The telecommunications industry has fared relatively well during the crisis. Mobile communication markets continued to demonstrate resilience, but the overall amount of telecommunication revenue experienced a decline of 5.1%: the market was valued at USD 1.16 trillion in 2009, compared to USD 1.17 trillion in 2007 and USD 1.21 trillion in 2008.

This edition of *Communications Outlook* is the first to examine the effects of the crisis. Firms headquartered inside and outside the OECD area differed in their experiences. While revenue fell in both areas during 2009, firms headquartered in OECD countries increased their net income, despite an overall decline in revenue.

The resilience of communication markets can be traced to a number of reasons: long contract durations, the emergence of bundled offers, and the fact that communication services are increasingly perceived as non-discretionary spending items. Households seeking to reduce expenditure seem to be economizing in other areas, at least as a first measure. The increasing prevalence of bundled services has played a role in this shift by reinforcing customer loyalty and reducing churn – particularly beneficial for operators during economic downturns. Finally, the experience of the dotcom bubble meant that telecommunication firms were better placed to meet the challenges of the crisis.

NGA networks are in a critical phase of development

Some consider the shift to next generation access (NGA) networks a "once in a generation" decision as the impact on competition dynamics and market structures will likely be spread over more than a decade. Previous comparable infrastructure roll-outs (the public switched telephone network, cable television networks) were mostly deployed during the monopoly era, when little attention was paid to the resulting effects on competition. A key question is then whether multiple fibre networks will be able to compete in urban areas and whether one, at most, may be economically deployed in more sparsely populated regions. Whether wireless access networks provide a cost-effective and competitive alternative in those areas, or continue to be predominantly a complement, remains to be seen.

There may be dissatisfaction among certain stakeholders with the current pace of infrastructure upgrading or new deployment. Key debates in OECD countries surround how and when public intervention to attain policy objectives is warranted, and which regulatory settings best promote private investment and competitive choice for consumers. In these cases, careful analysis should be undertaken to ensure that public investment does not result in reduced competition. For example, the choice of topology in NGA networks plays a critical role in providing regulators with adequate tools to enforce competition in cases where there is insufficient alternative infrastructure. There may also be economic and technological challenges to unbundling fibre networks, contingent on the technology option and interconnection topology chosen. The future implications of these choices need to be taken into account.

The emergence of NGA networks has foregrounded the debate on vertical separation of telecommunication networks, previously undertaken in utilities such as electricity networks. Governments may use vertical separation, either structural of functional, as an instrument to encourage competition; this has recently been the case in some OECD countries.

Boost in mobile broadband services and the need for spectrum resources

Mobile broadband services are becoming increasingly popular in the OECD area and smartphones already represent a significant share of handsets in many countries. This boost has been fuelled by inexpensive, flat-rate mobile data plans. Mobile broadband is among the areas where growing revenues are expected. The launch of tariff plans better suited to customers has stimulated growth in data use, in conjunction with the success of "application stores", which have created a business model that encourages the availability of content and new services.

Increasing traffic on mobile networks may reduce network performance in the busiest areas and times of day, requiring operators to invest in network capacity to allow for faster speeds and a higher level of simultaneous use. Operators are also developing tariff options to better manage network use and user requirements. Commercial deployment of Long-Term Evolution (LTE) technology has also begun with initial deployments In Sweden and Norway at the end of 2009, and WiMAX-based fourth-generation (4G) services in the United States. On the policy and regulatory side, the key issue is how to encourage investment and competition to meet the needs of users.

Newly available spectrum resources, such as those released by the digital dividend, should play a role in accommodating the growing demand for mobile data services. The opportunity to benefit from these resources is clear. Furthermore, lower spectrum bands provide good transmission capabilities and require fewer base stations to deploy in a specific region, making them especially suitable for rural areas.

The supply of IPv4 addresses runs out in 2011

The Internet Assigned Numbers Authority (IANA) assigned the last five unallocated IPv4 address blocks to the regional registries (RIRs) in February 2011. Although the RIRs can still allocate their remaining addresses, depletion is quickly approaching, and is expected in mid-2011.

The Internet was originally designed as an experimental research network, not a general purpose, world-wide network. The version of the Internet Protocol in current use, IPv4, is insufficient to accommodate present and future needs for address space. This shortage has been accelerated by mobile devices, always-on broadband connections and virtual hosts that increase the need for IP addresses.

Over the past two decades, the shortage has driven the development of various technological solutions and techniques aimed at maximising the efficiency of the current pool of IPv4 addresses (*e.g.* Network Address Translators). Nonetheless, the implementation of IPv6 is the only long-term solution able to ensure the capability of the Internet to connect billions of people and devices. IPv6 was designed to provide a vastly expanded address space. However, IPv6 represents only a very small portion of the Internet, despite experiencing very strong deployment growth. In early 2011, only 8.3% of routed networks were able to handle IPv6 traffic. The reasons for modest deployment of IPv6 include the associated costs, lack of backwards compatibility with IPv4, and the weak business cases for migration to IPv6. There is, nonetheless, increasing interest in promoting policy initiatives to raise awareness of IPv6 and to encourage IPv6 research.

Broadband prices decline slightly while speeds grow

Between September 2008 and September 2010, the price of a selected broadband connection fell by an average of 5% for cable and 2% for DSL year-on-year across the OECD, while the average download speeds of offers increased between 15% (DSL) and 20% (cable) per annum.

The trend towards increasing speeds is underpinned by infrastructure upgrades, based on the roll-out of fibre infrastructure and the upgrading of existing DSL and cable networks. Despite most fixed broadband offers having no restriction in terms of data caps, some 29% of offers surveyed included caps, down from 36% in 2008. Data caps are much more common for mobile broadband offers where capacity is more limited. Fixed broadband networks generally follow the opposite trend: increases in entry-level data allowances have taken place in some countries, where smaller data caps of several hundreds of megabytes per month are no longer present.

Over the last two years an increasing number of operators have launched broadband services with faster download speeds. In September 2010, at least one operator among those surveyed advertised broadband service with 100 Mbps and above in 23 countries of the OECD area. This statistic should be taken with caution, however, as actual speeds are usually much lower than those advertised.

The growth in take-up of broadband services has seen consumers become increasingly aware of the quality of service they are provided with, while increasing attention is being paid to the information used to inform stakeholders. As a result, certain governments and regulators in the OECD area now require operators to provide information about the quality of service, while some operators and governments are launching web-based measurements sites.

Prevalence of triple and quadruple play bundled offers

Communication services are now frequently sold as mixed bundles where the consumer chooses between purchasing a stand-alone service (*e.g.* broadband) or a bundle with a significant reduction to the sum of stand-alone prices. This may benefit consumers by shifting their interest from a high-valued to a less-valued element, and by providing additional benefits such as unified billing, integrated services or customer assistance.

However, the complexity of some bundled offers makes them increasingly hard to interpret and poses additional challenges for consumers attempting to compare prices and make informed decisions. In addition, bundling may decrease the ability of users to switch providers or drop a service.

Bundled offers reflect increasing convergence in communications markets, where virtually all services may be delivered over an IP-based broadband connection. Triple-play offers are present in virtually every OECD country and fixed voice, broadband and television services may be purchased separately or as part of double and triple-play offers. The availability of television services is sometimes contingent on the extent to which operators have upgraded their networks. Integrated quadruple-play offers (triple-play plus mobile services) are less widespread. Few operators offer a full convergent package in one subscription due to the need for a mobile subsidiary or alternative arrangement, or due to prospects of higher revenues from separate fixed and mobile offers.

Mobile subscriptions grow: new devices and business models

Mobile access is the primary communication access path in the OECD area, and the total number of mobile subscriptions reached 1 257 million in 2009. While still increasing, the growth rate has slowed as the compound annual growth rate fell from 46% by the end of the 1990s to only 5% between 2007 and 2009. Most of world growth in mobile subscription now comes from developing countries. The mobile subscription penetration rate in the OECD area was 103% in 2009.

The growth of the application model is causing profound transformations in business models in conjunction with the use of new devices such as smartphones and tablet computers. The market size and reach of these applications is starting to be comparable with traditional television counterparts. This implies a significant potential for advertising revenues.

Another recent trend is “sponsored connectivity” business models. These forego the direct relationship between customer and network provider, with service providers paying directly for the network connection. Examples of sponsored connectivity include e-book readers and GPS services. ICT devices are increasingly equipped with direct connections to mobile networks, which contribute to the amount of traffic handled by these networks and encourage infrastructure upgrades.

Broadcasting and audiovisual content: a broader range of devices and the DTT switch-over

All OECD countries have made public their plans for the transition to digital terrestrial television (DTT), which will involve the switch-off of analogue broadcasts. More than 10 OECD countries have already completed this transition and the European Union has set a target of 2012 for the cessation of analogue transmissions.

One of the outcomes is the release of significant spectrum resources ("the digital dividend"), which allow for broad territorial coverage and very good reception inside buildings. This constitutes a unique opportunity to enhance access to communication services and boost mobile broadband services, which require significant spectrum resources. Various OECD countries are setting up auctions to make available this resource as an opportunity to expand wireless access and service quality.

Other implications of the digital switch-over include the potential to broadcast HDTV channels and launch new channels, which broadcasters are using to target specific audiences. Cable and satellite television broadcasters are responding by launching new television packages that address demand for targeted programmes. The total number of national channels in all the European OECD countries rose from 816 in 2004 to 2 529 in 2009. Another outcome of increased channel availability is audience fragmentation. This poses new challenges to broadcasting revenue models and encourages broadcasters to reconfigure their business models, as well as intensifying the inter and intra-platform struggle for revenue sources.

Communications, economic growth and social development

Communication technologies and broadband, in particular, are increasingly perceived as a critical factor in social and economic development. They provide the underlying connectivity for a range of innovative applications in areas like smart energy, electronic health services, e-government, and so forth.

Fostering competition and innovation plays a key role in making services available to consumers and business at inexpensive prices, as well as providing adequate quality of service levels. Liberalised telecommunication markets have a strong record in OECD countries, as regulatory frameworks have achieved a certain degree of maturity. They are now at a crucial point in their development, as the evolution towards NGA may have an impact on market structure in the decade to come. Policy makers and regulators should encourage investment, innovation and competition at all levels of value chains across the communications industry.

Measures providing an incentive to deploy communication infrastructures and achieve efficient competition should be complemented by broader demand-side initiatives, which increase the incentive of consumers and businesses to use communications services, create new business models, and then integrate these into their daily lives.

Chapter 1

Main Trends

The communication services industry has fared relatively well during the global financial crisis. In part, as has been discussed in previous editions, the industry's experience in, and emergence from, the "dotcom bubble" has placed it in a much stronger position to meet recent challenges. Certainly, parts of the industry have characteristics – similar to other utilities – that make it more resistant to financial downturns. That being said, the industry's resilience must also be attributable, at least in part, to its need to deal with extremely rapid commercial and technological changes.

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.

In 2010, the communications industry was barely recognisable from a decade earlier. At the turn of the century, very few Internet users had broadband connections. Today, Internet dial-up services are extremely rare, and are used mostly in geographical areas of OECD countries where no other option is available.

By 2009, there were more than 285 million broadband subscriptions across the OECD area, a compound annual increase of 40% over the decade. The technologies used to provide these connections were transformed, first by advances in copper (telecommunication) and cable (television) networks, and subsequently by the application of fibre optic technology.

Similar transformations are now taking place with wireless communications. In 2000, the family of standards that comprise so-called "3G" networks had yet to enter into preliminary commercial trials. Today, the LTE (Long Term Evolution) networks developed from 3G are being deployed.

Time and distance diminished over the last decade as better service for lower prices spread across the OECD area. Flat-rate, as compared to usage-based fees, grew in popularity. Bundled offers, which offer converged double, triple and even quadruple play (voice, data, television and mobile services) packages, had a significant effect on pricing.

These changes can be as rapid as they are transformative for communication business models. Consider, for example, that in less than three years the number of e-books delivered via fixed and wireless networks, and sold by leading online retailers in the United States, has outpaced the sales of hardbacks and paperbacks delivered through the mail or couriers. Moreover, e-books can now be sent to a range of devices, which may be located in almost any country around the globe.

In terms of business models, the traditional relationship between the wireless network provider and the consumer may no longer be direct. Whether pertaining to e-books, games, GPS navigation or some other product or service, the "sponsored connectivity model" is replacing the direct relationship between a consumer and a wireless carrier. Consumers pay for connectivity and may not be aware of the identity of the entity providing the network. In the future, this model may well be expanded into so-called machine-to-machine (M2M) communications.

Sponsored connectivity is one example of how value chains are changing, with a greater separation between wholesale and retail in the provision of fixed and wireless services. The entity that provides the infrastructure is no longer necessarily the same entity that performs functions such as customer acquisition, management and billing, and more generally, the user interface. Examples include Amazon's e-book reader and Apple's tablet computer. A consumer might use a Kindle 3G to access the World Wide Web or an iPad 3G to make a call using Skype. In the United States, Amazon and Apple, rather than AT&T provide the customer interface, even though AT&T provides the network infrastructure.

As a result of these changes, the first telecommunication carriers have begun to report subscriptions for conventional connections, whether their own customers or resellers (*e.g.* mobile virtual network operators), alongside new categories such as "device subscribers" or "M2M subscriptions". At present, these subscriptions are recorded in terms of the overall number of ways consumers use to access networks (Figure 1.1). The trend here shows a continual increase in the number of overall communication access paths, even during the global financial crisis (GFC).

This edition of *Communications Outlook* is the first to explore the effect of the crisis. Three key areas are examined: the effects of the crisis in terms of communication industry revenue (Chapter 3); the trend in the number of subscriptions to communication services (Chapter 4); and developments in international trade (Chapter 9).

Revenue trends for the largest 100 global telecommunication firms constitute a key indicator (Figure 1.2). This includes firms offering services such as telephony, Internet, broadband access (*e.g.* cable television networks) and so forth, and covers all countries of the world. Equipment manufacturers are excluded. These data reveal that, between 2000 and 2009, these firms experienced a compound annual growth rate (CAGR) of 8% in terms of revenue and a CAGR of 12% in terms of net profit.

Figure 1.1. **Access growth in OECD regions, 1997-2009**

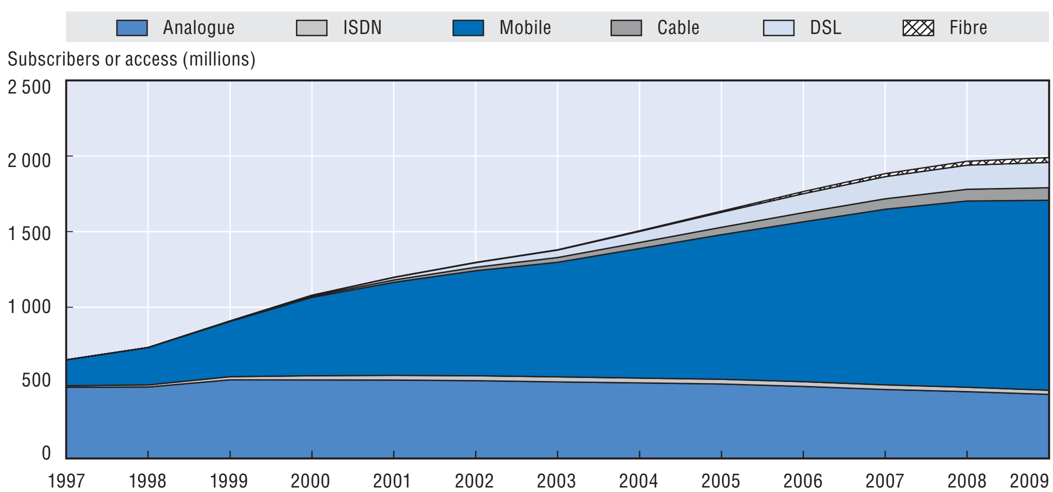

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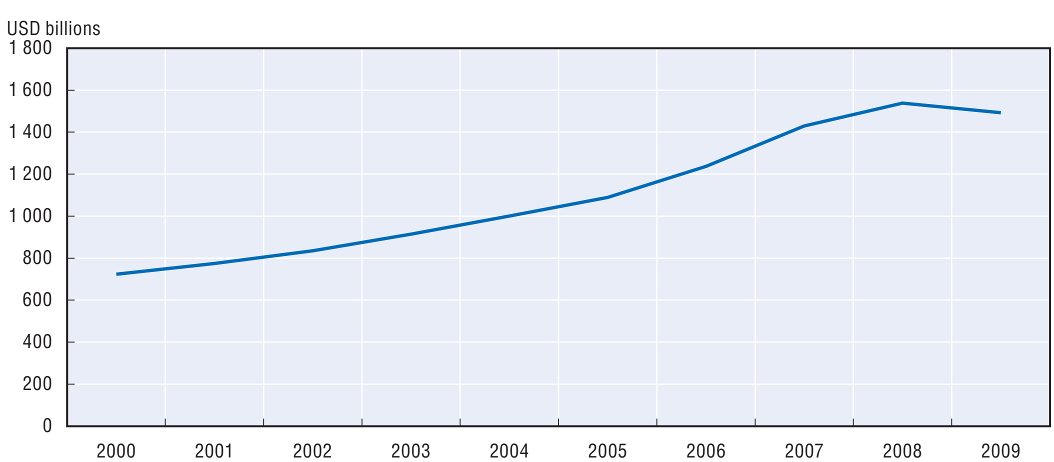
Figure 1.2. **Communications revenue for the largest 100 global firms, 2000-09**



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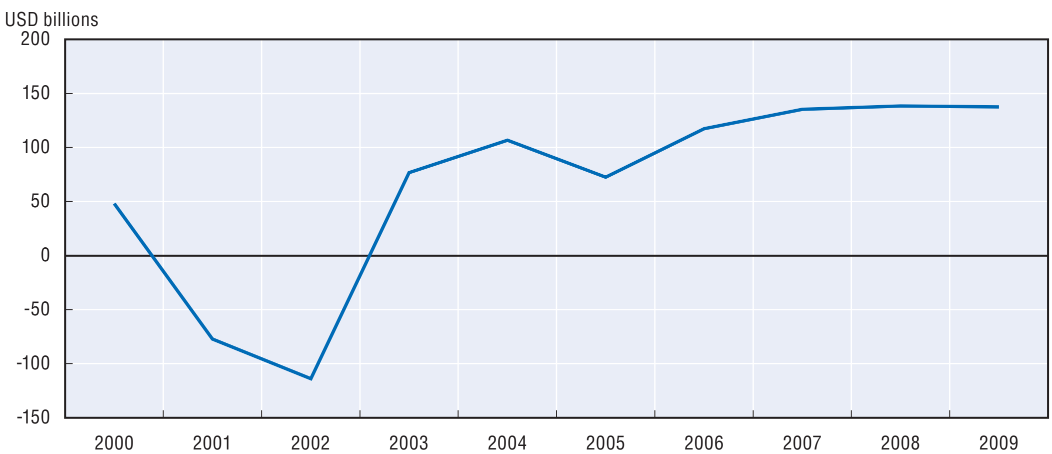
During this time the industry experienced two global financial crises. The first occurred between 2001 and 2003 in the aftermath of the dotcom bubble. The second covers the period from September 2008 through 2010, and is referred to here as the crisis. The results of the crisis are evident from the slowdown in revenue growth in 2008 and its decline in 2009. Global revenues fell by USD 30 billion between those two years or by –2.5%.

A comparison of the experience of firms headquartered inside and outside the OECD area, while not representing a direct correlation, may provide one indicator of the effects of the crisis on growth in developed and developing countries. A breakdown of the data reveals that revenue fell in both areas during 2009, but that net income varied, with firms headquartered in OECD countries increasing their net income (Figure 1.3). Overall these firms were able to remain profitable even during the financial crisis.

Figure 1.3. **Communications net income for the largest 100 global firms, 2000-09**



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The long-term trend for net income remained relatively flat between 2006 and 2009. While firms inside the OECD area experienced subscription growth in areas such as Internet broadband and wireless access, this was offset by decreases in traditional telephony revenue and a decrease in public switched telephone network (PSTN) lines. By way of contrast, growth in developing countries was dominated by wireless technologies, with much fewer fixed services to be displaced.

Overall, large firms in both developed and developing countries experienced revenue growth throughout the aftermath of the dotcom bubble, but firms headquartered in the OECD area fared worse in terms of profitability. Conversely, firms in OECD countries increased profitability in 2009, whereas their counterparts experienced a drop.

Operators in OECD countries are relatively well insulated from economic downturns. There are several reasons for this: communication services are increasingly non-discretionary spending items, have long contract durations and are sold as bundled services (see *Communications Outlook* 2009). Communication providers tend to set contract durations at periods of 12 months or longer as a way to recover the costs of the equipment provided when a contract is signed. These longer term contracts also result in greater consumer "stickiness" because they discourage households from cancelling services in times of financial difficulty.

A further factor relating to revenue trends and the crisis, both inside and outside the OECD area, is pre-paid subscriptions. Stimulated by competition, these remain the most popular means for consumers to access wireless services in many OECD countries and nearly all the developing world. Pre-paid subscriptions provide consumers with an alternative to longer term contracts, and enable them to avoid dropping their service in the event of financial challenges. They allow users to control their discretionary expenditure, but retain the empowerment that communication services provide (*e.g.* as a key tool for job seekers searching for new employment).

The balance between pre-paid and post-paid subscriptions may be one reason for the difference in levels of profitability between developed and developing country firms. There are, however, other factors. Competition for some market segments is now fiercer in developing than in developed countries, much to their benefit. Consumers in some OECD countries, for example, can only marvel at international mobile roaming offers that charge users the same amount in their home country or across a continent. In addition, decreasing mobile termination charges permit some operators to launch disruptive, flat-rate calling offers, as they are no longer constrained by high termination charges. Broadly speaking, operators explore elasticities to maximise profit. The problem stems from possible market failures or ineffective competition (*e.g.* international mobile roaming, mobile termination). As a result, policy makers and regulators are considering ways in which to improve competition dynamics in these markets (Chapter 2).

One of the key trends in OECD countries in recent years has been the growth of bundled services and the appeal of these packages to consumers and operators. Operators bundle voice with video and data services as a way to increase revenues and help foster service loyalty. This loyalty is particularly beneficial to operators during economic downturns because households often value one of the services more than the others and choose to remain a subscriber rather than cancelling an entire bundle. The rising popularity of bundled offers may explain the continued profitability of communications companies. To date, bundled services are more prevalent in the developed than the developing world.

Bundling can be viewed alongside two fundamental developments in the first decade of this century: digitalisation and the convergence of services thus enabled over broadband. Digitalisation made possible technologies, such as DSL and cable modems, which formed the platforms for the first generation of broadband access technologies. The dial-up Internet age witnessed innovations such as VoIP (Voice over the Internet Protocol) and streaming media (*e.g.* audio over the Internet). However, it was not until broadband started to gain traction with consumers that a transition away from traditional business models commenced. In telecommunications this was evident in the growth of services such as Skype, and in the music industry with iTunes.

These changes affected traditional telecommunication operators that faced competition from other platforms (*i.e.* cable, mobile), as well as from over-the-top services, such as Skype, for their traditional narrowband services (*i.e.* telephony). The second broadband age over networks, often called next generation broadband, promises to be equally, if not more, influential in transforming business models.

Areas that may be affected by the next generation of broadband include cable/satellite television and mobile services. Disentangling its effects from structural changes can prove challenging, particularly against the backdrop of the crisis. Take, for example, cable television. In 2010, operators of cable networks, like their telecommunication counterparts, have reported sound levels of profitability, and continue to report growth in cable broadband Internet access and bundled services, which include telephony. Recent years have also witnessed revenue growth related to digital upgrades. On the other hand, the number of basic cable television subscribers continues to decline in some countries. In the United States, for example, basic cable television subscriptions fell from 65.4 million in 2006 to around 61 million by the close of 2010.

These declines may be the result of consumers shifting to other platforms (*e.g.* the television services of telecommunication operators). They may also be the result of consumers, affected in one way or another by the crisis, giving up their cable television service and returning to reliance on free-to-air broadcasters, which now include new digital stations. The question remains open, however, as to whether consumers are giving up traditional cable or satellite television in favour of "over-the-top" video options.

In the United States, a growing number of options exist for over-the-top video consumption on broadband networks. These include new devices and services such as Amazon Video on Demand, Apple TV, Boxee, Google TV, Hulu, Netflix, Roku and XBox Live. At the same time, content producers or rights holders can stream services (*e.g.* sports) or sell content direct to consumers via online stores (*e.g.* iTunes) for consumption on any number of devices (*e.g.* games devices, mobile phones, tablet computers).

In some cases, consumers will, as they have done in France, choose a new entrant that simply bundles telephony and television with broadband Internet access. This is typified by the offer of a service called "Free", offered by Iliad, which charges USD 42 per month, as of November 2010, for broadband Internet access, television (several hundred stations) and telephony, including uncharged calls to landlines in France and 130 countries. If customers of this service wish to use additional services (*e.g.* premium stations or video on demand), they can subscribe on an *à la carte* basis or choose an "over-the-top" provider such as iTunes. As a result of the increasing range of options, some consumers will undoubtedly begin to question the value they receive from some aspects of their bundle, even if bought at a relative discount to the individual prices of these services. Others may add over-the-top offers on an *à la carte* basis if these provide services they value, or if services from one provider can be substituted for another, for example, cable television from their Internet access provider.

Incumbents, whether they are telecommunication or cable operators, find it challenging to shift to the type of pricing adopted by Iliad. While they offer discounts for bundles, they are reluctant to change a business model that has served them well over many years. However, just as telecommunication operators were forced to make changes to their business models during the first generation of broadband, it is unlikely that cable operators will escape from the competitive forces raised by the new generation.

Mobile operators are also grappling with the opportunities and challenges created by the new generation of broadband networks. This is perhaps most evident in the rapid development of the "applications market" over the last two years (Chapter 4). The success of online "app stores", such as those of Apple and Google, has been little short of extraordinary. Their impact, however, has affected the various parts of the industry and its value chains in different ways.

In terms of traditional fixed-line telecommunication services, applications such as Skype have had little impact because these changes occurred with the first generation of broadband. In other words, many fixed-line operators had already changed their business models prior to the advent of Skype on mobile phones. These applications have also had minimal effect on mobile operators that sell service with large buckets of inclusive minutes, as is the case in North America. For other wireless operators, however, they represent the introduction of the first over-the-top services, long resisted on their networks.

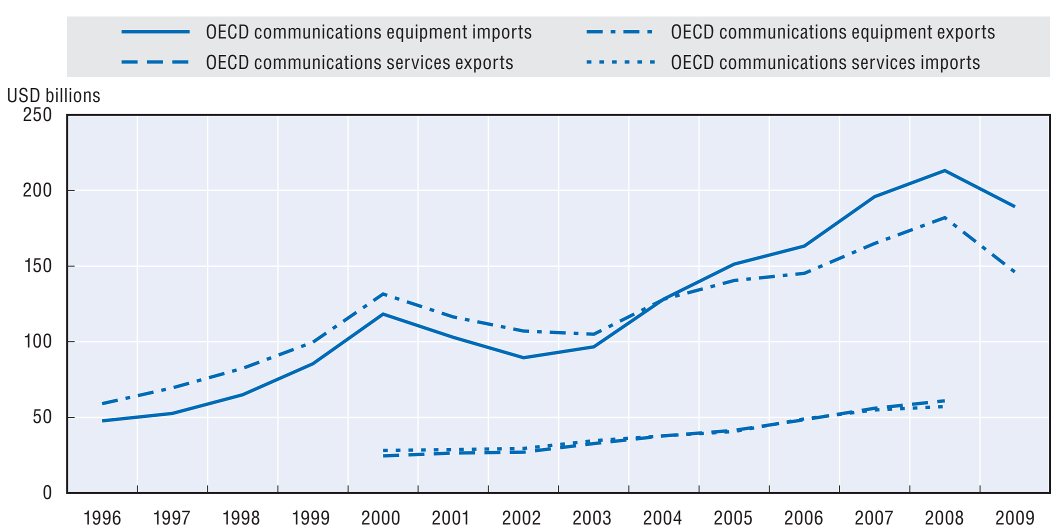
Clearly, many of the services enabled by "apps" are valued by consumers, as is evident in their increased sales, as well as the growth of smartphones themselves. The effect along different value chains may be significant but remains difficult to disentangle, due to the crisis. Advertising revenue for cable television operators in the United States fell from USD 26.4 billion in 2008 to USD 24.3 billion in 2009. While the crisis undoubtedly contributed to this decline, the longer term question is whether advertisers will structurally shift advertising to the Internet. It is notable, for example, that the daily reach and use of some applications matches some of the most popular television programmes in the United States. Firms such as Apple and Google are positioning themselves to take advantage of these trends on fixed and wireless consumption of all types of media.

Investment

While subscription numbers continued to increase and revenue growth stalled during the crisis, the area most affected was investment in infrastructure. Network operators spent USD 175 billion in 2009, down from USD 190 billion in 2008. The decline reversed a trend toward increasing investment, following the aftermath of the dotcom bubble, from 2004 to 2008. In the United States, data from two sources reveal slightly different capital investment trends. Data from the United States Census Bureau suggest that, after decreasing between 2006 and 2007, capital expenditures by wireless providers rebounded in 2008, increasing by approximately 15% over the previous year to more than USD 25.5 billion. However, data from the United States Cellular Telephone and Industry Association, suggest that while the mobile wireless industry has continued to invest in network expansions and upgrades, capital investment has declined over the past few years.[1]

The declines in capital expenditure by operators contributed to a reduction in international trade for ICT equipment (Figure 1.4). In 2009, imports and exports were down 11% and 20% from the previous year (Chapter 9).

Figure 1.4. **Trade in telecommunication equipment and communication services for OECD countries**



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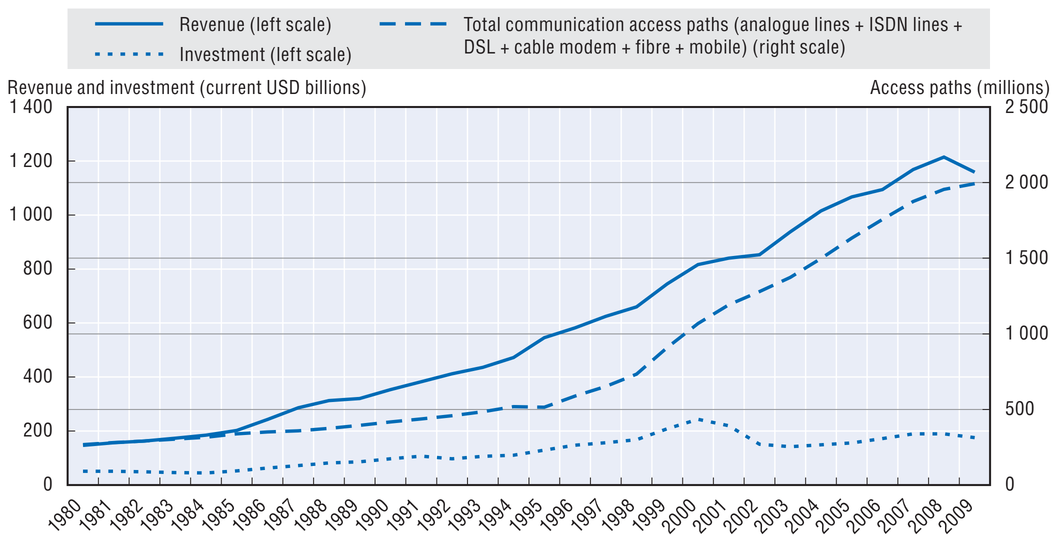
The outlook for growth

The first billion communication access paths in the OECD area were surpassed in 2000. This took more than 100 years. In 2010, the amount exceeded 2 billion. Between 2000 and 2009, the access technologies used for these paths represented respective compound annual growth rates of fibre (58%), DSL (45%), Cable (30%) and Mobile (10%) (Figure 1.5).

Figure 1.5. **Subscriber, revenue and investment growth, 1980-2009**



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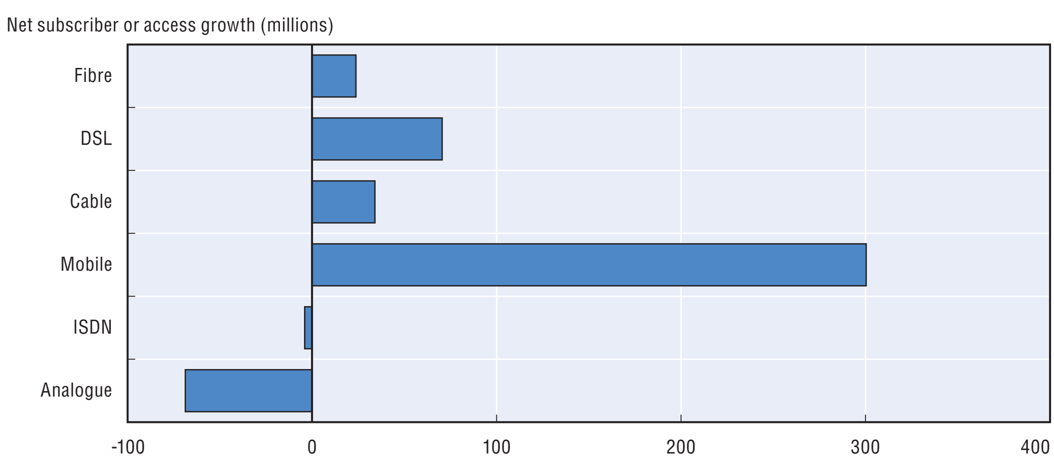
Mobile subscriptions account for 63% of total access paths in the OECD area. The number of net additions on mobile networks between 2005 and 2009 was over 300 million, much greater than any other access path technology (Figure 1.6).

Figure 1.6. **Net access path growth, 2005-09**



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The number of mobile subscriptions in the OECD area topped 1.2 billion in 2009, equivalent to 103 subscriptions per 100 inhabitants. Significantly, by the end of 2009, some 24% of the mobile subscriptions had a mobile broadband service (3G) enabling them to access data. Mobile revenues now account for nearly half of all telecommunication revenues (45% in 2009), up from 24% ten years earlier. This transformation is evident in data from the largest operators in the OECD area (Table 1.1).

Much still remains to be done in terms of infrastructure development to meet expected demand, and the investment it will require. Fibre access, which many expect to become the default fixed broadband access technology, represented just 4.3% of fixed communication access paths in 2009. At the same time, mobile operators are gearing up to provide the next generation of wireless technologies to meet user demand, demonstrated by the growth of smartphones.

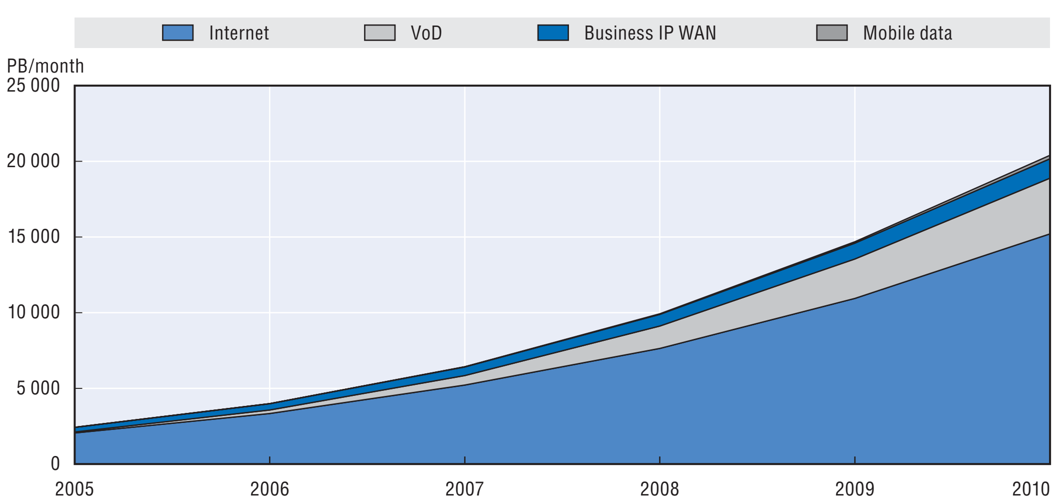
The outlook for connected devices, including M2M communications, may vastly outstrip current rates of connectivity. Intel has predicted some 5 billion M2M network connections by 2015 and Ericsson 50 billion by 2020.

Internet traffic growth

By 2010, global Internet Protocol (IP) traffic was equivalent to the inhabitant of each OECD country sending about four DVDs or 24 CDs every month. IP traffic has grown exponentially since 1984 (Chapter 5). Growth is forecast to continue unabated in all regions in the coming few years as ultra-fast fibre connectivity is deployed, new services leveraging very fast connectivity are launched, and penetration levels worldwide increase and the Internet becomes truly global.

According to Cisco's Visual Networking Index (VNI), global IP traffic has continued to grow throughout the crisis, reaching just over 20 000 Petabytes (PB) per month in 2010 (Figure 1.7). This has increased eightfold in five years, from just 2 426 PB/month in 2005. To provide an order of magnitude, 1 Petabyte equals 1 000 Terabytes, 1 million Gigabytes, or 1 billion Megabytes. Of global IP traffic, Internet traffic (*i.e.* traffic that is routed through the "public" Internet) accounted for 75% in 2010. The remaining 25% of traffic was generated on private networks, which include traffic on business networks, mobile data and Video on Demand (VoD).

Figure 1.7. **Global IP traffic, 2005-10**



Source: Cisco Visual Networking Index (VNI).

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Traffic on the public Internet grew by nearly 50% per annum (CAGR) from 2005 to 2010. Over the same period, the subset of consumer Internet traffic grew at the slightly faster annual rate of 56% per year and represented over 80% of total Internet traffic in 2010. Meanwhile business traffic on the public Internet grew 29% per year and represented the remaining 20% of Internet traffic in 2010.

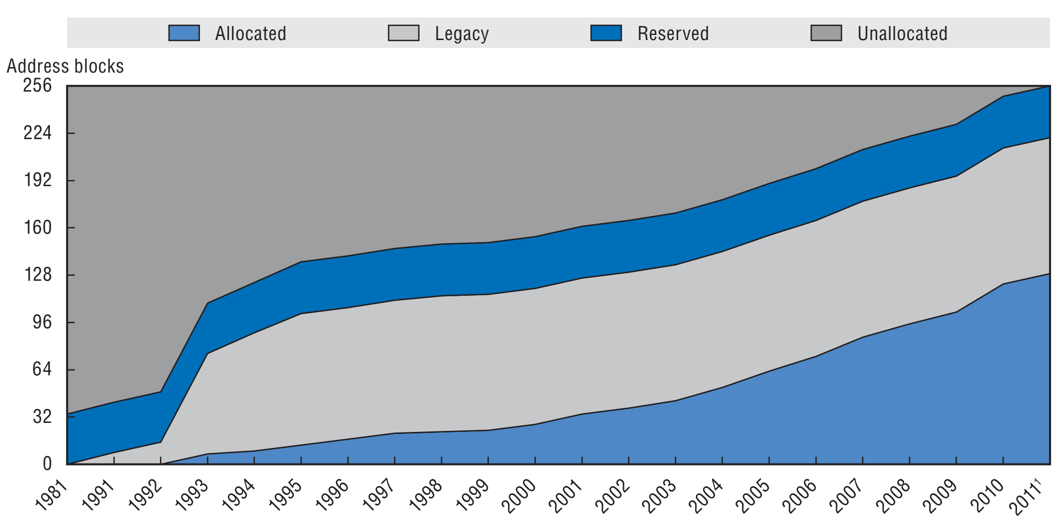
Video on Demand systems, which allow consumers to access video or audio content upon request, generated 3 680 PB/month (18% of total IP traffic), up from only 65 PB/month in 2005, constituting a year-on-year growth of 124% over the same time period. Due to the high demand for mobile services and the introduction of increasingly high performance networks (*e.g.* 3G), mobile data traffic in 2010 reached 228 PB/month (1.1% of total IP traffic), starting from a very small base but representing yearly growth of over 200% between 2005 and 2010. As such, mobile data was the fastest growing IP traffic category.

The top traffic-generating countries, in 2010, were the United States with an estimated 31% of the world's IP traffic (6 337 PB/month), followed by Korea with 10% (2 196 PB/month) and China with 6.3% (1 277 PB/month) (Chapter 5). On a per-capita basis, Korea is the country that generated the highest amount of IP traffic with 4 555 TB/month per 100 000 inhabitants, followed by Canada (2 288 TB/month) and the United States (2 110 TB/month). It is worth noting that the United States' share of VoD traffic was particularly high (60%), mainly due to the wide adoption of VoD systems, usually available from cable and satellite television providers.

Addressing the future Internet

Internet protocol version 4 (IPv4) addresses held by the Internet Assigned Numbers Authority (IANA) ran out in February 2011 (Figure 1.8). This meant that the IANA had distributed its last IPv4 blocks to the Regional Internet Registries (RIRs). While the RIRs can continue to allocate these addresses for the few months following the depletion, there are now no more previously unallocated IPv4 addresses for distribution to growing networks with address space needs.

Figure 1.8. **IANA IPv4 address pool, 1981-2011**



* As of February 2011.

Source: OECD, based on data from the IANA.

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IPv6, the newer version of IP, provides virtually unlimited address space. Its deployment is considered to be the only readily available long-term solution to the upcoming shortage of IPv4 Internet address space needed to support the proliferation of broadband, Internet-connected mobile phones and sensor networks, as well as the development of new types of services. Implementation of IPv6 has experienced significant growth since mid-2007. However, adequate adoption of IPv6 to satisfy foreseeable demand for Internet deployment still requires a significant increase in its relative use and significant mobilisation across all parts of the Internet.

Transformation over broadband

Communication markets in the OECD area continue to grow and transform. The key trends, since the last *Communications Outlook,* have been the advent, development and growth of innovations such as app stores, smartphones and M2M communications. The convergence of services on a range of platforms is changing the industry, but both established operators and new entrants are finding sufficient room to grow and develop new business models.

The crisis was associated with a decline in ICT trade and investment in 2009, as well as flat or slight declines in overall sector revenue. In contrast, and unlike the bursting of the dotcom bubble, the sector maintained its profitability. Overall demand for communication access and services has continued to grow during the crisis with further innovation poised to create new growth.

Note

1. *http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-10-81A1.pdf*.

Table 1.1. **Major public telecommunication operators and Internet service providers in the OECD area (fiscal year 2009 unless noted)**

		USD millions						Units		
Name of Public Communications Operator (PTO)	Country	Revenue	Net income	Long-term debt	Capital expenditures	Mobile revenue	R&D spending	Fixed access lines	DSL/cable/ FTTH lines	Mobile subscribers
AT&T	United States	123 018	12 535	64 720	16 595	53 597		49 392 000	17 254 000	85 120 000
NTT	Japan (1)	108 810	5 261	36 087	14 651	45 788	2 972	38 330 000	16 632 000	56 082 000
Verizon	United States	107 808	3 651	55 051	17 047	62 131				91 249 000
Deutsche Telekom	Germany	89 745	490	58 068	12 783	11 265	278	38 100 000		151 700 000
Telefonica	Spain	78 810	10 802	66 135	10 548		963	40 606 000	15 082 500	202 332 500
Vodafone (Group)	United Kingdom (1)	69 280	13 467	44 604	10 866	53 628	436			302 600 000
France Telecom	France	64 603	4 163	42 883	7 942	11 943				132 593 000
Telecom Italia	Italy	38 126	2 196	48 881	6 311		1 170	18 525 000		30 856 000
Vivendi	France	37 692	1 153	11 558	3 679	15 217	960 (4)			
KDDI	Japan (1)	36 787	2 274	9 327	5 285	28	331	2 850 000	2 544 000	31 872 000
Comcast	United States	35 756	3 638	27 940	5 639				15 900 000	
BT	United Kingdom (1)	32 495	1 601	14 834	3 909		1 714			
Sprint Nextel	United States	32 260	- 2 436	20 293	2 194	6,816				
Softbank	Japan (1)	29 533	1 034	18 490	2 392	18	6	1 670 000	4 006 000	21 880 000
America Movil	Mexico	29 209	5 692	7 486	3 938			27 382 727	11 985 589	211 296 669
Telstra	Australia (2)	18 978	2 944	9 314	2 726	5 364	156	9 018 000		10 191 000
Koninklijke KPN NV	Netherlands	18 767	3 026	17 368	2 473		61			
Time Warner Cable	United States	17 868	1 070	22 631	3 231				9 000 000	
Telenor	Norway	15 529	1 376	5 100		9 943	70			174 000 000
BCE	Canada	15 515	1 409	9 010	2 497	3 987	705	9 788 000	2 867 000	6 954 000
Carso Global Telecom	Mexico	15 506	1 176	9 592	2 096					
KT	Korea	15 388	581	5 901	2 176	4	0	17 069 000	6 953 000	15 016 000
TeliaSonera	Sweden	14 262	2 463	8 318	1 825	6 673 (3)	132	5 212 000	2 438 000	39 521 000
Qwest	United States	12 311	662	11 866	1 409			10 266 000	2 974 000	850 000
Singapore Telecommunications	United States (1)	12 133	2 810	3 848	1 492	1 567	1			293 000 000
SK TELECOM	Korea	11 399	977	4 028	1 788	9 477	1 426			24 270 000
Swisscom	Switzerland	11 029	1 770	7 601	1 826	3 417	25	3 484 000	3 447 000	5 610 000
Rogers	Switzerland	10 128	1 396	7 306	1 796	6 654		124 000	1 619 000	8 494 000
VimpelCom Ltd.	Netherlands	10 071	1 317	5 546			610		2 256 793	86 617 884
Portugal Telecom	Portugal	9 425	950	9 101	1 762	6 468	296	2 746 000	862 000	58 996 000
Telefonos de Mexico	Mexico	8 813	1 467	6 150	786			15 882 000	6 651 000	
Telus	Canada	8 403	811	5 958	1 840	4 142		4 048 000	1 128 000	6 524 000
Telmex	Mexico	8 379	1 467	6 150	786					
Belgacom	Belgium	8 314	1 254	2 903	829	2 703		3 447 000	1 521 000	5 059 000
Hellenic Telecommunication	Greece	8 313	561	7 482	1 238	3 329		7 733 000	1 931 000	21 950 000
Turk Telekomunikasyon	Turkey	6 819	1 182	1 147	1 497	1 616	19	16 500 000	6 200 000	11 800 000
Telekom Austria	Austria	6 802	132	4 464		4 453	56	2 313 500	1 022 600	18 945 400
TDC	Denmark	6 704	452	5 710		2 325	3	2 680 000	1 435 000	5 484 000
Virgin	United States	5 927	- 557	9 243	886	835			3 837 000	3 174 700
Turkcell	Turkey	5 790	1 094	821	1 768	5 766				62 700 000
Telekomunikacja Polska	Poland	5 307	410	1 928	700					
freenet	Germany	5 231	356	998		5 072		870 000		17 580 000
Tele2	Sweden	5 130	595	512	580	3 208		3 010 000	1 179 000	22 390 000
Telephone and Data Systems	United States	5 021	194	1 493	671	4 215		1 131 800	245 200	6 141 000
CenturyLink, Inc.	United States	4 974	643	7 254	757			7 039 000	2 236 000	
NII Holdings, Inc.	United States	4 398	381	3 016	650	4 398				7 385 000
LG Uplus	Korea	3 876	241	438	386	3 876	29	347 743	2 521 725	8 658 475
Level 3	United States	3 762	- 618	5 755	313					
Telecom New Zealand	New Zealand (2)	3 575	237	1 335	675	826	8	1 146 000	579 000	2 171 000
MetroPCS	United States	3 481	177	3 626	847	34 805				6 639 524

Notes: (1) Fiscal year ending March 2010; (2) Fiscal year ending June 2010; (3) Not include mobile revenue in Eurasia; (4) Of which EUR 393 million were capitalized; (5) Converted to USD based on the OECD exchange rate of 2009.

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Chapter 2

Recent Communication Policy Developments

Next generation access networks (NGA) are in a critical phase of development. Present policy decisions are likely to have an impact over the next decades in terms of market structure, service provision, investment and innovation. Furthermore, the rise of smartphones and other devices is driving the boost in mobile broadband traffic and usage. This involves new challenges for spectrum policy, which policy makers have to balance carefully as spectrum is a key competitive asset. This transition is being facilitated by the release of spectrum resources coming from the switch-over from analogue to digital terrestrial television.

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.

Introduction

Broadband connectivity is proving to be crucial for the development of the Internet Economy, as a means to boost economic growth and productivity. Information and communication technologies (ICTs) have been a key enabler of economic growth since the mid-1990s. Relevant economic literature identifies the productivity gap between the United States and Europe, up to the end of the last century, as being influenced by the increasing adoption of ICTs, as well as by organisational changes and skills that made it possible to fully reap the benefits of the new technology. ICTs, now fundamentally underpinned by broadband, may be used to improve social cohesion and inclusion, although the risk of creating "digital divides" should not be underestimated.

New technologies are emerging and enabling new types of services. Femtocells[1] are being used to extend mobile coverage over a limited area and Wi-Fi networks are increasingly used as a complement to mobile networks. TeliaSonera in the Nordic and Baltic countries was the first operator to launch commercial Long Term Evolution (LTE) mobile services, while many others have announced their intentions to commit to this technology. In addition, firms such as cable television networks are expanding availability of their subscriber services on new platforms, such as mobile applications.

Communications policy remains a key foundation for technology uptake and usage. Poor choices may result in underperforming communications infrastructure and service markets. In turn, this may prevent consumers, businesses and governments from exploiting economic and social benefits. Preserving incentives for innovation and investment, fostering competition and promoting consumer choice and empowerment, remain among the main issues governments have to consider. This is of particular importance because Next Generation Access (NGA) networks are in a critical phase of development. As happened in the 1990s when most OECD countries liberalised telecommunication services, present policy options may have an impact on market performance in the decade to come. Decisions concerning market structure and ways to encourage innovation and responsive and widespread service provision – as well as the required investment – are being foregrounded. In the United States, the Federal Communications Commission (FCC) recently released a report and order on preserving the open Internet and addressing broadband practices, which will be summarised below.

Leaving NGA networks aside, the future framework of interaction between Internet Service Providers (ISPs), telecommunication or cable operators and content providers is at issue. The question of "network neutrality" has led to vigorous discussions among large Internet players, infrastructure providers and policy makers. Issues such as whether communication providers favour certain applications, give priority to premium content, or charge some service providers differently will most likely shape the future service provision model over the Internet. Here again, choices made by all stakeholders today are likely to have important implications for the coming decade.

Ongoing growth in the use of mobile services and further fixed-mobile convergence involves new challenges for spectrum policy. The radio spectrum, a scarce resource, is an important competitive asset. Therefore, policy makers need to carefully balance the multiple factors which will greatly influence the outcomes, in terms of competition, consumer choice and investment. That being said, the switch-over from analogue to digital terrestrial television services will release significant spectrum resources that should help to ease the spectrum needs of the mobile communications industry.

Broadband networks are widely recognised as a key factor for economic and social development. As such, competitive markets, high investment levels and innovative applications are a step forward towards increasing communication uptake and use, which will deliver increasing benefits for consumers and businesses. Nonetheless, supply-side measures, focused on deploying infrastructure, fostering investments and achieving effective competition, should be complemented with demand-side initiatives that promote communications use, highlight economic and social benefits, and increase spillovers across the economy, thus boosting economic growth and productivity.

In the context of the economic downturn, communication infrastructure and, in particular, broadband, is considered an opportunity for structural reform, and an area where governments could invest in order to increase productivity and long-term growth. Moreover, broadband infrastructure deployment projects are labour intensive and may provide a significant stimulus for local economies. In the United States, a National Broadband Plan was delivered by the FCC to Congress in March 2010, which recommended the creation of a "Connect America Fund" (CAF) to support the provision of affordable broadband and voice services with at least 4 Mbps actual download speeds. Meanwhile, the National Telecommunications and Information Administration (NTIA) is responsible for managing the Broadband Technology Opportunities Program (BTOP) and the State Broadband Data and Development (SBDD) Program, which aim to expand broadband infrastructure and encourage sustainable adoption.

A growing number of countries have introduced changes to market structures surrounding NGA deployment. These include functional separation in countries such as Italy and the United Kingdom. Moreover, some countries such as Australia and New Zealand are using public investment to create national broadband networks. Here, a split between service and infrastructure provision is being introduced, as is already the case in Singapore. In other countries, such as Chile, public investment in national broadband backbone networks is being pursued. Meanwhile, "unbundling" or new open access models are being built in line with policy and regulatory approaches. Finally, infrastructure competition continues to deliver leading performance in countries such as Korea and in some non-member economies such as Hong Kong, China.

More than a decade after liberalisation, competitive outcomes can be considered a success for business and consumers across the OECD area. Available data on the number of PSTN suppliers is provided here (Table 2.1). Prices have fallen, new technologies and services have been developed, and penetration has increased (Table 2.2 charts the PSTN line-subscriber market share of new entrants for a number of OECD countries, and Table 2.3 shows the development of pre-selection in OECD countries). Indeed, the communications landscape is barely recognisable from the monopoly era, having been transformed by developments surrounding the Internet and wireless networks. The private sector has led infrastructure investment, freeing scarce public resources for other priorities and bringing greater efficiency to the delivery of services. In the context of the deployment of NGAs, however, policy makers have begun to assess whether commercial outcomes match their objectives in all market segments and geographical regions. Where they have intervened it is not to supplant the market, but rather to promote competition where it may otherwise not flourish, or to ensure the availability of services.

Trends in competition

Declining or stable fixed telephony revenues and mature mobile markets, at least in terms of penetration, have shifted the competitive focus to broadband services. This includes the relatively recent success of higher speed mobile services on smartphones. While voice still represents more than 80% of mobile revenues, mobile broadband services are expected to grow in the short to medium term. Fixed broadband markets have not yet reached maturity as broadband penetration is still increasing, although at a more moderate pace than in past years. In addition, fixed network operators continue to expand their offerings in areas such as linear and non-linear music and video services. They do so, however, in an increasingly competitive market defined by traditional broadcasters and a range of new "over-the-top" service providers.

The largest share of growth forecast for industry revenues is expected to come from wireless data services. Communication providers have succeeded in maintaining revenue during the economic downturn. However, the economic situation has led operators to increase their efforts to hold or increase their share of consumers with lower average revenue per user (ARPU), while mobile virtual network operators (MVNOs) targeting low-expenditure consumers have increased their market shares. The larger players have managed to maintain their market shares (Table 2.4) and some have expanded to markets outside the OECD area, where they see more promising growth prospects in terms of penetration. Although MVNOs are an interesting option for low-expenditure consumers in most OECD countries, their market shares have thus far remained modest, mostly under 5% in terms of lines and even lower in terms of revenues. In the United States, two facilities-based mobile providers, MetroPCS and Leap Wireless, have been relatively successful in targeting the most price-sensitive segments of the market, and account for several million subscribers, although they remain small in terms of market share (Metro PCS had around 6 million subscribers and a 2% market share and Leap Wireless had around 4.5 million subscribers and 1.5% market share in 2009).

Following a long tradition of liberalised communication markets, new entrants serving one market graduate to others and expand their range of services. In the case of MVNOs, a number are beginning to offer prepaid smartphones, which previously lay at the more expensive end of the market. Some players are moving towards offering basic smartphone handsets for prepaid subscriptions. Boost, MetroPCS and Leap Wireless are also offering smartphones as part of their wireless plans, while Verizon has responded to these developments by offering prepaid smartphone data packages.

Bundled offers are becoming increasingly popular in OECD countries. Consumers frequently benefit from bundled offers (double, triple or even quadruple play) including lower prices and more convenience, but this may not always be the case. Bundled offers may also allow operators to better achieve return on investments in backbone networks. Consumers may not benefit from a bundle if they are required to take one or more services that they do not value to receive a service that they do. Bundling may also increase market power. This is particularly serious if there are no available stand-alone offers for a particular service. Furthermore, having a low priced, stand-alone broadband offer means a step forward towards enhancing broadband uptake by lower income customers, even though affordability is not the only factor contributing to low consumer demand for broadband services. It would be expected that both would be available in the most competitive markets. In France, for example, a new entrant changed the shape of the fixed broadband market with an inexpensive bundled triple-play offer, but did not offer a stand-alone service. It was not long before other firms began to compete by offering unbundled service elements at similarly inexpensive prices.

In less competitive markets bundling may pose challenges to consumers with regard to assessing prices and their dynamics. Complexity increases as communication operators multiply the features and criteria that consumers need to consider when making a purchase decision. Relative to stand-alone prices, it is becoming increasingly difficult to map services to prices. This may limit the ability of consumers to compare offers.

Triple-play (fixed voice, broadband and television service) offers are present in almost every OECD country, although availability outside urban areas depends on the degree to which providers have upgraded their networks to support IPTV or cable modem services. Fixed voice, broadband and TV services may often be purchased separately or as double or triple-play offers. Despite the relative success of triple-play, quadruple-play (triple-play plus mobile services) offers have been launched in fewer countries, sometimes only by one operator. The need for a mobile subsidiary (or an arrangement with a mobile operator), limited options for incumbents to launch offers due to remedies against market power, and possible prospects of higher revenues by having separate mobile and fixed communication packages, have so far prevented widespread quadruple-play offers in the OECD area. Nevertheless, Bouygues Télécom, SFR and Orange in France, Virgin in the United Kingdom, cable operators in Germany, Netherlands and Austria, and Verizon in the United States, among others, have successfully provided a full convergent package in one subscription. In Canada, both incumbent cable and telephone operators, such as Rogers and Bell Canada, offer quadruple-play offers.

Mobile broadband services represent the fastest growing market segment in the telecommunication industry. The increase in usage of smartphones, netbooks and other devices over the last few years has triggered a significant boost in mobile broadband penetration and traffic. Mobile networks are being upgraded by carriers, but face ever-growing demand in some parts of the OECD area as this traffic grows. For mobile voice services, number portability is widely utilised as an instrument to promote competition as it empowers consumers to change operators in response to their level of satisfaction or new offers. Some figures on ported fixed and mobile numbers in the OECD area are presented here (Table 2.5). While voice is now only one of several services included in many mobile offers, the ability to port a telephone number remains a key requirement for many users. Nevertheless, it can be noted that for some devices the number of over-the-top social networking applications, from Twitter to Facebook, or the many location-based services, provide new ways to stay connected, even when changing provider. They are not, however, complete or perfect substitutes for all services (*e.g.* business or professional use or the simplicity and convenience of retaining a number).

Most OECD countries consider fixed and mobile broadband services as complements and not substitutes. This is underpinned by different patterns in usage, transmission rates typically being one order of magnitude lower for mobile networks, and mobile or nomadic use associated with mobile broadband services. Evolving usage and technology patterns may change this conclusion in the future, but so far it is widely agreed that mobile and fixed broadband services are generally complementary. Only Austria has moved forward and formally stated that mobile and fixed broadband may be substitutes in some cases, reflected by the relevant market analysis undertaken in the country. At the end of 2009, only 4% of households with Internet access in the European Union area solely use mobile network access. According to the E-communications Household Survey, 25% of households, in this area, had mobile telephone service but no fixed telephone subscription.

According to the Austrian regulator, mobile broadband was used by around 35% of residential customers in March 2009. In that country, a price analysis showed that prices of fixed and mobile broadband connections were moving closer together and that fixed broadband providers directly reacted to price reductions introduced by mobile broadband operators. Moreover, 75% of residential mobile broadband customers used their connection mainly on a stand-alone basis, rather than coupled with a fixed connection. Results from a survey confirmed that key applications, despite lower speeds, could be used via fixed and mobile broadband. This evidence led the Austrian regulator to the conclusion that the residential customers' retail broadband access market included DSL, cable and mobile broadband connections, which was later reviewed and confirmed by the European Commission.

Developing new indicators for mobile broadband services is a challenging task, and is receiving increasing attention in OECD countries. Wireless networks can clearly provide effective competition to wireline networks for many traditional and some new services. Data show that some households have given up PSTN lines and not replaced them with fixed broadband. However, patterns of usage and capabilities are fundamentally different. Indeed, in some markets, tariffs (or terms of use) on wireless networks have been recently adjusted in ways that may make them less substitutable for some usage patterns, taken for granted on fixed networks. Moreover, the differences may increase as conditions are applied, for example, to tethering devices on wireless networks, and new higher bandwidth services become more popular over fixed networks. To keep track of these developments it is likely that stakeholders will need to rely increasingly on data collected from both traditional and new approaches.

Concerns are being raised by a number of stakeholders regarding the quality of communication services. A number of OECD countries have developed a framework for measuring and reporting quality of service of fixed and mobile voice and broadband services (France, Korea, Portugal, Spain). While this has always been the case with the Internet and perhaps other networks, attention has been increasingly drawn to the fact that actual speeds do not match advertised performance. As a result, some regulators are providing consumers with tools to measure the speed of their broadband lines directly. In the United States, the FCC provides a set of tools for consumers to measure upload and download speeds, so as to give them additional information about the quality of their broadband connections. The objective is to create awareness about the importance of broadband quality in accessing content and services over the Internet. Similar initiatives have been taken in Denmark, Estonia, Korea and Norway. Available data on the development of quality of service measurement and reporting of fixed, mobile and broadband services is presented here (Table 2.6).

Local loop unbundling (LLU) and infrastructure competition

Over the past two decades, OECD countries have aimed to increase market efficiency through the use of facilities-based competition (also called platform or infrastructure competition), but have sometimes differed in approach. In some countries (Korea, United States), infrastructure competition is prevalent and no or very little local loop unbundling (LLU) takes place, or at least it does not play a key role in the competitive dynamics. Others (France, Netherlands) have identified LLU as a key aspect to allow alternative operators to gain market share while deploying their networks. In some countries (Greece, Hungary, New Zealand, Poland, Switzerland), LLU is only nascent or available for a low share of exchanges, and more time will be needed to assess the success of this policy option. Only in Mexico is LLU unavailable. Current regulatory obligations, if any, and pricing of loop unbundling in the OECD area are presented here (Table 2.7), alongside data on the number of unbundled loops by country (Table 2.8).

A number of countries with significant fibre-to-the-house/building (FTTH/B) deployments have implemented regulation. Japan has provided a regulatory framework for fibre-based LLU, since 2001, based on the forward-looking cost method. The Netherlands has also implemented regulations to unbundle fibre loops. The Dutch regulator, OPTA, has imposed obligations on cable-TV resale. No regulator has addressed cable-based LLU for broadband, although Canada and Denmark have developed a regulation that imposes bitstream (wholesale) obligations on cable operators. Significant technical challenges are associated with cable LLU, which is one reason why it has not been used as regulatory remedy. Local loop unbundling remains a significant source of competition and a useful instrument towards the longer term development of new infrastructure and competition. In France, for example, firms that entered the market using unbundling have progressed to offering their own fibre optic networks in some areas.

Market structure and next generation access (NGA) networks

The *OECD Communications Outlook 2009* warned that investment in next generation access networks (NGAs) would be hampered by the current economic crisis. Poor prospects have been confirmed in some countries and in some traditional market segments. Nevertheless, the pace of change, particularly in the most competitive markets, continues unabated. Investment in the wireless sector, for example, continues with new entrants planned in countries such as France (three to four) and the United States, although there has been some consolidation of operators in Australia (four to three) and the United Kingdom (five to four). Investment in the next generation of wireless networks continues unabated alongside unprecedented innovation around the use of smartphones and other wireless devices. In the United States, one new entrant (Lightsquared) proposes to become a national wholesale wireless operator for independent providers to offer retail services for mobile data services only. Lightsquared initially will not offer mobile voice services.

In fixed markets, investment plans in fibre deployment or the next generation of cable television networks are not always proceeding as fast as some policy makers would wish. In some countries this may be due to concerns related to the overall state of an economy and its prospects during the emergence from the global financial crisis (GFC). That being said, the pace of technological and commercial change in communications is such that capital markets may be reluctant to extend finance without a clear direction in expected returns. This may be the case, particularly, if the regulatory framework that deals with broadband deployment is (if already set up) unclear in terms of implementation and implications on longer term market structures.

OECD governments are aware that the decisions they will make in the next few years will have a significant influence on subsequent competition developments. Some consider these issues to be "once-in-a-generation" decisions, in that existing copper networks were deployed under public or private monopolies, and did not have to consider competition. Cable television network infrastructure was also originally developed under monopoly conditions. As communication markets were liberalised, policy makers encouraged telecommunication and cable operators to enter or expand into each other's markets. For the future, in those countries fortunate enough to have competitive facilities running past most households, a key question is whether multiple fixed networks, using fibre optics, can be economically provided in these areas. It may be that this is the case in areas with the most propitious geographical or demographical circumstances. If this is not the case, the question is left open as to whether wireless networks can provide sufficient competition or will remain an essential complement to fixed broadband in these areas. At the same time, there may be some areas where obtaining a single connection for higher speed broadband is still a challenge. In these areas, wireless access networks may be more cost effective than fibre, but the question of how to ensure competitive services are delivered to business and consumers remains.

Naturally, this draws attention towards areas where deployment is proceeding apace and the key decisions are taken by policy makers. Unlike the monopoly era, decisions are being taken with next generation network topologies, which may have implications for the options available to policy makers in terms of future market structures. The situation today is complex: there may be, for example, constraints on future competition, such as the technical and economic feasibility of unbundling fibre networks, technology options (GPON, P2P PON, VDSL), or changes in interconnection topology and patterns. The future implications of these decisions need to be taken into account by all stakeholders and, given that public investment should not result in reduced competition in meeting the needs of business and consumers, particularly by policy makers and regulators.

The debate about whether telecommunication networks and services should undergo vertical separation, as has occurred in some other utilities such as electricity networks, has become far more prominent in respect to NGAs. Some question whether commercial developments alone will be able to match policy requirements, and argue that this may not be the case if the market judges the expected returns on investment to be insufficient to fund a single NGA, let alone two or three. If this results in insufficient competition it is then argued that objectives such as innovation, competitive pricing and widespread geographical coverage, as well as other welfare-enhancing affects, may not be obtained. At the same time policy makers wish to encourage private investment or ensure that public investment does not reduce competition. With that in mind, some countries have introduced functional or structural separation. Other countries believe that network unbundling or line sharing can provide competition while encouraging alternative facilities to be developed. Still others view end-to-end infrastructure competition, across similar or alternative platforms, to be more propitious for the development of next generation networks, while complementing this approach with regulatory safeguards or public financial subsidies in regions where market forces are judged insufficient.

While accounting separation is a widespread tool used by many OECD regulators, and functional separation has been implemented in some OECD countries (Italy, New Zealand, United Kingdom), recent policy developments have foregrounded the potential role of a form of structural separation. Moreover, for the first time in many years, a number of publicly owned companies, responsible for rolling out national telecommunication infrastructure, have been established. Australia's NBN Co Limited (NBNCo), a publicly owned company, has been charged with building and operating a wholesale-only, open access, high-speed broadband network, potentially investing an estimated USD 35.9 billion (Government equity USD 27.5 billion) to connect 93% of premises with fibre-to-the-premises (FTTP) technology, delivering speeds of up to 100 Mbps. This is, to date, the most significant initiative undertaken by an OECD government to pursue policy objectives considered unlikely to be met by the private sector alone. At the same time, New Zealand has announced the development of a National Broadband Network, which will deliver FTTP to 75% of households within ten years, with the government investing up to USD 1 billion in open-access, dark-fibre infrastructure. Moreover, Chile is passing new legislation to facilitate investment in telecommunication infrastructure. So far, only licensed retail communication service providers are authorised to deploy infrastructure. This has been identified as a barrier preventing certain infrastructure-focused companies from investing.

Outside the OECD area, Singapore's government is contributing USD 543 million for the construction and USD 181 million for the operation of the country's Next Generation National Broadband Network (NGNBN), aimed at providing a 1 Gbps downstream and 500 Mbps upstream connection to 95% of business premises and households by 2012. While few other countries have yet to follow this approach, some countries outside the OECD area have models similar to that of Chile. Argentina, for example, is investing around USD 2 billion to build a fibre optic backbone network in rural and remote areas, which it says will complement existing private networks in these regions.

While Australia and New Zealand's initiatives are relatively unique among OECD countries, government funding of broadband and next generation infrastructure is fairly common. Most governments have set an objective of attaining the greatest practical broadband capabilities and coverage. Fibre is increasingly the technology of choice for government-funded local access networks. To fulfil their objectives, however, wireless technologies including satellites are used, as reaching 100% of the population by means of wired technologies may be prohibitive. A clear framework on the terms under which broadband infrastructure investments may be publicly funded is crucial. As highlighted by the Recommendation of the OECD Council on Broadband Development, successful government investment needs to strike a balance between four key goals when investing in the telecommunications industry: improving connectivity, increasing competition, stimulating innovation and growth and increasing social benefits.

Japan and Korea are well advanced in fibre deployment. FTTH and FTTB deployments are also widely available in large cities in some countries including Italy, Portugal, Slovak Republic, Sweden and the United States, alongside others. As mentioned above, extensive deployments covering most urban areas in OECD countries remain to be developed. Some of the issues that regulators should address in order to provide a comprehensive regulatory framework for NGA networks are: interconnection topologies, unbundling policy and its implications on technology choice, migration paths, wholesale offer requirements, access to ducts and conduits, in-house wiring regulation, and so forth. All these items have been addressed by most regulators in the OECD, although effective implementation remains a challenge.

The technological feasibility of cable-based networks matching the speeds that fibre-based access networks may offer is still an open question. These remain an important form of competition in ultra high-speed broadband networks, especially following the development of the DOCSIS 3.0 standard specifications for cable networks. Cable networks have been the main source of platform competition in almost every OECD country and will certainly remain so in the coming years for countries with widespread cable infrastructure.

Regulatory issues

Foreign direct investment and state ownership of communication providers

Today, very few OECD countries maintain barriers to foreign direct investment (FDI) in telecommunication providers. Only Canada and Korea apply them to all providers. In Mexico, foreign investors may only own up to 49% of fixed public telecommunications network providers. Full foreign ownership of mobile operators is permitted upon review by the Foreign Investment Commission. A few more countries (Japan, Norway and Switzerland) have restrictions on foreign/private ownership of the incumbent operator. Foreign investment in Australia needs to be cleared by the government above a certain threshold (around USD 250 million).

Although more common in the past, a small number of governments (Portugal, Turkey) have "golden shares" in an incumbent operator in their country. In the 1980s and 1990s, a policy of owning a golden share was instituted by some governments following privatization of state-owned operators. The justification for this approach was sometimes given as having the option to veto decisions that might otherwise be taken by incumbents, or to promote the role of incumbents as national champions associated with broader industry policy (*e.g.* limiting foreign hostile takeovers). In some cases, golden shares included a commitment by a newly privatised entity to maintain a certain practice (*e.g.* untimed local calls).

The European Commission has successfully challenged golden shares before the European Court, which issued a decision in July 2010 against the golden share kept by the Portuguese government in Portugal Telecom (PT). Although these entitlements had been little used in the past, the Portuguese government blocked the acquisition of PT's stake in Vivo (the leading Brazilian mobile operator) by Spain's Telefonica by applying its golden share. After the European Court issued the decision, PT and Telefonica reached an agreement on Vivo.

Little progress has been made in removing the final barriers to foreign investment. OECD countries retain sufficient legal instruments to ensure that their national interests (*e.g.* security, emergency services, criminal law enforcement, etc.) are not hampered or put at risk, which means that barriers to FDI are unwarranted. The OECD Declaration on International Investment and Multinational Enterprises was adopted in 1976 by the governments of OECD member countries, who committed to treating foreign-controlled enterprises operating on their territory no less favourably than domestic enterprises in like situations. As highlighted in previous *Communication Outlooks*, these barriers, particularly those applied to all communications providers, are an obstacle towards effective competition as foreign capital is kept away from a country where it may sometimes be crucial to provide effective competition.

Many governments own shares in communication providers, some of which, including Belgium, Luxembourg, Norway, Slovenia, and Switzerland, retain control of incumbents. Finland, France, Germany, Japan and Sweden are examples of governments owning minority shares of incumbents. As mentioned above, Australia has founded a publicly owned wholesale company, NBNCo Limited, which will deploy a nationwide Next Generation Access network. Government ownership of communication providers and restrictions to FDI in OECD countries are presented here (Tables 2.9 and 2.10). The governments of New Zealand, Portugal and Turkey maintain a certain type of golden shares in the incumbent operator. New Zealand's Kiwi shareholder (the Crown, represented by the Minister of Finance), has to approve purchases of shares in Telecom New Zealand, if above certain thresholds.

Concerns have been raised in the past regarding the lack of independence of National Regulatory Authorities (NRAs) in some countries, especially as some governments retain considerable voting rights in communications providers, as indicated. The European Commission opened proceedings against Luxembourg, Poland and Slovakia in 2010, while looking into the early dismissal of the Slovenian NRA's Director. As a result, new legal instruments were put in place, reinforcing the NRA's independence in those countries.

Network neutrality

The issue of network neutrality has gained increasing prominence in recent years and will likely be much debated in the near future. Depending on different definitions, network neutrality can encompass a range of subjects in popular debates, including the openness of the Internet to some types of content, applications or equipment. It is, however, the role or applicability of traffic prioritisation that lies at the forefront of issues being considered by communication regulatory authorities in relation to competition. The central issue is whether access providers may prioritise some types of traffic or slow it down, according to certain criteria (*e.g.* bandwidth management, willingness to pay, etc.) or, on the contrary, whether Internet traffic should be treated as "neutral". In the sense widely used, neutral would mean that access providers should not treat third-party service providers in a different manner from like services of their own subsidiaries. Furthermore, should providers be allowed to manage their networks to improve quality, the term would address whether there should be limits on the ability of providers to discriminate for or against certain types of traffic (*e.g.* favouring real-time applications) or particular providers of certain types of traffic (*e.g.* a competing provider of over-the-top video). Under the first arrangements, those service providers should be allowed to charge an upstream content, service or application provider for prioritisation. Internet access, for those customers, would then be separated into "layers" according to the priority given to a specific type of traffic by their service provider.

Some network operators, such as Deutsche Telekom, Telefonica and Vodafone, have indicated that they may charge tiered levels of pricing for some types of services. Google and Verizon have outlined a framework model for the Internet. They advocate openness and criticise practices, such as slowing Internet traffic, while leaving room for any other additional or differentiated services that would have to be distinguishable in scope and purpose from the provision of broadband Internet access. The two entities also suggest that the issues considered may be different, depending on whether fixed or mobile networks are under consideration.

While the mainstream debate relates to traffic prioritisation, there have been examples of some entities, both content and service providers, that have blocked the exchange of traffic for some services, as well as applications or the attachment of equipment. This is either because commercial negotiations have reached an impasse or possibly an attempt to limit competition. An example is when content providers prevent consumers from using certain types of set-top boxes to access video content available from them on the World Wide Web (although this also raises some technical issues). Further examples relate to blocking applications, such as Skype, or over-the-top video services. Such examples are relatively rare and quickly draw attention from consumers and regulators.

The European Commission has launched a consultation process in order to take forward Europe's net neutrality debate. This will cover the convenience of ISPs adopting traffic management practices, any possible harm for users, impact on competition in conjunction with the new European regulatory framework, and whether the European Union needs to act on this issue. The responsible European Union Commissioner expressed her commitment to an open and neutral Internet, while acknowledging the complexity of the issue. Chile's Parliament has recently passed an amendment of the General Telecommunications Law, stating that ISPs must not interfere, discriminate against or hinder access to content, application or services, except for security reasons.

In April 2010, a United States Federal Appeal's Court, in action brought by Comcast, ruled that the FCC had limited authority, under its application of current statutes, to direct the company not to treat traffic in a non-neutral manner. On 21 December 2010, the FCC adopted an "Open Internet Order", which responded to the Court decision. The Open Internet Order adopted three basic rules that are applied in conjunction with the complementary principle of reasonable network management. The three basic rules adopted are designed to: promote transparency by requiring providers to disclose the network management practices, performance characteristics and terms and conditions of their broadband services; prevent blocking of lawful content, applications, services or non-harmful devices; and ensure there is no unreasonable discrimination in transmitting lawful network traffic. Moreover, in Canada, the Canadian Radio-television and Telecommunications Commission issued a decision that establishes a framework to guide ISPs in their use of Internet traffic management practices.

Network neutrality, in respect to traffic prioritisation, raises a complex set of issues that need to be considered by policy makers and regulatory authorities, not least of which involve the level of competition available for broadband access. Any intervention by regulators may be viewed as benefiting one actor in a value chain over another in their commercial negotiations for the exchange of traffic between their networks or network providers. The litmus test is undoubtedly whether any intervention is beneficial for consumers. In drawing conclusions on this, factors that will need to be taken into account include how any action may affect outcomes, such as investment, at all levels of value chains, as well as whether any initiative would assist or hinder the Internet's ability to be a platform for innovation. Given the range of issues that need to be considered, OECD countries will benefit from a broad debate that will foster the principles on which the future Internet will be based.

Mobile termination rates (MTRs)

In OECD countries two retail pricing structures are used for mobile communications. The most common is known as calling party pays (CPP). Under this system the person initiating the call pays the entire, directly attributable cost incurred by both operators involved in the call. A second system, used in North America (Canada, United States) and some non-OECD countries in Asia (*e.g.* Hong Kong, China; Singapore), is known as receiving party pays (RPP). Under the latter pricing model, both the users initiating and receiving the call contribute to the overall cost of the call. In recent years, regulators in countries with CPP have increasingly intervened to reduce prices for mobile termination. In those countries with RPP, greater reliance on market forces has been evident.

High mobile termination rates can be a barrier to lower prices for mobile calls and more effective competition in mobile markets. This is because mobile providers have a degree of monopoly power in terminating calls to their users from the customers of other providers. Operators levying far higher MTRs than the efficient operator's incurred cost would imply placing an additional hurdle for mobile operators seeking to explore price reductions and behave independently from their competitors. In particular, high MTRs prevent the launching of flat-rate mobile plans, thus lowering usage. Additionally, if MTRs are set well above costs, this creates substantial transfers between fixed and mobile users. Asymmetric charging between a pair of mobile operators may result in excessive payments from smaller to larger competitors. Current MTR arrangements are presented here (Table 2.11).

Most regulators in countries with the CPP model have been involved in setting up a framework to reduce MTRs. In 2009, the European Commission issued a Recommendation on the Regulatory Treatment of Mobile Termination Rates, which stated that regulators in that area were obliged to take utmost account in carrying out their responsibilities. MTRs should only be based on the real costs that an efficient operator incurs. The French regulator, ARCEP, estimates that efficient MTRs should cost around USD 0.01 to USD 0.03 – an example of a regulator implementing this recommendation. Other examples of OECD country regulators working to reduce MTRs by regulation are found in Chile, Israel and New Zealand (currently unregulated but where regulation has been recommended by the NRA). Some countries do not, as a rule, regulate mobile termination rates and thus these are commercially negotiated between carriers. This is because RPP provides greater scope for market forces, although arbitration is sometimes undertaken if carriers do not reach an agreement.

International mobile roaming

Concerns continue regarding high prices for international mobile roaming services across the OECD area and the drawbacks these create for trade and travel. The European Union has extended and expanded the 2007 Roaming Regulation to include SMS, data roaming and further transparency measures for consumers. Policy makers and regulators elsewhere are also devoting greater attention to the factors that result in high prices, and proposing a way forward in terms of increasing price transparency and empowerment for consumers. These initiatives include fostering effective competition and promoting awareness of substitutes.

In 2009, the OECD produced two reports on international mobile roaming. These reports benchmarked prices, undertook market analysis, and suggested actions that policy makers and regulators could take to address excessive prices. A number of international entities have been active in some regions, including countries outside the OECD area, with discussions underway at the International Telecommunication Union. IIRSA/CITEL (Latin America), AREGNET (Arab Countries), APECTEL and the Asia Pacific Telecommunity are among other transnational organisations involved in roaming issues. In some of these regions, OECD countries are also exploring co-ordinated options. For example, the Governments of Australia and New Zealand have initiated a joint assessment of trans-Tasman (bi-lateral) roaming services.

It is widely agreed that roaming services have inherent characteristics that make them difficult to address by means of traditional regulatory tools, including their cross-country nature. Measures proposed to address these aspects include raising awareness of roaming prices and substitutes, furthering international co-operation, examining the role of the WTO framework, and regulating wholesale and retail prices, among others. If some sort of regulation is enforced, regulators will have to bear in mind a possible way for regulatory exit (*i.e.* when the market no longer needs to be regulated and there is effective competition). At present, the dysfunctions of international mobile roaming markets are far from being adequately addressed across the OECD area, and as such, this issue will most likely remain relevant in the immediate future.

Spectrum policy: Main trends

The 2006 OECD Report "*Spectrum Dividend: Spectrum Management Issues*" highlighted the opportunities that would arise from the release of spectrum resources currently dedicated to analogue television broadcasting. The digital switchover has now taken place in a number of countries, while others are planning to undertake it in coming months. By way of example, the European Union has recommended to its member states that they finalise the transition by 2012. Twelve OECD countries underwent this process during 2010 or earlier, and proceeded to switch off analogue emissions. Data on recent or on-going spectrum allocation processes in the OECD area is presented here (Table 2.12).

New mobile wireless services, especially mobile broadband, require significant spectrum resources, taking into account increased usage and the bandwidth requirements of rapidly developing smartphone services. The opportunity to benefit from these resources and use them for advanced wireless services is clear. Lower spectrum bands (*e.g.* 700 to 900 MHz) provide good transmission capabilities, which involve lower investments in network deployment (as fewer base stations are needed) and are especially suitable for rural areas.

Some OECD countries have recently undertaken or will soon conduct spectrum auctions for these bands. While bids are expected to be lower than those made for 3G spectrum bands a decade ago, they will provide a significant source of public revenue. Germany raised around USD 6 billion through an auction in April/May 2010 for the 800 MHz band, where 70 MHz was auctioned. In 2010, Mexico completed the process of auctioning the 1.7, 1.9 and 2.1 GHz bands, with the average price per MHz being higher than in previous spectrum allocations (2005), and comparable with those raised in other countries that auctioned similar bands. Although the initial one-off assignment fees were relatively low (USD 665.5 million for 90 MHz), spectrum usage fees to incentivise efficiency are also applied, which amount to USD 231.1 million per annum over 20 years. To facilitate market entry, certain blocks had limits as to the total amount of spectrum that a single player could hold. As a result, some blocks were assigned at the reference price and no bids were made for one of the spectrum bands, which may also be due to the current market competitive conditions.

The Australian Government plans to auction its "digital dividend" (700 MHz) spectrum, comprising the frequency range 694-820 MHz, in 2012. It aims to make the spectrum available to new users following the completion of the analogue switch-off at the end of 2013 and the subsequent clearing of digital broadcasting services out of the band. The recent FCC "white space" decision allows for the use of a variety of unlicensed services of the former unused bands between television channels, as these are less necessary in the context of digital television. The National Broadband Plan noted the importance of unlicensed spectrum in creating opportunities for new technologies and recommended that the FCC complete the television white spaces proceeding as expeditiously as possible.

The complexity of the process of reallocating spectrum resources for wireless services not only depends on the timing of the switch-off process, but also on spectrum management and planning issues such as existing spectrum allocations in a given country.

Evolving mobile communications

The report *Mobile Communication Developments in the OECD Area* (2010) summarized current developments in new generation mobile technology. Telia-Sonera was the first operator to launch commercial LTE service in Stockholm, Sweden and Oslo, Norway in

December 2009. Clearwire, together with Sprint, provided WiMAX-based 4G services with covering 55.7 million people. Further deployments are expected by the end of 2010 and 2011/2012 in countries including Austria, Finland, Japan, Korea and the United States. The report also noted the increasing uptake of smartphones.

The use of unlimited data tariff plans, popular with many users, has stimulated traffic growth and raised questions over the pricing structures of some mobile networks. In the United States, AT&T (and its affiliates), which has an exclusive handset arrangement with Apple for one of the most popular smartphones (Apple's iPhone), announced that it would move to tiered pricing for new customers, and would no longer offer a plan for unlimited data use. In response, some of the company's competitors stepped up their advertising for their unlimited plans with rival smartphones. They also offered customers various choices to tether smartphones and portable devices, such as tablet computers, to their mobile handsets, with unlimited tariff plans.

Unlimited data plans undoubtedly encourage increased data usage and most likely the development of applications for smartphones. At the same time, increased use may challenge network capacity, requiring higher investments by operators to avoid network congestion. To what extent usage will be curtailed by data caps, and network enhancements will match increasing data usage, will be seen in the future. The key issue for policy makers is whether there is sufficient competition, in any market, to provide a range of tariff options with reasonable prices to meet user requirements.

New device and bundling arrangements

Amazon's Kindle and Apple's iPad, as well as the growing range of competitive devices, have become popular in a relatively short space of time. Although not only offering a communications service, they make use of wireless data connectivity to complement the device's functionality. While these devices can use Wi-Fi if they access mobile wireless networks such as 3G services, there needs to be a commercial relationship. Under sponsored connectivity models, there is no longer a direct contractual link between the network provider and the end user. For example, Amazon and Apple may act to provide the customer's interface (accession, billing, support) with the network provider.

The growth in the use of exclusive arrangements for marketing some of the most popular mobile devices has received attention in some countries. Apple's iPhone strategy, for example, has been to sign exclusive deals with one operator per country, then sometimes allow other mobile providers to offer the device. Such arrangements have raised concerns regarding competition law in some OECD countries. As an example, Apple and Orange committed not to engage in exclusive distribution contracts concerning the iPhone, after the French competition authority issued an antitrust decision specifically annulling Apple and Orange's exclusive deal. This decision was later endorsed by a court, which argued that it would harm competition in the French mobile market. At the same time, the competition faced by both operators and equipment manufacturers is expanding choice for consumers at an unprecedented rate. As has been the case in the past, the key issue for policy makers is to ensure there is sufficient competition in their market, and that consumers can switch between services, under reasonable terms and conditions, to take advantage of these offers.

Contingent on the success of newly released devices, new bundling arrangements and changes in industry partnerships are likely to continue shaping communications markets in OECD countries. In addition to traditional business models for mobile services, sponsored connectivity models are being developed. Under these models, customers do not have a direct relationship with connectivity providers. The best known example of this is the Amazon Kindle e-book reader and service. Amazon directly pays for the network connection and the Kindle's user pays for this service via the content purchased from Amazon.

Faster mobile broadband networks will expand the potential for tethering. Tethering allows a wireless handset to work as a modem and provide wireless Internet connectivity to other devices, such as netbooks, notebooks and multimedia players. This may have significant implications for competition between fixed and mobile networks. Nonetheless, wireless services may have a more limited substitutability for fixed connections if carriers apply restrictions on tethering, for example, by certain operators excluding tethering from their fixed monthly data plans.

Broadband as universal service

Universal service policies were introduced to ensure that every citizen had access to telephony services. This evolved to bridge analogue and then digital divides by guaranteeing that rural or remote areas or low-income users were provided with access to a set of affordable telecommunication services. Over the years the tools to achieve this aim have been expanded, due to technological development, but so too have the set of services that policy makers regard as essential to participate in economic and social interaction.

Following the liberalisation of telecommunication markets, government's tasked incumbent operators with the default provision of universal service. This ranged from providing standard network connections in areas that may not otherwise have been served to the deployment of public payphones. This became known as Universal Service Obligations (USOs), sometimes met wholly by the incumbent or in combination with contributions from new entrants.

OECD countries have taken different approaches to addressing the issue of USO financing (Universal Service Funds, direct public subsidies, etc.). Whether broadband should be included in USOs is currently under discussion. The underlying goal is to ensure broadband for all, but the question is whether USOs are the best way to achieve it. In this regard, the Seoul Declaration on the Future of the Internet Economy stated: "We will facilitate the convergence of digital networks, device, applications and services, through policies that: … ensure that broadband networks and services are developed to attain the greatest practical national coverage and use."

The European Commission has consulted on universal service and, more specifically, on whether its scope should be expanded to include broadband. A few OECD governments have taken the decision to include broadband as part of USOs. At the end of 2008, the Finnish Government decided to extend the scope of universal service to broadband and legislation was passed to ensure that a minimum-speed broadband Internet connection would be determined. Switzerland has included access to the Internet at 600/100 Kbps download/upload capacity as an element of Universal Service Obligations since 2008. France's "*France Numérique 2012*" plan, launched by the government in 2008, included the objective of broadband access for 100% of the population by 2012, through the creation of a certificate to be granted to those providers offering a minimum of 512 Kbps at an affordable price of less than USD 48 per month. In the United Kingdom, the government has stated its commitment to a universal service provision of at least 2 Mbps broadband by 2015.

While extending broadband coverage is among the objectives of every OECD government, implementation approaches differ. Few countries have chosen to include it as a specific users' right enforceable by legislation. Most have decided to foster broadband deployment plans that aim to extend coverage in rural areas or subsidise broadband connections for people with special needs, low income levels or who reside in remote areas. There is a risk that state aid for broadband may crowd out private investments or run contrary to fiscal consolidation policies. This means that policy makers have to bear these constraints in mind. The need to ensure the greatest practical coverage and the increasing use of broadband by businesses and citizens will surely keep this issue at the forefront of public debates in years to come.

Several approaches have been taken to ensure sufficient coverage and speed in broadband services. While some governments have taken the initiative to fund and own broadband infrastructure (Australia, New Zealand), others have redefined universal service obligations to include broadband connectivity (*e.g.* Finland). Some have taken the approach of providing incentives to providers to extend broadband coverage and upgrade connectivity, by means of subsidies or grants to deploy infrastructure.

Mobile coverage has also been the target of public policy concerns, with coverage obligations included in spectrum tendering processes (*e.g.* France, Germany, Spain), where coverage milestones and deployment speed were among the criteria evaluated in the context of spectrum licensing procedures. In some cases (*e.g.* O2 in the United Kingdom), the regulator threatened to shorten the license validity, should coverage obligations not be met.

Convergence trends

Convergence trends are increasingly present in the OECD area, in parallel with the advent of bundled offers of voice, data and television services. Cable networks were originally deployed to provide cable television services, but have been upgraded to support high-speed data services. Similarly, a high number of DSL providers offer IPTV services, providing new competition for other television broadcast platforms (terrestrial, satellite, cable). Convergence has therefore enabled cross-platform and cross-service competition, as virtually every service may be provided over any technology platform. As a specific example of cross-platform competition, PSTN-based international calls were put under considerable competitive pressure by the advent of Skype and other Voice over Internet Protocol (VoIP) services. Furthermore, the relationship between content network providers plays a prominent role in market dynamics. This is because the initial success of new communication technologies or market entrants is heavily reliant on access to the most popular content, the rights for which may have been contracted many years previously.

The immediate consequence for regulation is the need for a comprehensive regulatory approach. Indeed, some countries have merged telecommunications and broadcast regulators into one convergent entity (*e.g.* the United Kingdom). Regardless of whether a convergent regulator is in place, broadcast, communications and content provision should be regarded as a whole, at least when addressing some aspects, and a convergent regulatory approach should be developed accordingly.

Note

1. In telecommunications, a femtocell is a small cellular base station, typically designed for use in a home or small business. It connects to the service provider's network via broadband and allows service providers to extend service coverage indoors, especially where access would otherwise be limited or unavailable.

Table 2.1. **Number of communications providers by country (2009)**[1]

	Fixed PSTN (local, national and international)	Cellular mobile	MVNOs	Number of licensed cable operators
Australia	4	3	Not available (NA)	3
Austria	134	4	2	126
Belgium	60	3	30	11
Canada	109 (legal entities providing local service)	25 (legal entities)	11 (legal entities)	224
Chile	22	3	0	645
Czech Republic	49	4	10	74
Denmark	19	44	1	17
Estonia	14	3	2	15
Finland	35	14	1	25
France	42 (including operators of pre-paid cards and of voice over broadband)	4 (in metropolitan France, one of which has not yet started operations)	18	1 (nation-wide, non-licensed)
Germany	64	4	2	400
Hungary	5	3	0	294
Iceland	2	4	0	0
Ireland	25	4	2	8
Israel	7	4	0	1
Italy	33	4	15	2
Japan	21	6	Permitted	510
Korea	3	3	0	100
Luxembourg	10	3	Permitted	71
Mexico	8	10 (regional operators)	None	1 164
Netherlands	180	3	50	45
Norway	11	30	3	No licenses required. A few major operators and several medium size and small regional/local networks
New Zealand	2	3	7	1
Poland	173	5	15	284
Portugal	25 licensed (17 active)	3	2	9
Slovak Republic	10	3	0	217 licensed (164 active)
Slovenia	2	6	2	73 (registered)
Spain	349 registered (91 active)	4	221 registered (20 active)	368 registered (87 active)
Sweden	169	86	3	5
Switzerland	NA	4	1	129
Turkey	123	3	28	13
United Kingdom	120	4	30+	2
United States	1 521 (includes interconnected VoIP)	101	43	33 858[2]

1. The number of operators may differ from that considered by other statistical publications, due to different definitions.

2. In the United States, there are currently a total of 33 858 active community units (CUIDs) registered with the FCC. These CUIDs are not licensed by the FCC but need local franchise agreements.

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Table 2.2. **Fixed line subscriber market share of new entrants**

(% of total fixed analogue subscriber lines)[1]

	2002	2003	2004	2005	2006	2007	2008	2009
Australia*[2]	0.9	1.8	2.5	1.8	1.9	2.2		13.8
Austria	5.3	6.0	7.4	9.6	10.2	14.3	16.0	17.3
Belgium*			7.7	11.3	13.9	18		
Canada	32.1	36.7	37.2	39.5	42.6	46.2	50.3	52.0
Chile	20.0	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Czech Republic				3.0	3.0		15.0	18.0
Denmark	13.1	14.1	18.5	19.8	19.0	18.9	18.0	18.1
Estonia	0	0	0	10	10	10	20	20
Finland					33.6	32.0	33.0	33.6
France								
Germany	0.8	3.0	5.0	8.0	13.0	19.0	27.0	33.0
Greece								
Hungary	21.0	21.0	22.0	23.0	25.0	27.1	29.82	21.0
Iceland								
Ireland				20.0		23.0	27.0	28.0
Israel[3]						12.4	19.6	25.8
Italy						14.3	21.2	25.7
Japan			5.3	6.2	7.5	9.0	10.0	12.1
Korea	4.0	4.4	6.2	6.8	7.9	9.6	10.2	10.1
Luxembourg				1.2	3.0	4.0	9.0	11.5
Mexico								
Netherlands								28.0
New Zealand					8.0	11.5	19.0	25.0
Norway								
Poland	1.3	10.0	9.0	10.4	11.7	14.7	18.2	26.8
Portugal	4.7	5.6	6.7	10.8	21.5	28.0	31.0	35.3
Slovak Republic	0	0	0	0.05	0.08	2.26	3.69	4.75
Slovenia				0.5	0.5	0.5	0.2	0.3
Spain	4.9	5.6	6.7	10.7	21.7	28.4	21.1	27.4
Sweden				0.5	0.5	0.5	0.5	0.5
Switzerland	0	0.1	0.2	0.2	0.3	0.3	0.3	0.3
Turkey			0.007	0.016	0.067	0.458	1.267	
United Kingdom	17.0	18.0	20.0	24.0	30.0	32.0	36.0	42.0
United States	13.1	16.3	18.5	17.9	17.1	18.1	16.3	16.8

(*) indicates Secretariat estimates.

1. The underlying methodology may differ from that used for similar entrants' share indicators (*e.g.* the European Commission's). There may also be methodological inconsistencies among countries listed in this table.

2. Government estimate.

3. Share of the market of single lines. The indicator represents a blend of lines, minutes and revenues.

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Table 2.3. **Number of preselected lines and as a percentage of analogue subscriber lines**

	2002	2003	2004	2005	2006	2007	2008	2009	As % of lines
Australia									
Austria	870 000	976 041	961 037	935 200	851 000	720 000	600 593	536 692	23.15
Belgium	595 627	850 384	1 115 761	1 048 672	908 751	837 849	808 751	758 778	22.15
Canada									
Chile									
Czech Republic					442 848	384 568	262 364	180 468	9.13
Denmark	905 161	918 018	564 009	398 903	339 868	293 230	142 000	144 000	9.57
Estonia	61 500	91 800	86 000	70 100	37 737	32 650	27 494	23 288	6.31
Finland									
France						4 949 000	3 328 000	2 795 000[1]	12.84
Germany	4 141 000	4 900 000	6 000 000	6 300 000	5 900 000	4 700 000	3 600 000	3.300.000[2]	16.70
Greece		274 021	635 867	306 119	355 538	788 729	502 546	278 144	5.89
Hungary				778 890	791 201	795 703	525 179	449 508	15.52
Iceland		27 061	18 805	16 371	16 255	15 592	12 698	9 833	7.23
Ireland		225 000	326 796	389 724	406 598	397 684	399 438	388 450	25.87
Israel								NA	NA
Italy	3 370 000	3 600 000	4 017 000	4 085 000	3 829 000	2 779 800	1 754 200	1 227 236	7.61
Japan	16 348 000	16 826 000	16 997 000	16 232 000	16 971 000	16 592 000	16 250 000	15 640 000	41.25
Korea	21 674 000	22 085 000	21 792 000	21 774 000	21 831 413	21 776 590	21 260 929	19 303 520	96.09
Luxembourg				57 800	56 700	57 000	58 000	56 000	32.15
Mexico									
Netherlands						831 000	744 000	593 000	15.38
New Zealand					159 681	198 867	171 169	149 005	7.99
Norway	395 168	321 719	164 618	101 324	71 660	53 098	40 867	31 918	3.47
Poland	413 539	395 168	164 618	1 342 410	855 446	539 983	69 774	96 746	1.01
Portugal	374 268	355 516	394 893	470 107	429 935	292 779	171 816	141 703	4.76
Slovak Republic					19 777	17 446	10 614	9 558[3]	1.01
Slovenia			4 436	14 636	25 061	14 719	9 921	10 634	2.62
Spain	1 511 379	1 883 435	2 385 890	2 295 128	1 934 027	1 822 476	1 548 762	1 212 848	5.96
Sweden	1 946 392	2 101 042	1 989 576	1 048 306	850 231	513 448	337 237	283 469	6.98
Switzerland[4]	1 369 252	1 247 631	1 196 146	1 131 565	1 025 124	826 702	754 661	742 572	26.74
Turkey				1 402	3 091	12 304	80 293	212 805	1.29
United Kingdom	638 138	2 597 664	4 571 131	5 781 273	6 314 843	5 893 113	4 164 040	3 726 092	13.44
United States				73 611 000	58 112 000	52 857 000	48 387 000	42 764 000	40.41

1. Preselection + selection per call. 2. As of 1 April 2009. 3. CS only. 4. Government estimate.

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Table 2.4. **Market share of the largest mobile network operators in the OECD, 2009**

Number of operators:	1	2	3	4	5
Australia	37.4	30.7	25.7		
Austria	42.3	30.1	19.8	7.8	
Belgium	37.7	26.5	25.8		
Canada	35.7	28.7	27.4	8.2	
Chile	42.1	38.3	19.6		
Czech Republic	38.8	38.3	22.6	0.3	
Denmark*	43.7	27.4	18.9	7.0	2.7
Estonia[1]	28.2	16.2	13.2		
Finland	38.0	36.0	24.0	2.0[2]	
France*	42.8	33.2	16.3		
Germany	36.2	32.0	17.5	14.3	
Greece	44.5	31.2	24.3		
Hungary	43.4	34.5	22.1		
Iceland	44.2	30.6	16.0	0.4	
Ireland	39.6	32.8	21.8	5.8	
Israel	34.7	32.0	29.1	4.2	
Italy	35.1	33.9	20.9	10.1	
Japan	48.4	27.5	19.0	3.5	2.3
Korea	50.6	31.3	18.1		
Luxembourg	51.2	34.7	14.2		
Mexico*	70.9	21.9	4.4	3.7	
Netherlands	52.6	24.0	23.4		
New Zealand	52.3	49.1	4.0		
Norway	52.5	26.8	8.5	3.1	
Poland	31.3	30.6	29.5	7.7	0.5
Portugal*	45.0	38.5	15.6		
Slovak Republic	52.6	37.3	10.0		
Slovenia	56.3	28.1	8.1	0.8	
Spain	43.6	30.4	20.4	2.5	
Sweden	41.5	32.0	16.9	8.4	
Switzerland[3]	60.3	19.4	16.7	1.5	
Turkey	56.3	24.8	18.8		
United Kingdom	24.6	20.6	20.2	15.8	6.2
United States*	32.0	30.0	18.0	12.0	9.0

(*) indicates Secretariat estimates.
1. 1.16 million additional subscribers belong to an MVNO operator focused on roaming prepaid services abroad.
2. Includes subscribers for a small network-based mobile operator and two MVNOs.
3. Government estimate.

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Table 2.5. **Number portability: number of fixed and mobile numbers ported (in 2009)**

	Fixed subscriber lines ported	As % of subscriber lines	Mobile numbers ported	As % of mobile subscribers
Australia	832 218	9.2	1 346 689	5.6
Austria	14 950	0.6	156 758	1.4
Belgium	133 686	3.9	293 754	2.3
Canada	NA	NA	NA	NA
Chile	NA	NA	NA	NA
Czech Republic	706 913	35.8	229 546	1.6
Denmark	287000	19.1	583000	7.9
Estonia	27 389	7.4	48 799	1.8
Finland	46 000	3.2	575 000	7.5
France	2 900 000	13.3	1 800 000	2.9
Germany	4 287 807	21.7	699 922	0.6
Greece	544 039	11.5	486 815	2.4
Hungary	136 250	4.7	63 060	0.5
Iceland	NA	NA	NA	NA
Ireland	32 000	2.1	357 453	7.4
Israel				
Italy	761 792	4.7	4 120 000	4.7
Japan			2 280 000	2.0
Korea	1 908 555	7.1	10 312 622	21.5
Luxembourg	1 794	1.0	21 043	2.9
Mexico	314 778	1.6	741 193	0.9
Netherlands				
New Zealand	74 000	4.0	92 000	2.0
Norway			576 000	10.7
Poland	800 284	8.3	827 216	1.8
Portugal	230 973	7.8	74 710	0.5
Slovak Republic	126 447	13.4	92 092	1.7
Slovenia	90 438	22.3	65 216	3.1
Spain	1 480 000	7.3	4 500 000	8.8
Sweden	268 000	6.6	445 000	3.8
Switzerland	120 000	4.3	143 000	1.6
Turkey	33 000 (2010)	0.2	10 095 579	16.0
United Kingdom				
United States	15 857 000	10.4	15 966 000	5.8

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Table 2.6. **Quality of service**

	Fixed and mobile voice services *Does the government publish or require the operators to publish data on QoS?*	**Broadband** *Does the government publish or require the operators to publish data on QoS?*	*Is there a government-endorsed site where users can test the speeds and characteristics of their broadband connections?*
Australia	Yes. Australia's regulatory body for telecommunications consumer issues, the Australian Communications and Media Authority (ACMA), publishes a number of quality of service reports, including: • on a quarterly basis, the *Telecommunications Performance Data* report on the performance of the three major carriage service providers in relation to the fixed telephone network (Telstra, Optus and AAPT). It reports on performance in relation to: – the percentage of connections and repairs made within the timeframes specified in the *Telecommunications (Customer Service Guarantee) Standard 2000 (No. 2).* – Priority Assistance arrangements (for enhanced connection and repair timeframes for consumers with diagnosed life-threatening medical conditions). – Telstra's national payphone performance in accordance with Telstra's Universal Service Obligation (USO) as outlined in Telstra's Standard Marketing Plan. • on an annual basis, the *Telecommunications Performance Bulletin,* which provides information on telecommunications performance data over the financial year. It covers the major service providers, Telstra, Optus and AAPT, with regard to the Customer Service Guarantee (CSG), Priority Assistance, the Network Reliability Framework (NRF) and payphones. • on an annual basis, the *Communications Report*, which reports on the performance of carriers and carriage service providers with particular reference to consumer satisfaction, consumer benefits and quality of service. In addition, it discusses issues such as the efficiency and quality of the telecommunications industry's supply of carriage services, the CSG, NRF and the telecommunications industry performance in meeting industry codes and standards.	Yes. The *Communications Report* provides information on consumer satisfaction with Internet services.	No
Austria	No. Only the Universal Service operator is obliged to provide Quality of Service for Voice Telephony.	No	No. But ISPs frequently offer such tests on their websites.
Belgium	Yes. For USO operator www.bipt.be/ShowDoc.aspx?objectID=3156&lang=en	Yes, for significant market power (SMP) operator. The BIPT publishes a list of key performance indicators for unbundling and bitstream.	No

StatLink http://dx.doi.org/10.1787/888932397416

Table 2.6. **Quality of service** *(cont.)*

	Fixed and mobile voice services	**Broadband**	
	Does the government publish or require the operators to publish data on QoS?	*Does the government publish or require the operators to publish data on QoS?*	*Is there a government-endorsed site where users can test the speeds and characteristics of their broadband connections?*
Canada	Fixed: incumbent operators are required to meet public QoS standards in areas where they remain regulated. Mobile: No.	No	No
Chile	Yes. Mobile service QoS is published, although not fixed service QoS. The launch of a QoS website is planned.	No	Yes. www.mibandaancha.cl/prontus_bpp/site/edic/base/port/inicio.html
Czech Republic	In accordance with the Electronic Communications Act, each provider of a publicly available telephone service is obliged to publish a description of the service and its guaranteed level of quality.	No. In accordance with the Electronic Communications Act, the NRA is entitled to require a provider (publicly available electronic communication services) to publish certain information (overview of current prices, quality, conditions of provision of publicly available services).	No.
Denmark	No	No	www.it-borger.dk/verktojer/bredbaandsmaaleren
Estonia	A communications provider is required to make publicly available at least the following information: • Average supply time for initial connection (taking account only 95% of fastest times). • Number of end-user complaints about service quality per end user. • Average service fault repair time (taking into account only 95% of fastest times). A communications provider providing mobile telephone services is required to make publicly available a map of the coverage area.	A communications provider is required to make publicly available at least the following information: • Average supply time for initial connection (taking account only 95% of fastest times). • Number of end-user complaints about service quality per end user. • Average service fault repair time (taking into account only 95% of fastest times). A communications provider providing data communications service is required to make publicly available the information about upload and download rates of the data transmission it provides to the end user.	Users can test the speeds at the following address: www.netitester.ee
Finland	The Finnish Communications Regulatory Authority has required operators to publish average response times of customer service.	The Finnish Communications Regulatory Authority has required operators to publish average response times of customer service.	No
France	**Fixed voice service** ARCEP's 2008-1362 decision (4 December 2008) imposes an obligation on residential fixed voice service providers to measures QoS parameters as defined by ETSI. From 30 June 2010, every provider serving 100 000 subscribers or more (per access type), has an obligation to publish these results quarterly on its website. There are guidelines and description available on how to conduct measurements, auditing procedures, etc. QoS indicators are broken down into two categories: • Six indicators on network access. • Three specific indicators and phone service QoS. **Mobile service QoS** Mobile service QoS has been evaluated yearly since 1997, by means of an annual survey conducted by ARCEP. It addresses voice service and mobile data services such as SMS, MMS, WAP, Visio and FTP.	From 1 July 2010, operators have to publish one or several coverage maps, showing service and download speed levels (Decree no. 2009-166 and Decision of 15 January 2010, implementing article D. 98-6-2 of the Post and Electronic Communications Code, concerning the publication of information on geographical coverage of electronic communications services). ARCEP has imposed the following obligations on France Télécom: • Article 17 of Decision 2008-0835: France Télécom must measure and publish relevant QoS indicators of wholesale LLU offers, duct access offers. • Article 12 of Decision 2008-0836: France Télécom must measure and publish relevant QoS indicators for DSL wholesale offers. Publication will generally occur on a monthly basis.	No. ARCEP has realised that there is a lack of transparency regarding actual download speeds enjoyed by consumers and is undertaking a study to identify relevant indicators and follow up actual download speeds, before and after customer subscription. This could result in measuring and publishing QoS information.

.../...

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Table 2.6. **Quality of service** *(cont.)*

	Fixed and mobile voice services	**Broadband**	
	Does the government publish or require the operators to publish data on QoS?	*Does the government publish or require the operators to publish data on QoS?*	*Is there a government-endorsed site where users can test the speeds and characteristics of their broadband connections?*
France *(cont'd)*	This evaluation is a legal obligation to verify that operators achieve their QoS objectives as stated in their tariff books. It also aims to provide the consumer with an improved perception of QoS and daily usage conditions.		
Germany	No	No	No
Hungary	Operators are required to publish data on QoS in connection with those services that belong to the Universal Service.	Guaranteed upload and download speed (kbit/s) at subscriber access points within the network (guaranteed by the service provider to subscribers, have to be published in the standard contract conditions, in every announcement and media appearance) must be realised in 80% of cases. The Authority is considering to set further parameters (packet loss, delay, jitter, overbooking), which must be published on the website of the service providers.	No
Iceland	No	No	No
Ireland	Yes. ComReg publishes such data. Regulation 10 of the Universal Service Regulations requires the Universal Service Provider (currently the incumbent Eircom) to publish information on its performance in relation to the provision of the USO. In exercise of ComReg's general powers to publish information under Regulation 17 of the Framework Regulations, ComReg simultaneously publishes the performance data with Eircom on a quarterly basis.	No	No
Israel	Publication is not required, but operators are obliged to meet minimum QoS standards in their licenses, which are published.	No. Measures are currently being taken to require ISPs to publish minimum guaranteed speeds along with best-effort speeds.	No
Italy	According to AGCOM's Decision no. 179/03/CSP, operators are required to publish an annual report about QoS for both fixed and mobile services on their websites. This report contains the specification of quality indicators, the methods of measurement, and the achieved quality results for this calendar year. AGCOM Decisions no. 254/04/CSP and no. 104/05/CSP establish quality indicators for fixed and mobile services, respectively, on a yearly basis, AGCOM issues an ad-hoc Decision setting the quality goals for universal service indicators in the calendar year of reference. In order to allow consumers to compare operators' data on QoS, a specific section of AGCOM website provides a list of links to relevant websites where operators have published data on QoS relevant to their own services.	According to AGCOM's Decision no. 179/03/CSP, operators are required to publish an annual report about the QoS of broadband services on their website. This report specifies quality indicators, the methods of measurement and the quality results achieved in the calendar year of reference. AGCOM Decisions no. 131/06/CSP and no. 244/08/CSP establish quality indicators for broadband services. In order to allow consumers to compare operators' data on QoS, a specific section of AGCOM's website provides a list of links to relevant websites where operators have published data on QoS relevant to their own services.	No. However, AGCOM, pursuant to Decision no. 244/08/CSP is implementing a specific system (elaborated by qualified research institutes Fondazione Ugo Bordoni and Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione of the Ministry of Economic Development) to measure effective broadband quality. Moreover, AGCOM is currently working to certify and launch a free service in the next months, which will allow consumers to test speeds and features of their broadband connections.
Japan			None
Korea	In the case of mobile phones, the QoS of WCDMA calls is tested and publicly notified by the government. Not applied to fixed-line telephony.	The quality of broadband service (transmission speed based on a hub) is tested and publicly notified by the government.	Transmission speed based on the hub can be tested at "speed.nia.or.kr", operated by the National Information Society Agency (an affiliated institute of the Ministry of Public Administration and Security).

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Table 2.6. **Quality of service** *(cont.)*

	Fixed and mobile voice services	Broadband	
	Does the government publish or require the operators to publish data on QoS?	*Does the government publish or require the operators to publish data on QoS?*	*Is there a government-endorsed site where users can test the speeds and characteristics of their broadband connections?*
Luxembourg	No	No	No
Mexico	The government publishes data on QoS only for mobile voice services in certain Mexican states.	No	No
Netherlands	For regulated wholesale access services, service level agreements and performance indicators must be published, including QoS.	For regulated wholesale access services, service level agreements and performance indicators must be published, including QoS.	No
New Zealand	No	The Commerce Commission has published some data on the quality of residential broadband plans.	No
Norway	Yes, specifically on customer support.	No	Yes. The NPT has newly made a "broadband speed tester" available. This service let users test their own Internet connection: www.nettfart.no/ (in Norwegian only).
Poland	Indicators of data transmission quality in phonic frequency using modems are used only in case of Universal Service. Paragraph 5.5 of the standardization document ETSI EG 202 057-2 V1. 3 .1. is used to calculate the value of that indicator, description of the indicator and methods of calculation. Specific values of indicators are set out in the decision of the President of UKE of 5 May 2006, designating a universal service provider and determining the conditions of universal service provision. These values are provided for the period 2006 to 2011. Parameter: Throughput for 80% of connections (kbit/sec) 48.00 kbit/s.	At present, the government (Ministry of Infrastructure) is preparing a decree (Article 63.3 of *Prawo telekomunikacyjne act)*, which will introduce an obligation for operators to publish information on QoS.	No
Portugal	Fixed Voice Service ICP-ANACOM approved and published, on 28 August 2009, Regulation no. 372/2009 (Regulation amending the Regulation no. 46/2005, of 14 June) applicable to the services of access to the public telephone network at a fixed location and the publicly available telephone service at a fixed location: www.anacom.pt/render.jsp?contentId=983509 This Regulation defines a set of parameters to be measured by all fixed telephone service providers regarding their contents, formats and manner of information, to be published, in order to ensure that the information disclosure to end users, concerning quality of service, is clear, up-to-date and comparable. According to the referred Regulation, all fixed telephone service providers shall publish and make available, at their headquarters and at all their establishments, quality of service indicators, containing their definition and the measuring methods, as well as defined performance objectives and quality levels reached, where applicable. The referred	Under the scope of the determination *"Object and form of public disclosure of the conditions of provision and use of electronic communication services":* *1)* *Companies* are bound to publish and disclose information on the levels of quality which the service provider undertakes to uphold with its customers, that is, minimum levels of quality of service to be engaged with the customer, non-compliance with which determines the payment of compensation or refund. In the Annex of determination ICP-ANACOM recommended some parameters, which companies may use (some of these parameters are specific to Internet Service Providers). *2)* In addition, *companies providing the Internet Access Service*, if they decide to publish and disclose levels of quality on access and surfing maximum and average speed, are specifically bound to disclose an additional warning stating that the speed provided for any connection, at any time, may not be ensured, as it depends on the level of use of the network and server to which the customer is connected.	No

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Table 2.6. **Quality of service** *(cont.)*

	Fixed and mobile voice services	**Broadband**	
	Does the government publish or require the operators to publish data on QoS?	*Does the government publish or require the operators to publish data on QoS?*	*Is there a government-endorsed site where users can test the speeds and characteristics of their broadband connections?*
Portugal *(cont'd)*	information shall also be disclosed in the undertaking's website, when it exists, in a clearly identifiable advertisement. Additionally and by determination of 21/04/2006, ICP-ANACOM approved the "Object and form of public disclosure of the conditions of provision and use of electronic communication services." www.anacom.pt/render.jsp?contentId=357230 According to the referred determination, companies providing publicly available telephone networks and services are bound to publish and disclose, namely, information on the levels of quality which the service provider undertakes to uphold with its customers, that is, minimum levels of quality of service to be engaged with the customer, non-compliance with which determines the payment of compensation or refund. In the Annex of determination ICP-ANACOM recommended some parameters which companies may use.		
Slovak Republic	No	No	No
Slovenia	Only for universal service.	SMP operators have to inform APEK and also publish on its website data about quality of fully unbundled access, shared access and co-location.	No
Spain	Operators have the obligation to publish on their websites, on a quarterly basis, information on the actual QoS actually of fixed and mobile telephony, and broadband services. Additionally, the Ministry of Industry compiles and publishes the following information on its website: www.mityc.es/telecomunicaciones/es-ES/Servicios/CalidadServicio/informes/Paginas/Informes09.aspx		No
Sweden	No	No	Yes
Switzerland	No, although there is legal basis for it (art. 12a LTC)	No, although there is legal basis for it (art. 12a LTC)	No
Turkey	Although there is a legal basis for it, which means the Authority can publish it or force operators to publish QoS values, no data has been published data yet. However, SLA QoS target values are published on the incumbent's website.	As new regulations on QoS will be implemented, the Authority can publish it or force operators to publish QoS values.	
United Kingdom	Until recently (2009), certain providers of fixed voice services were required by the regulator to collect and publish specific aspects of customer service information, such as complaints data or faults resolution times. However, following a review, Ofcom decided to withdraw this requirement as it was decided that the information was not meaningful or comparable. A link to this decision can be found at: www.ofcom.org.uk/consult/condocs/topcomm/statement/ There is currently no requirement in place requiring mobile or fixed line operators to publish information on QoS.	At present, there is no formal requirement placed on broadband providers to publish information of QoS. However, all of the largest ISPs in the UK (representing over 95% of broadband connections) have signed up to Ofcom's code of practice on broadband speeds, which requires ISPs to provide an estimate of line speed at point of sale; and from July 2011 consumers will be able to exit the contract with the ISP if actual speeds are significantly below the estimate provided. The 2010 study is set out at http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/broadband-speeds/broadband-speeds-2010/	No

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Table 2.6. **Quality of service** *(cont.)*

United States	The FCC publishes an annual mobile wireless services competition report, which looks at many aspects of the mobile wireless services market, including network quality and call quality performance in the industry. In addition, FCC rule 8.3 requires broadband Internet access providers, including mobile broadband Internet access providers, to publicly disclose accurate information regarding the network management practices, performance and commercial terms of its broadband Internet access services, sufficient for consumers to make informed choices regarding use of such services, and for content, application, service and device providers to develop, market and maintain Internet offerings, and disclose accurate information regarding network performance and network management practices.	The FCC requires broadband Internet access providers to disclose accurate information regarding network performance and network management practices. The FCC is also undertaking to test and publish information about QoS of fixed broadband providers by testing ISPs performance to capture information about actual end-user experience relative to the service level purchased.	Yes. The FCC has a tool available on its website for consumers to, among other things, assess the upload and download speeds of their broadband connections.

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Table 2.7. **Local loop unbundling**

	What (if any) are the unbundling requirements for *PSTN operators?*	**What (if any) are the unbundling requirements for *cable operators?***	**What (if any) are the unbundling requirements for *FTTH operators?***
Australia	The telecommunications access regime in the Competition and Consumer Act 2010 (formerly the Trade Practices Act 1974) was amended in 2010. The Australian Competition and Consumer Commission (ACCC) will be required to make access determinations for most declared services, including the unconditioned local loop service, the line sharing service and the wholesale line rental service. Terms and conditions of access to a declared service that are specified in an access determination must include terms and conditions relating to the price of access to the declared service or a method of ascertaining price. Access determinations replace the previous regulatory access model of negotiation between access seekers and access providers; bilateral arbitration by the ACCC; and indicative prices published by the ACCC.	The ACCC imposes no unbundling requirements on Hybrid Fibre-Coaxial operators as this service has not been declared under Part XIC of the Trade Practices Act 1974.	The ACCC imposes no unbundling requirements on Fibre-to-the-Home operators as this service has not been declared under Part XIC of the Trade Practices Act 1974.
Austria	**Unbundled local loop:** One-off connection charge for new line with works on subscriber premises: EUR 109 One-off connection charge for new line with works on subscriber premises (12 months minimum contract duration): EUR 69.40 One-off connection charge for new line without works on subscriber premises: EUR 31.50 Monthly rental/full loop: EUR 5.87 Monthly rental/sub loop greenfield distr. Frame – network termination point – EUR 4.55 Monthly rental/sub loop inhouse distr. Frame – network termination point – EUR 0 **Shared line:** One-off connection charge for new line: EUR 31.50 Monthly rental/shared line – EUR 2.94 **Wholesale line:** (Voice line resale) One-off charge for system implementation: EUR 750 One-off connection charge for new line: EUR 109 Monthly rental for wholesale line: EUR 12.70	No requirements	No requirements, as FTTH is not part of the relevant markets for physical access and wholesale broadband access.
Belgium	**Unbundled local loop:** One-off connection charge: EUR 91.93 Monthly rental – full loop: EUR 7.57 – sub loop: EUR 5.66 **Shared line:** One-off connection charge: EUR 74.15 Monthly rental – full loop: EUR 0.87 – sub loop: EUR 0.85 **WBA VDSL2:** One-off connection charge: EUR 120.18 – without voice: EUR 13.85 – with voice: EUR 9.04	No requirements	No requirements

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
Canada	**Unbundled local loop:** One-off connection charge: – CAD 38.27 per order – CAD 20.79 per loop Monthly rental: – Downtown Toronto, Montreal, Ottawa: CAD 6.75 – Major metropolitan areas: CAD 13.45 – Medium-sized communities: CAD 15.42 – Small cities and towns: CAD 17.61 – Communities with less than 1 500 lines: CAD 28.40 – Communities with 1 500 to 8 000 lines and average loop length greater than 4 km: CAD 22.43. www.crtc.gc.ca/eng/archive/2011/2011-24.htm **Shared line:** Monthly rental: CAD 2.52 **Bitstream:** (Bell Canada, residential services) One-off connection charge: CAD 50.00 Monthly rental (3-year term, 1 000 lines): 640 Kbps: CAD 11.15 2 Mbps: CAD 13.40 5 Mbp: CAD 18.20 www.crtc.gc.ca/eng/archive/2010/2010-802.htm	**Bitstream (Rogers Communications)** One off connection charge: CAD 63.53 Monthly rental: 3 Mbps: CAD 15.42 10 Mbps: CAD 20.24 15 Mbps: CAD 25.61	No requirements
Chile	Local loop unbundling is not mandatory, so unbundling and bitstream charges are negotiated between operators. However, there is a price-cap framework, which operators are free to observe. LLU is very rarely used in Chile.	No requirements	No requirements
Czech Republic	**Unbundled local loop:** One-off connection charge: CZK 1 223 Monthly rental -full loop: CZK 262 Monthly rental sub loop: CZK 245 **Shared line/bitstream:** One-off connection charge: CZK 970 Monthly rental: – full loop: CZK 53 – sub loop: CZK 53 **Wholesale line:** One-off connection charge: CZK 80 Monthly rental: – full loop: monthly rental – sub loop: CZK 178 + CZK 5 for each call or CZK 318 (prices for WLR)	No requirements	No requirements

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
Denmark	**Unbundled local loop:** One-off connection charge: – full loop: without technician DKK 329 / DKK 739 with technician. Monthly rental – full loop: DKK 832 – sub loop: DKK 734 **Shared line:** One-off connection charge: – without technician: DKK 264 – with technician: DKK 739 Monthly rental: – full loop: DKK 416 – sub loop: DKK 367 **Wholesale line:** One-off connection charge: 585 DKK Monthly rental: – full loop: DKK 85.75 – sub loop: not available	There are currently no unbundling requirements for cable operators, but from 31 March 2010 there will be LRAIC regulated bitstream prices on the incumbent's cable network.	No requirements
Estonia	**Unbundled local loop:** One significant market power (SMP) operator (incumbent) has unbundling requirements. One-off connection charge: EEK 898 Monthly rental – full loop: EEK 95 – sub loop: no obligations **Shared line/bitstream:** One-off connection charge: EEK 1 565 Monthly rental: – full loop: EEK 60 – sub loop: no obligations **Wholesale line:** no obligations	No requirements	No requirements
Finland	Unbundled local loops charges are based on weighted average of 32 SMP operators: One-off connection charge: EUR 107.20 Monthly rental: – full loop: EUR 12.07 – sub loop: EUR 5.90 Ficora's price comparison of SMP operators' charges for local loops (May 2010) can be found at Ficora's web pages: www.ficora.fi/attachments/englantismp/5q0uKdZvz/Hintavertailu100501Tilaajayhteydet_englanti.pdf	No requirements	No requirements

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
France	ARCEP's unbundling policy has privileged full unbundling. Public initiative ("*collectivités territoriales*") has greatly promoted competition in the fixed broadband market. By the end of 2008, nearly 40% of unbundled NRAs were in place thanks to public initiative (2 millions of which would have never been unbundled without public intervention). For the remaining 2.6 million, this has enabled a faster unbundling process than with private initiative only. As of 31 March 2010, 80% of the population has access to unbundled lines. **Unbundled local loop:** Monthly rental: EUR 9/month **Shared-line:** Monthly rental: EUR 1.8/month **Wholesale line access/bitstream:** – Access component: EUR 7.3/month (with telephone subscription), EUR 14.15/month (without) – Aggregation component "*composante collecte*"*):* IP: EUR 3.20/access/month + EUR 30/Mbps (débit constaté) ATM: EUR 70/Mbps (débit garanti) Ethernet: EUR 3.20/access/month + EUR 30/Mbps (débit constaté)	No requirements	No requirement, although there is a standard access offer to ducts made available by France Télécom. The conditions of this offer are fixed by a decision from ARCEP, and their reference tariffs are reviewed every 6 months.
Germany	**Unbundled local loop:** One-off connection charge: EUR 30.83 Monthly rental: – full loop: EUR 10.20 – sub loop: EUR 7.21 **Shared line/bitstream:** One-off connection charge: EUR 38.20 Monthly rental: – full loop: EUR 1.84 – sub loop: n/a **Wholesale line:** n/a	No requirements	No requirements
Greece	EETT reviewed OTE's proposal for the Reference Unbundling Offer (RUO) and finally approved it with significant modifications in April 2007. It has been updated twice (July 2007, April 2008).		
Hungary	**Unbundled local loop:** HUF 9 364	No requirements	No requirements

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
Ireland	**Unbundled local loop:** Monthly rental: EUR 12.41 – Sub loop: EUR 10.53 **Shared line:** Monthly rental: EUR 0.77. **Wholesale line:** ComReg will issue a consultation on its second round review of the Wholesale Broadband Access market in the second half of 2010. Last Outlook: EUR 92.39 (one-off, monthly EUR 18.02)	No requirements	Obligations imposed on Eircom for all Wholesale Physical Network Infrastructure Access products and services in an NGN/NGA environment would include: • an obligation to meet reasonable requests for access to, and use of, specific WPNIA network elements and associated facilities. • an obligation to negotiate in good faith with OAOs requesting access. • a transparency obligation (including the requirement to communicate quarterly with OAOs regarding the introduction of new technologies, products, services or processes). • a non-discrimination obligation. • a price control obligation. • obligations concerning cost accounting and accounting separation.
Iceland	No requirements	N/A	No requirements
Israel	Currently no unbundling requirements. A public committee is setting the detailed requirements subsequent to the Ministerial adoption of a wholesale market regulation.	The regulation will apply to cable operators as well.	FTTH services will be available to alternative operators as well. No "regulatory holiday" will be granted on very high-speed services.
Italy	**Unbundled local loop:** One-off connection: – full loop: EUR 35.88 – sub loop: EUR 26.40 Monthly rental: – full loop: EUR 8.49 – sub loop: EUR 5.67 **Shared access:** One-off connection: EUR 35.88 Monthly rental: EUR 1.97 **Shared bitstream:** One-off connection: EUR 46.66 Monthly rental: EUR 8.00 **Naked bitstream:** One-off connection: EUR 86.26 Monthly rental: EUR 18.72 (of which EUR 10.72 of naked component) **Wholesale line rental:** One-off connection: EUR 5.39 Monthly rental: EUR 11.79	N/A	Decision no. 731/09/CONS has imposed on Telecom Italia the provision of bitstream services over fibre infrastructures. Before the end of 2010 AGCOM will define the key elements of the wholesale offer that Telecom Italia has to publish in advance of the provision of retail services.

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
Japan	**Unbundled local loop:** Charge for Dry copper: JPY 1 416(NTT East) or JPY 1 410(NTT West) per month for a line. **Shared line:** Charge for Line Sharing: JPY 72 (NTT East) or JPY 84 (NTT West) per month for a line **Wholesale line:** No requirements	No requirements	**Local loop unbundling:** Charge for Shared Access (Main Terminal Line): JPY 4 179 (NTT East) or JPY 4 368 (NTT West) per month for a line **Shared line:** Charge for Shared Access (Branch Terminal Line): JPY 350 (NTT East) or JPY 382 (NTT West) per month for a line Charge for Single Star: JPY 4 610 (NTT East) or JPY 4 932 (NTT West) per month for a line **Wholesale line:** No requirements
Korea	No requirements	No requirements	No requirements
Luxembourg	Regulation 08/135/ILR (17/12/200) modifies regulation 08/128/ILR, regarding the RUO (Reference Unbundling Offer)	No requirements	No requirements
Mexico	No requirements	No requirements	No requirements
Netherlands	Due to the implementation of an all-IP network, local access points (MDFs) will be phased out. New regulation is in place for wholesale obligations for KPN regarding unbundled access to the subloop (the part of the network between the street cabinets and the copper access network) and all accompanying facilities. This results in price caps for subloop services and parts of subloop services. This includes the use of the copper line between household and street cabinet, and collocation in the street cabinet. All elements mentioned are regulated.	OPTA has implemented regulation for resale of the cable connection including analogue television signals, and is implementing regulation for access to broadcast third-party digital television packages, both with on-off and monthly charges. Cable is not regulated for broadband or telephony.	OPTA implemented full unbundling regulations for ODF-access in 2009.
New Zealand	The access network arm of the incumbent provider has to make available unbundled local loops and sub loops to access seekers. Prices are as follows: **Unbundled local loop:** Individual new connection where site visit required: NZD 225 Individual new connection where no site visit required: NZD 74.83 Bulk rate for 20 or more new connections at the same exchange where no site visit required: NZD 56.12 **Full loop monthly rental:** Urban exchange: NZD 19.84 Non-urban exchange: NZD 36.63 **Sub loop connection:** Individual new connection where end-user site visit required: NZD 258.94 Individual new connection where no end-user site visit required: NZD 108.77 Bulk rate for 10 or more new connections at the same Distribution Cabinet where no End User site visit required: NZD 81.57 **Sub loop monthly rental** (excluding cabinet co-location charges): Urban charge: NZD 11.99 Non-urban charge: NZD 22.14	No requirements	No current requirements, though open access requirements are proposed for layer 1 and layer 2 services provided by the companies that receive government funding under the government's ultra-fast broadband project.

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
Norway	**Unbundled local loop:** One-off connection charge: NOK 1 056 Monthly rental: – full loop: NOK 95 – sub loop: NOK 95 **Shared line (local loop and sub loop):** One-off connection charge: NOK 556 Monthly rental: NOK 59 **Bitstream:** One-off charge without PSTN/ISDN: NOK 1 380 One-off charge with PSTN/ISDN: NOK 700 Monthly rental: From NOK 154 to 296, depending on speed **Wholesale line:** Same as unbundled local loop	No requirements	No requirements
Poland	**Unbundled local loop:** One-off connection charge: PLN 55.21 Monthly rental: – Full loop: PLN 22,00 (full access), PLN 5.81 (shared access) – Sub loop: PLN 16,77 (full access), PLN 5.81 (shared access) **Shared line:** One-off connection charge: PLN 40.98 Monthly rental: PLN 21.76	No requirements	No requirements
Portugal	**Unbundled local loop:** One-off connection charge: EUR 38 (including eligibility, EUR 8.05) Monthly rental: – full loop: EUR 8.99 – sub loop: N/A **Shared line:** One-off connection charge: EUR 38 (including eligibility, EUR 8.05) Monthly rental: EUR 2.51 **Wholesale line/bitstream:** One-off connection charge: EUR 38 ("normal" installation, without splitter and assistance) Monthly rental: – ADSL Local access: EUR 6.71 (512 Kbps, contention 1:50), EUR 60.46 (24 Mbps, contention 1:10).	No requirements	No requirements

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
Slovak Republic	**Unbundled local loop:** One-off connection charge: EUR 57.17 Monthly rental: – full loop: EUR 8.6 – sub loop n/a **Shared line:** One-off connection charge: EUR 54.17 Monthly rental: EUR 3.45	No requirements	No requirements
Slovenia	**Unbundled local loop:** One-off connection charge: EUR 44.55 Monthly rental: full loop: EUR 8.33 – sub loop: n/a **Shared line:** One-off connection charge: EUR 55.55 Monthly rental: – full loop: EUR 3.27 – subloop: n/a **Wholesale line/bitstream:** One-off connection charge: EUR 20.03 Monthly rental: full loop EUR 8.33 – subloop: n/a	No requirements	No requirements
Spain	**LLU and naked DSL:** One-off connection charge: EUR 24 Monthly rental: EUR 7.79 For Bitstream Naked DSL, a monthly extra charge of EUR 9.55 is applied. **Shared line:** One-off connection charge: EUR 32.41 Monthly rental: EUR 2.06 **Wholesale bitstream services:** One-off connection charge: EUR 47.13 (EUR 38.72 for bitstream services provided over lines without PSTN) Monthly rental: Depends on the level of aggregation (national vs. regional), combination of downstream/upstream bitrates, and QoS guarantee (*i.e.* contention ratio). Best-effort services are provided at regional level at fees varying from EUR 8.84/month (for 128/128Kbps) to EUR 21.16/month (for 30 Mbps/3 Mbps)	No requirements	No requirements
Sweden	Fixed SMP operator TeliaSonera's unbundling and bitstream access obligations are technology neutral as of 2010 and thus include NGA.	None	See above regarding the SMP operator

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
Switzerland	**Unbundled local loop:** (VAT excluded) One-off connection charge: CHF 44.60 (inactive lines), CHF 40.20 (active lines) Monthly rental: – full loop: CHF 18.40 – sub loop:CHF 15.20 **Shared line:** One-off connection charge: CHF 88 (if local exchange set-up), CHF 46 otherwise. Monthly rental: CHF 10.90 (5 000/500Kbps), CHF 13.40 (20 000/1 000Kbps) **Wholesale line rental (price for one 2 Mbps line):** One-off connection charge: CH 885 (in other cases CHF 1 876/CHF 2 539) Monthly rental: CHF 171.80 (handover inside the local exchange), CHF 205.80 (outside) Different fees apply if the line termination point is located within another access network, depending on distance.	No requirements	No requirements
Turkey	**Unbundled local loop:** One-off connection charge: TRY 35.44 Monthly rental – full loop: TRY 14.62 – sub loop: N/A **Shared line:** One-off connection charge: TRY 38.55 Monthly rental: TRY 5.49 – sub loop: N/A **Bitstream:** there are two types of bit stream access model: ATM and IP One-off connection charge: TRY 21.80 (valid for both models) Monthly rental: fees change in accordance with the selected tariff packages. (The packages are determined at wholesale level from 1 Mbit/s to 100 Mbit/s with quota or unlimited.) **Naked Bitstream:** One-off connection: TRY 21.80 (same with IP connection charge) Monthly rental: Naked DSL access fee and monthly rental fee Access fee for Naked DSL: TRY 8.13 Monthly rental fee changes depending on the selected tariff packet. **Wholesale line rental:** One-off connection charge: n/a Monthly rental: n/a – full loop: n/a – sub loop: n/a	No requirements	No requirements

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Table 2.7. **Local loop unbundling** *(cont.)*

	What (if any) are the unbundling requirements for *PSTN operators?*	What (if any) are the unbundling requirements for *cable operators?*	What (if any) are the unbundling requirements for *FTTH operators?*
United Kingdom	**Unbundled local loop:** One-off connection charge: – full loop new provide GBP 75.01 (2% of connections) – full loop transfer GBP 38.64 (98% of connections) – Sub-loop new provide GBP 106.62 (not price controlled) Monthly rental: – full loop: GBP 90.46 – sub loop: GBP 93.96 **Shared line:** One-off connection charge: – shared full loop new provide GBP 38.64 – shared sub loop new provide GBP 127.61 (not price controlled) **Wholesale line:** One-off connection charge: GBP 15.63 Monthly rental: GBP 11.47	No requirements	No current obligation though FTTH and FTTC are being considered as part of the Wholesale Local Access Market Review www.ofcom.org.uk/consult/condocs/wla/
United States	The FCC found that requesting carriers are impaired without access to certain high-capacity loops upon certain triggers. Specifically, incumbent local exchange carriers must unbundle DS1 and DS3 loops within the service area of a wire centre that contains fewer than a certain number of business lines or fibre-based co-locators. However, requesting carriers are not entitled to access unbundled dark-fibre loops as network elements in any instance. Pursuant to the terms of the Triennial Review Order, line sharing has been completely phased out in the US as of September 2006.	None	None

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Table 2.8. **Number of unbundled local loops**

	2002	2003	2004	2005	2006	2007	2008	2009	As % of main lines
Australia						391 000	600 000	770 000	4.33
Austria	9 075	26 437	71 595	127 851	198 000	288 000	294 036	288 708	12.45
Belgium	3 637	6 597	7 844	9 230	53 720	80 818	96 318	105 022	3.07
Canada	380 806	439 725	568 080	710 080	721 700	859 149	627 015	427 433	2.34
Chile									
Czech Republic					23 195	38 019	45 199	53 133	2.69
Denmark	905 161.0	918 018.0	564 009	398 903	339 868	293 230	142 000	144 000	9.57
Estonia	600	1 500	2 950	3 640	4 500	6 000	7 800	8 500	2.30
Finland	61 500	91 800	86 000	70 100	37 737	32 650	27 494	23 288	1.63
France		273 255	1 536 000	2 840 000	3 986 000	5 238 000	6 332 000	7 723 000	12.84
Germany	944 941	1 349 000	2 000 000	3 300 000	4 700 000	6 400 000	8 400 000	9 200 000	16.70
Greece	93	655	2 715	6 884	19 504	274 031	646 124	387 310	8.20
Hungary				40	4 424	13 182	19 191	24 403	0.84
Iceland		12 074.0	19 216.0	24 357.0	31 371.0	35 812.0			26.34
Ireland		1 366.0	1 668.0	4 978	19 528	17 918	22 652	22 903	1.53
Israel								NA	
Italy	124 400	538 800	732 909	1 085 837	1 710 906	2 902 800	3 663 800	4 272 889	26.51
Japan									
Korea	0	580	967	486	133	70	3	1	
Luxemburg				3 651	7 025	10 224	12 788	15 092	8.66
Mexico									
Netherlands	29 107	93 490	462 214	657 127	796 560	573 500	653 000	706 000	18.31
New Zealand							3 000	37 000	1.98
Norway		67 925	145 392	234 539	285 417	330 819	355 894	338 280	36.73
Poland					59	132 525	355 072	511 584	5.34
Portugal	54	1 867	8 780	72 019	195 754	291 175	305 244	280 518	9.42
Slovak Republic									
Slovenia					27 129	55 984	73 345	76 669	18.91
Spain		16 016	113 954	434 760	939 009	1 353 948	1 698 249	2 153 795	10.59
Sweden	7 671	51 902	209 944	373 504	517 781	609 164			15.01
Switzerland				0.0	0.0	778.0	31 333.0	152 800[1]	5.50
Turkey								15 000	0.09
United Kingdom	2 250	8 229	27 801	192 000	1 295 082	3 728 810	5 502 607	6 362 446	22.95
United States	17 229 000	21 296 000	22 253 000	17 108 000	13 124 000	11 115 000	9 792 000	9 056 000	7.78

1. Provisional results.

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Table 2.9. **Government ownership of public telecommunication network operators**

	Name of operator	Government ownership (2010): includes status, control of PSTN and golden shares
Australia	NBN Co Limited	100% owned: ordinary shares (NBN Co also has a wholly owned subsidiary, NBN Tasmania Limited).
	Telstra	As of 31 March 2010, the Future Fund held AUD 3 930 million worth of Telstra shares (approximately 10.9% of the company). The Future Fund was established to assist future Australian governments meet the cost of public sector superannuation liabilities. The Fund operates at arm's-length from the government.
Austria	Telekom Austria TA AG	28.68%
Belgium	Belgacom Group	53.5 % (Belgian state)
	NMBS – Holding NV	99.9% (Belgian state)
	Infrabel	Belgian state
	Sofico	Walloon region (100%)
	Syntigo	Belgian state
	Tecteo	Liège province, 56 communes, Walloon region
	CIRB	Brussels region
Canada	Saskatchewan Telecommunications	Province of Saskatchewan: 100% owned
Chile	Telefonica de Chile	Private ownership: 100%
Czech Republic	O2 (Cesky Telecom)	Private ownership
Denmark	TDC	Private ownership
Estonia	AS Televõrgu	The operator is owned by Eesti Energia AS in which the government has 100% ownership shares
	Riigi Infokommunikatsiooni Sihtasutus (State Infocommunication Foundation)	The foundation does not have shares, but is controlled by the state 100%.
	Levira AS	State ownership: 51%
Finland	TeliaSonera	State ownership: 37.3% by Swedish government and 13.7% by Finnish government
	Elisa ltd.	0.65%
France	Orange/France Télécom	State ownership: 26.97% (as of 1 July 2010)
Germany	Deutsche Telekom AG	14.8% directly by the Federation 16.9% by KfW Bank (state owned)
Hungary	Magyar Telecom	Private ownership: 100%
Iceland	Siminn	Private ownership: 100%
Ireland	Eircom	Private ownership: 100%
Israel	Bezeq	Private ownership with government retaining 1% of shares with no special rights.
Italy	Agertel S.r.L.	100% by municipalities/local authorities
	Alpikom S.p.A.	60% municipalities/local authorities and national public utilities
	Brennercom S.p.A.	80% municipalities/local authorities
	Infracom Italia S.p.A.	40% municipalities/local authorities
Japan	NTT East Corp. and NTT west Corp (indirect Government Ownership)	The NTT Law stipulates that the Government shall always hold one-third or more of the total number of the outstanding shares of NTT Corp. (holding company), and the law also stipulates that NTT Corp. shall always hold all the shares of NTT East Corp and NTT West Corp. Therefore, the government does not have any direct ownership shares in NTT East Corp. and NTT west Corp. Accordingly, the Government holds 33.7% of the issued shares of NTT Corp as of March 2010.
Korea	KT	Private ownership
Luxembourg	EPT	100%
	Luxconnect[1]	100%
Mexico	Satélites Mexicanos, S.A de C.V.	State ownership: 20% of economic rights and 55% of the voting rights.
Netherlands	KPN	Private ownership

1. Luxconnect's mandate is to develop and manage a fibre-optic network and to build and operate one or several Internet primary access centres. This mandate may be expanded by the government.

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Table 2.9. **Government ownership of public telecommunication network operators** *(cont.)*

	Name of operator	Government ownership (2010): includes status, control of PSTN and golden shares
New Zealand	Telecom New Zealand	Kiwi share: • If anyone (whether a New Zealander or a foreigner) purchases shares in Telecom NZ that take its total shareholding to or beyond 10%, then they must get prior approval from both the Crown (represented by the Minister of Finance, and known as the Kiwi Shareholder) and the Board. • If a foreigner purchases shares in Telecom NZ that take its total shareholding beyond 49.9%, then it must get prior approval from the Crown (represented by the Minister of Finance, and known as the Kiwi Shareholder). If the Kiwi Shareholder has not consented, a shareholder will be given three months' notice to dispose of the excess shareholding, after which the board may sell the shares on the shareholder's behalf.
	Kordia, which in turn owns Orcon	Kordia ownership Kordia is a state-owned enterprise (SOE), fully owned by the New Zealand government, but operating as a commercially viable entity. Kordia legal entities: • Kordia Group Ltd • Kordia Ltd • Kordia Pty Ltd (ABN 33 062 953 940) • Kordia Solutions Pty Ltd (ABN 80 002 649 229) • Orcon Internet Ltd
Norway	Telenor ASA	53.97%
Poland	TP SA	3%
	Telefony Opalenickie SA	67.46%
	Telefony Podlaskie SA	34.16%
Portugal		The government has a golden share in Portugal Telecom Group, which has recently been found illegal by a ruling of the European Court of Justice (ECJ) in July 2010. Following the ECJ's ruling, Portugal should adapt its legislation to phase-out its golden share rights.
	PT Comunicações, S.A	7.28%
	PT Prime – Soluções Empresariais de Telecomunicações e Sistemas, S.A	7.28%
	TMN – Telecomunicações Móveis Nacionais, S.A	7.28%
	Refer Telecom – Serviços de Telecomunicações S.A	100%
	RENTELECOM– Comunicações, S.A.	51.04%
	EMACOM - Telecomunicações da Madeira, Unipessoal, Lda.	100%
	CTT – Correios de Portugal, S.A.	100%
	Rádio e Televisão de Portugal, S.A.	100%
	INFONET PORTUGAL – Serviços de Valor Acrescentado, Lda.	6.55%
	TELE LARM Portugal - Transmissão de Sinais, Lda.	The government has ownership shares in this company but ANACOM does not possess information on its percentage value.
	MINHOCOM – Gestão de Infra-estruturas de Telecomunicações	51%
	NetDouro – Gestão de Infra-estruturas de Telecomunicações, S.A	100%
	Valicom - Gestão de Infra-estruturas de Telecomunicações	51%
	Porto Digital - Operador Neutro de Telecomunicações, S.A	16.99% (33.99 if public universities' share is also considered)
	Zon TV Cabo Portugal, S.A	17.41%
	Zon TV Cabo Açoreana, S.A	17.41%
	Zon TV Cabo Madeirense, S.A	17.41%

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Table 2.9. **Government ownership of public telecommunication network operators** *(cont.)*

	Name of operator	Government ownership (2010): includes status, control of PSTN and golden shares
Slovak Republic	Slovak Telecom, a.s.	49% controlled by state (34% state holding, 15% by the National Property Fund
Slovenia	Telekom Slovenije d.d.	52.54% direct state ownership 21.61% indirect state ownership by two state-owned funds (KAD and SOD) 0.46% Telekom Slovenije d.d.(self-owned)
	Mobitel d.d.	100% owned by Telekom Slovenije d.d.
Spain	Telefonica	Private ownership
Sweden	TeliaSonera	State ownership: 37.3% (publicly listed company)
	Svenska Kraftnät	100%
Switzerland	Swisscom SA	State ownership: 57% state ownership (July 2010)
Turkey	Türksat	100% government ownership
	Turk Telecom	30% state ownership plus one golden share
	Avea	24.4% state ownership (indirectly through Turk Telecom's 81.4%)
United Kingdom	BT	Private ownership
United States	All major carriers	Private ownership

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Table 2.10. **National treatment for foreign-controlled enterprises in telecommunications**

Australia	Foreign ownership: prior approval is required for foreign involvement in the establishment of new entrants to the telecommunications sector or investment in existing businesses in the telecommunications sector. Proposals above the notification thresholds will be dealt with on a case-by-case basis and will normally be approved unless judged contrary to the national interest. Currently (as of 1 January 2010) relevant monetary thresholds are AUD 231 million for US and non-US investors. In addition, the *Telstra Corporation Act 1991* (part 2A, Division 4) places the following specific limits on foreign ownership of Telstra: • Aggregate foreign ownership of Telstra is restricted to 35% of that privatised equity. • Individual foreign investors are only allowed to acquire a holding of no more than 5% of that privatised equity.
Austria	No foreign ownership restrictions
Belgium	No foreign ownership restrictions
Canada	Legislated Canadian ownership and control requirements applicable to the telecommunications service industry were established in 1993 by the *Telecommunications Act*. Pursuant to section 6 of the *Act*, Canadian carriers (*i.e.* companies owning or operating telecommunications transmission facilities used to offer service to the public for compensation) must have at least 80% of their voting shares owned by Canadians, and not less than 80% of the members of their board of directors must be Canadians. In addition, these Canadian carriers must be controlled in fact by Canadians at all times. The Governor in Council subsequently issued *The Canadian Telecommunications Common Carrier Ownership and Control Regulations*, which establish that investor companies in such Canadian carriers will be treated as Canadian if at least 66 2/3% of their voting shares are held by Canadians. The *Radiocommunication Regulations*, made pursuant to the *Radiocommunication Act*, adopt the same Canadian ownership and control requirements for radiocommunication carrier licensees. Resellers are not subject to Canadian ownership and control requirements, nor do they apply to satellite earth stations or international submarine cables. Ownership restrictions on satellites were eliminated with the passage of Bill C-9 *the Jobs and Economic Growth Act.* The Act received Royal Assent on 12 July 2010.
Chile	No foreign ownership restrictions
Czech Republic	No foreign ownership restrictions except as regards land ownership.
Denmark	No foreign ownership restrictions
Estonia	No foreign ownership restrictions
Finland	No foreign ownership restrictions
France	No foreign ownership restrictions
Germany	No foreign ownership restrictions
Greece	No foreign ownership restrictions
Hungary	There are no foreign ownership restrictions on individuals and corporations investing in the incumbent telecommunication operator(s) in Hungary.
Ireland	No foreign ownership restrictions
Iceland	No foreign ownership restrictions
Israel	A service supplier holding a general license must be incorporated under Israeli law, and maintain his main place of business in Israel. Generally, the supplier's articles of incorporation must state that the purpose of the incorporation is to provide telecommunications services. The control of a fixed domestic licensed communications company must be held by an Israeli individual or a corporation incorporated in Israel in which Israeli individuals hold at least a 20% interest. Israeli law also imposes nationality and residency requirements on members of the boards of directors: 75% of the members of the board of directors of fixed domestic licensed communications companies must be Israeli citizens and residents. In the case of, mobile phone and international communications services, the nationality and residency requirement apply to the majority of board members. For the supply of mobile telephone services, a local partner is required and at least 20% of the control in a licensee must be held by nationals who are citizens and residents of Israel. In the case of international communications services, satellite broadcasting, and cable broadcasting, at least 26% of the control in a licensee must be held by nationals who are citizens and residents of Israel. Under the Communications (Telecommunications and Broadcasting) Law (1982), a license for cable broadcasting is not granted to an applicant in which a foreign government holds shares, but the Minister of Communications may authorize an indirect holding in the licensee of up to 10% by such a corporation. Under the Second Authority for Television and Radio Law (1990), at least 51% of the control in a concession for commercial television or regional radio must be held by nationals who are citizens and residents of Israel. In addition, it should be noted that the restrictions noted here represent the most stringent restrictions that may be enforced; the government may, and in the past has, authorized foreign investment in percentages higher than those set out in the telecommunications regulations. For example, following the privatization of telecommunications incumbent "Bezeq" in 2005, Israeli holdings in the company are only approximately 3%. Future regulatory changes, leading to a wholesale market in telecommunications services, may lead to relaxations in investment criteria for license holders who do not operate essential infrastructures.
Italy	No foreign ownership restrictions. WTO rules apply with respect to reciprocity. The principle of reciprocity applies to "non-EU" service providers
Japan	There are no restrictions on individuals and corporations investing in the incumbent PTO(s) in Japan. However, foreign capital participation, direct and/or indirect, in NTT Corp., which holds all the shares of NTT East Corp. and NTT West Corp., is restricted to less than one-third. A screening system exists under the Foreign Exchange and Foreign Trade Act. When a foreign investor, which is not only foreign affiliate resident in Japan but also any foreign investor resident in foreign country, intends to make an inward direct investment specified by Japan's regulations, he/she shall notify in advance, the Minister of Finance and the minister having jurisdiction over the business, including the Ministry of Internal Affairs and Communications, of the business purpose, amount, time of making the investment, etc. and other matters specified by Cabinet Order in regard to the inward direct investment.

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Table 2.10. **National treatment for foreign-controlled enterprises in telecommunications** *(cont.)*

Korea	A foreign government or foreigner may not in the aggregate, acquire over 49% of the total issued shares of a facilities-based supplier of public telecommunications services. According to Article 9, Clause 1, item 1 of the *Capital Market and Financial Investment Services Act*, a corporation whose largest shareholder is a foreign government or a foreigner is considered a foreigner when the total issued shares acquired exceeds 15%. As long as the aggregate foreign ownership does not exceed 49%, foreign companies are licensed to provide facilities-based services, with no other restrictions applied. To deliver telecommunication services in the domestic market, foreign service providers without a domestic presence must conclude an agreement for cross-border supply with domestic common carriers or special category telecommunications operators delivering the same service.
Luxembourg	No foreign ownership restrictions.
Mexico	Foreign ownership restriction is limited to 49%, except for the case of cellular mobile operators. Full foreign ownership of mobile operators is permitted upon review by the Foreign Investment Commission. This restriction is not only for incumbents. There are no restrictions on the operations of foreign affiliates resident in Mexico, not even on their sales of telecommunication services. Foreign services providers of satellite facilities can provide telecommunication services by obtaining a concession to exploit the rights of transmission and reception of signals of frequency bands associated with foreign satellite systems that cover and can provide services in the country. These concessions shall be granted only if approved by the Mexican Government. Like other concessions, foreign ownership cannot exceed 49%.
Netherlands	No foreign ownership restrictions
New Zealand	There are no restrictions on foreign ownership of New Zealand's incumbent telecommunications operator, Telecom NZ. However, under clause 6 of the first schedule to the Telecom NZ Constitution (www.telecom.co.nz/binarys/constitution_as_at_4_october_2007.pdf): • If anyone (whether a New Zealander or a foreigner), purchases shares in Telecom NZ that take its total shareholding to or beyond 10%, then it must obtain prior approval from both the Crown (represented by the Minister of Finance, and known as the Kiwi Shareholder) and the Board. • If a foreigner purchases shares in Telecom NZ that take its total shareholding beyond 49.9%, then it must obtain prior approval from the Crown (represented by the Minister of Finance, and known as the Kiwi Shareholder). If the Kiwi Shareholder has not consented, a shareholder will be given three months' notice to dispose of the excess shareholding, after which the board may sell the shares on the shareholder's behalf.
Norway	The Norwegian government is required by a parliamentary decision to maintain a minimum of 34% of the shares in the incumbent telecommunications operator (Telenor ASA).
Poland	No foreign ownership restrictions
Portugal	No foreign ownership restrictions
Slovak Republic	No foreign ownership restrictions
Slovenia	No foreign ownership restrictions
Spain	Article 6 of Spanish General Telecommunications Act 32/2003, of 3 November, establishes that electronic communication services can be rendered to third parties and networks operated by physical or legal persons who are citizens of a European Union Member State or hold other nationality, when, in the latter case, it has been established in the international agreements binding the Kingdom of Spain. For any other physical or legal persons, general or particular exceptions to the former rule can be authorised by the Government.
Sweden	No foreign ownership restrictions
Switzerland	No foreign ownership restrictions. Swisscom, the incumbent operator, has to be majority owned by the Swiss Confederation, both as regards shares and capital (Article 6 al.1 of the LET, *Loi sur l'entreprise des télécommunications*). In November 2005, the Federal Council indicated its will to allow the total privatisation of Swisscom and requested a plan to revise the law. In early 2006, the Swiss Parliament refused to discuss the issue of privatisation. Following the failure of Swisscom's privatisation, several parliamentary interventions have addressed Switzerland's interest in maintaining a share in Swisscom, especially in the areas of universal service provision, shareholder structure and internal security, inviting the Federal Council to follow-up on these issues.
Turkey	No foreign ownership restrictions
United Kingdom	No foreign ownership restrictions
United States	In the case of certain radio licenses, foreign entities typically participate through ownership of domestic corporations since foreign governments may not directly hold a radio license and foreign individuals and business entities may not directly hold any such common carrier, broadcast or aeronautical fixed on *en route* license under 47 USC 310(b)(1) and (2). Under 47 USC 310(b)(3), a 20% foreign ownership limit is in force for domestic business entities that directly hold these licenses. Pursuant to section 47 USC 310(b)(4), in the case of domestic business entities that directly or indirectly control another corporation or other business entity that holds such a common carrier, broadcast and aeronautical fixed or *en route* license, foreign ownership is limited to 25%, but the Federal Communications Commission (FCC) has the discretion to allow foreign ownership in excess of 25% unless such ownership is inconsistent with the public interest. In the case of common carrier and aeronautical fixed and *en route* licenses, the FCC presumes that foreign investment from WTO member countries does not pose competitive concerns to the US market and is in the public interest.

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Table 2.11. **Mobile network interconnection**

Australia	**Publication of termination rates** Wholesale termination rates are not required to be published. The following is a description of how mobile termination rates are determined and relevant information is promulgated. The relevant regulatory authority, the ACCC, has no general power to set termination rates for mobile or other network services. They can either be commercially negotiated between relevant parties or determined by the ACCC through the dispute resolution framework established under Part XIC of the Trade Practices Act 1974 (TPA). Part XIC contains the telecommunications-specific access regime. The dispute resolution framework in Part XIC reflects a "negotiate/arbitrate" model, by which parties are encouraged to seek agreement on terms and conditions of access to declared services through direct, bilateral negotiations. The termination on a mobile network of calls originating on either a fixed or mobile network is called the Mobile Terminating Access Service (MTAS). The MTAS is a declared service under the TPA, and is therefore subject to the dispute resolution framework in Part XIC of the TPA. If parties are unable to agree on terms and conditions of access to a declared service, either or both can notify the ACCC of the dispute and submit the issue to legally-enforceable arbitration. The ACCC also contributes indirectly to the determination of termination rates by publishing pricing principles for all declared services. Carriers are not legally bound to comply with these pricing principles. Instead, they are used by the ACCC to indicate to the market the pricing methodology it would be likely to adopt if it was required to arbitrate in a pricing dispute on the relevant declared service. For most declared services, the ACCC has also issued indicative prices and/or published its pricing determinations from recent arbitration cases. These indicative and arbitration-determined prices are provided for reference by parties in access pricing negotiations. Another potential source of termination rates information is a published access undertaking. Under section 152BS of the TPA, a service provider can submit an undertaking to the ACCC relating to a declared service such as the MTAS. If the terms and conditions of the undertaking – including termination rates – are accepted by the ACCC, the service provider will be obliged to grant access to the declared service consistent with these. At present, there is no access undertaking applying to MTAS termination rates. The pricing principles for 1 January 2009 to 31 December 20010 for MTAS are published at: www.accc.gov.au/content/index.phtml/itemId/865150 MTAS arbitration determinations are available at: www.accc.gov.au/content/index.phtml/itemId/793063 **Determination of fixed-to-mobile termination rates** The termination of fixed-to-mobile calls is part of the MTAS declared service. The termination rates for fixed-to-mobile calls can either be commercially negotiated between the fixed line and mobile operators themselves or determined by the ACCC though the dispute resolution framework established under Part XIC of the TPA (described above). **Regulation of termination rates** As stated above, the ACCC has no general power to set termination rates for mobile or for other network services. However, the pricing principles for 1 July 2007 to 31 December 2008 for MTAS were derived via a cost-orientated approach. The ACCC considered that the appropriate costs to recover when determining the costs of supplying the MTAS were likely to be those of an efficient operator. **Regulation of mobile-to-mobile termination rates** Termination rates for mobile-to-mobile calls (which are also part of the MTAS declared service) can be commercially negotiated between mobile operators themselves or determined by the ACCC though the dispute resolution framework established under Part XIC of the TPA (described above).
Austria	**Publication of termination rates** Yes, on the websites of the mobile network operators (reference offers) and on NRAs website (please see www.rtr.at/de/tk/MTREntgelte0709) **Determination of fixed-to-mobile termination rates** Termination rates for fixed and mobile to mobile are fixed by the regulatory authority in line with the market analysis procedure set out in the legal (national and European) framework. **Regulation of termination rates** Yes, mobile termination rates (fixed-to-mobile as well as mobile-to-mobile) must be cost orientated (LRAIC); NRA has decided that all MNOs must have similar MTRs following a glide-path to EUR 0.00201 (June 2011) (please see www.rtr.at/de/tk/MTREntgelte0709) **Regulation of mobile-to-mobile termination rates** There is no difference between fixed-to-mobile and mobile-to-mobile termination rates; prices per minute, no set-up fee.

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Table 2.11. **Mobile network interconnection** *(cont.)*

Belgium	**Publication of termination rates** The three Belgian mobile network operators publish their MTRs. This transparency obligation has been imposed by the BIPT following the decision of the Council of the BIPT of 11 August 2006, regarding the definition of markets, the analysis of the competition, the identification of operators with a significant market position, and the determination of appropriate remedies on market 16 (termination on a mobile network). This obligation has been extended by the decision of 29 June 2010 regarding the analysis of Market 7 of the European recommendation on relevant markets of 17 December 2007. **Determination of fixed-to-mobile termination rates** The BIPT decision of 29 June 2010 regarding Market 7 of the European Recommendation on relevant markets sets the tariffs for the period 2010-13. The MTRs will evolve towards pure LRIC and symmetry between the three mobile operators in four steps. The actual MTR tariffs are different for the three mobile network operators: • Belgacom: EUR 0.0072/min • Mobistar: EUR 0.00902/min • KPN Group Belgium: EUR 0.1143/min 1. Revision, 1 August 2008: Belgacom: EUR 0.0452/min Mobistar: EUR 0.0494/min KPN Group Belgium: EUR 0.0568/min 2. Revision, 1 November 2011: Belgacom: EUR 0.0383/min Mobistar: EUR 0.0417/min KPN Group Belgium: EUR 0.0476/min 3. Revision, 1 January 2012 : Belgacom: EUR 0.0246/min Mobistar: EUR 0.0262/min KPN Group Belgium: EUR 0.0292/min 4. Revision, 1 January 2013: EUR 0.0108/min for the three mobile network operators. **Regulation of termination rates** The mobile termination rates of Belgacom Mobile, Base and Mobistar are subject to the principle of cost orientation. **Regulation of mobile-to-mobile termination rates** Same as fixed-to-mobile termination rates
Canada	**Publication of termination rates** No **Determination of fixed-to-mobile termination rates** Termination rates for fixed-to-mobile calls are not regulated and generally do not apply. **Regulation of termination rates** No **Regulation of mobile-to-mobile termination rates** Mobile-to-mobile termination rates are not regulated

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Table 2.11. **Mobile network interconnection** *(cont.)*

Chile	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** Termination rates are established in every operator's tariff obligations ("*Decreto tarifario*"). The same rate applies to M2M and F2M (access charge – "*cargo de acceso*". Termination rates are different for peak and off-peak. Termination rates in 2010 were: Entel PCS, Movistar and Claro: CLP0.4938-0.9877/second. **Regulation of termination rates** Established by tariff obligation **Regulation of mobile-to-mobile termination rates** Same as F2M
Czech Republic	**Publication of termination rates** Price cap is calculated according to operator with the lowest costs of termination (including WACC). **Determination of fixed-to-mobile termination rates** Yes, the CTO regulates MTRs through price caps. Price Decisions are imposed according to results of relevant market analysis. **Regulation of termination rates** The tariffs are set by mobile operators but cannot exceed the price cap stated in the Price Decision. **Regulation of mobile-to-mobile termination rates** The CTO has published Price Decision concerning one operator where a price cap has been set.
Denmark	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** Commercially negotiated – however constrained by regulated price ceiling. **Regulation of termination rates** All suppliers of mobile termination have SMP-status and are price regulated. **Regulation of mobile-to-mobile termination rates** Commercially negotiated – however constrained by regulated price ceiling.
Estonia	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** MTRs are regulated by the NRA. **Regulation of termination rates** Currently a price cap is used to regulate MTRs (benchmark of EU average). All MNOs plus one MVNO are subject to regulation. **Regulation of mobile-to-mobile termination rates** The methodology is applied for M2M.
Finland	**Publication of termination rates** Yes, mobile operators have obligation to publish mobile termination rates on their website. Ficora's price comparison of mobile network operators termination rates can be found at Ficora's website: www.ficora.fi/attachments/5gZ6ebv37/1-216205-Matkaviestinverkon_laskevan_liikenteen_hinnat_2004-2011_en.pdf **Determination of fixed-to-mobile termination rates** Mobile operators set their rates themselves and some fixed-to-mobile calls have to be cost orientated (for example pre-selection calls). **Regulation of termination rates** Mobile termination rates must be cost orientated. **Regulation of mobile-to-mobile termination rates** Mobile operators set their rates by themselves and rates must be cost oriented. Rates are also commercially negotiated between operators. Ficora evaluates cost orientation of termination rates using FIFAC-model (Ficora's cost model).

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Table 2.11. **Mobile network interconnection** *(cont.)*

France	**Publication of termination rates** Yes, as part of the market analysis process carried out by ARCEP. Mobile operators subject to obligations must publish a reference offer. **Determination of fixed-to-mobile termination rates** Mobile termination rates are regulated by ARCEP (both F2M and M2M). Price caps are set on a cost-orientation basis (long-term incremental costs), in line with the European Commission recommendation, using a technical-economic model (bottom-up model). In practice, operators apply these caps as actual prices (even though they could charge lower ones). There is also a non-discrimination obligation in place. **Regulation of termination rates** Pure LRIC (cost-orientation). As of December 2010, price caps are EUR 0.03/min for Orange and SFR, EUR 0.034/min for Bouygues Telecom. **Regulation of mobile-to-mobile termination rates** Same as F2M
Germany	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** These are regulated by the Federal Network Agency. **Regulation of termination rates** Yes. These have to be cost orientated (according to the standard of cost of efficient provision). **Regulation of mobile-to-mobile termination rates** These are negotiated between mobile operators.
Greece	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** MTRs are regulated by the NRA. **Regulation of termination rates** Currently a price cap is used to regulate MTRs (benchmark of EU average). All MNOs plus one MVNO are subject to regulation. **Regulation of mobile-to-mobile termination rates** The same methodology is applied for all call directions.
Hungary	**Publication of termination rates** Yes, the termination rates to mobile networks are published in Hungary. **Determination of fixed-to-mobile termination rates** The terminations rates for fixed-to-mobile calls are determined by the NRA using a glide path methodology. **Regulation of termination rates** The mobile termination rates are cost oriented for SMP operators and determined by the NRA. **Regulation of mobile-to-mobile termination rates** The termination rates are the same for the three mobile operators in Hungary. From 1 January 2010 to 30 November 2010 the termination rate is HUF 14.13 HUF/min and from 1 of December 2010 the rate is HUF 11.86 HUF/min.
Iceland	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** These are determined between operators, but the rates cannot be lower than a certain price, which is based on historical cost. **Regulation of termination rates** If operators have significant market power then prices are cost-oriented. **Regulation of mobile-to-mobile termination rates** These are cost-oriented.

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Table 2.11. **Mobile network interconnection** *(cont.)*

Ireland	**Publication of termination rates** Yes. These are published in the "Switched Transit Routing and Price List" on Eircom's wholesale website at www.eircomwholesale.ie/WorkArea/DownloadAsset.aspx?id=759 **Determination of fixed-to-mobile termination rates** ComReg imposed a glide path to cost orientation and the mobile operators have voluntarily reduced their rates as part of this approach. **Regulation of termination rates** Yes, the obligations of cost orientation, transparency, non-discrimination were imposed on all mobile operators. **Regulation of mobile-to-mobile termination rates** ComReg imposed a glide path to cost orientation and the mobile operators have voluntarily reduced their rates as part of this approach. Following voluntary commitments entered into during 2009, all four mobile network operators in Ireland will each reduce their MTRs annually to reach an average rate of EUR 0.05 per minute no later than the end of 2012.
Israel	**Publication of termination rates** All termination rates are set by the Minister of Communications (with approval of the Minister of Finance) for all mobile operators, and are published in the Official Gazette. **Determination of fixed-to-mobile termination rates** Termination rates are uniform regardless of the origin of the call (*i.e.* fixed-to-mobile and mobile-to-mobile rates are identical and set for all operators). **Regulation of termination rates** See above **Regulation of mobile-to-mobile termination rates** See above
Italy	**Publication of termination rates** Yes. Rates are set by Agcom (Decision no. 667/08/CONS) **Determination of fixed-to-mobile termination rates** All mobile termination rates are regulated in the same way, regardless of the originating network. **Regulation of termination rates** Yes. In line with EC Guidelines, all MNOs are deemed to be SMP operators for termination services. SMP mobile termination rates are cost oriented and are subject to a glide path according to which rates will reach symmetry in year 2012 (Agcom Decision no. 667/08/CONS). **Regulation of mobile-to-mobile termination rates** All termination rates are determined on a cost-oriented basis.
Japan	**Publication of termination rates** Telecommunications carriers with Category II designated telecommunications facilities are obliged to publicize their interconnection tariffs including termination rates. **Determination of fixed-to-mobile termination rates** The termination rates are principally determined through negotiations between carriers. **Regulation of termination rates** The termination rates of carriers with Category II-designated telecommunications facilities are required to be below the sum of reasonable costs under efficient management and reasonable profit. **Regulation of mobile-to-mobile termination rates** The termination rates are principally determined through negotiations between carriers.
Korea	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** Government sets the conditions for rate determination and makes public the conditions. The termination rates for fixed networks (KT) and mobile networks (SKT, KT, LGT) are determined according to the criteria for interconnection. **Regulation of termination rates** Government makes public the criteria for calculating interconnection fee and calculates the mobile termination rate accordingly. SMP providers must obtain approval for their interconnection agreements. **Regulation of mobile-to-mobile termination rates** Mobile termination rates of 2009 (KRW/minute). SKT: 32.93, KT: 37.96, LGT: 38.53

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Table 2.11. **Mobile network interconnection** *(cont.)*

Luxembourg	**Publication of termination rates** The decision (06/92/ILR) of 2 May 2006 on the wholesale voice termination market on mobile networks put in place ceilings for mobile termination tariffs. **Determination of fixed-to-mobile termination rates** The termination tariffs for fixed-mobile calls are determined by the regulator through an international benchmarking process. **Regulation of termination rates** All termination rates are regulated. **Regulation of mobile-to-mobile termination rates** Same as for F2M termination.
Mexico	**Publication of termination rates** Termination rates to mobile networks are public information contained in interconnection agreements subscribed between operators. **Determination of fixed-to-mobile termination rates** Termination rates for fixed-to-mobile calls are commercially negotiated between operators. Article 42 of the Federal Telecommunications Act stipulates that public telecommunications networks licensees must interconnect their networks and, to this end, conclude an agreement within a period of 60 calendar days following a request to do so. After this period, if the parties have not concluded the agreement (or even before, upon mutual request), the Federal Telecommunications Commission will decide on the conditions of the agreement, within the following 60 calendar days. **Regulation of termination rates** Article 42 of the Federal Telecommunications Act stipulates that public telecommunications networks licensees must interconnect their networks and, to this end, conclude an agreement within a period of 60 calendar days following a request to do so. After this period, if the parties have not concluded the agreement (or even before, upon mutual request), the Federal Telecommunications Commission will decide on the conditions of the agreement, within the following 60 calendar days. The Federal Telecommunications Commission is bound by the Fundamental Technical Plan of Interconnection and Interoperability to use a reference cost model. **Regulation of mobile-to-mobile termination rates** Termination rates from a mobile to a mobile network are MXN 1 per minute or fraction. The unit of measurement for calculating interconnection charges, determined by the Federal Telecommunications Commission, will follow the principles and objectives of the Fundamental Technical Plan of Interconnection and Interoperability, as well as trends and best international practices.
Netherlands	**Publication of termination rates** Yes, via OPTA. **Determination of fixed-to-mobile termination rates** Maximum tariff determined by the regulator, OPTA. **Regulation of termination rates** Cost oriented for operators with significant market power. **Regulation of mobile-to-mobile termination rates** Maximum tariff determined by the regulator OPTA.
New Zealand	**Publication of termination rates** Termination rates for the period 2007-12 for fixed-to-mobile voice calls are published in Deeds Poll (voluntary undertakings) issued by the then two incumbent mobile operators in April 2007. Other termination rates to mobile networks (mobile-to-mobile voice, SMS, data) are unpublished. **Determination of fixed-to-mobile termination rates** These termination rates were set by the then two incumbent mobile operators as voluntary undertakings in April 2007. The third operator will have set its termination rate by commercial negotiation. **Regulation of termination rates** Fixed-to-mobile voice termination rates were subject to self regulation of the Deeds Poll of April 2007. Other mobile termination rates are currently unregulated although regulation has been recommended by the regulator. **Regulation of mobile-to-mobile termination rates** These termination rates are currently unregulated and are negotiated commercially by the operators concerned, although regulation has been recommended by the regulator.

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Table 2.11. **Mobile network interconnection** *(cont.)*

Norway	**Publication of termination rates** Yes, these are published in NPT's decisions in Market 7. In addition, the operators should publish their termination rates on their respective websites. **Determination of fixed-to-mobile termination rates** All termination rates are regulated with price caps. The prices for termination calls on mobile networks are the same regardless of whether the call originates from a fixed or mobile network. **Regulation of termination rates** Termination rates are regulated with a price cap. The NPT has used a LRIC model to estimate the effective price level for the operators. A public consultation has recently been concluded. Operators were informed of the new glide paths/price-levels for 2011 to the end of 2013. **Regulation of mobile-to-mobile termination rates** All termination rates are regulated with price caps. The prices are set using a LRIC model.
Poland	**Publication of termination rates** Yes, the mobile operator with SMP publishes its MTR on its website. **Determination of fixed-to-mobile termination rates** F2M termination rates are set at the same level as M2M termination rates. The President of UKE sets the level of MTR. **Regulation of termination rates** Yes, MTR are regulated in Poland by the President of UKE, and are cost oriented. **Regulation of mobile-to-mobile termination rates** M2M termination rates are the same as for F2M (fixed to mobile). They are based on the decisions of the President of UKE and are cost oriented. The price of termination is PLN 0.1677/min.
Portugal	**Publication of termination rates** Maximum termination rates are set by the regulator, and are publicly disclosed. **Determination of fixed-to-mobile termination rates** Maximum termination rates set by the regulatory Authority apply to all types of traffic (fixed-to-mobile, mobile-to-mobile as well as international originated calls-to-mobile) and to all SMP operators. Mobile termination rates were set taking into consideration the existence of high MTRs prices as well as the need to solve a market failure that distorts Portuguese markets (resulting from the on-net/off-net price strategies adopted by larger operators, which translate into high traffic imbalances). SMP operators have a cost-orientation obligation. However, since a cost model is not fully developed, MTRs are set based on a benchmark. In the most recent decision, a benchmark of six countries was used – Austria, Finland, France, Italy, Romania and Sweden –corresponding to the countries identified by the Commissioner for the Information Society as being on the right path towards the development of a cost model. Meanwhile, the regulator ICP-ANACOM is engaged in preparing a cost model, in accordance with the EC Recommendation on MTRs, that will be implemented to allow for further reductions in termination rates by the end of 2011. **Regulation of termination rates** Maximum termination rates set by the regulatory Authority apply to all types of traffic (fixed-to-mobile, mobile-to-mobile as well as international originated calls-to-mobile) and to all SMP operators. **Regulation of mobile-to-mobile termination rates** Same as F2M.
Slovak Republic	**Publication of termination rates** Yes. Termination rates are published on the website of the Telecommunications Office of the Slovak Republic. **Determination of fixed-to-mobile termination rates** Termination rates on public mobile telephone networks are regulated by SMP decisions. Fulfilling the obligation of non-discrimination, the same price is applicable to fixed-mobile termination rates and to mobile to mobile. Termination rates for fixed-to-mobile calls and for mobile-to-mobile calls are determined by a benchmark based on prices of those European countries which have LRIC price regulation. Until the end of January 2011, T-Mobile and Orange will charge the MTR at the rate of EUR 0.0635/min and Telefonica at the rate of EUR 0.0768/min. **Regulation of termination rates** Termination rates on public mobile telephone networks are regulated by SMP decisions. Termination rates for fixed-to-mobile calls and for mobile-to-mobile calls are determined by a benchmark based on prices of those European countries which have LRIC price regulation. **Regulation of mobile-to-mobile termination rates** Same as F2M.

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Table 2.11. **Mobile network interconnection** *(cont.)*

Slovenia	**Publication of termination rates** Yes. Termination rates to mobile networks are published on the websites of incumbent and alternative operators **Determination of fixed-to-mobile termination rates** Termination rates for mobile calls are regulated by national authority. **Regulation of termination rates** Termination rates have to be cost oriented. Imposed glidepath from LRIC plus in 2009 to pure LRIC in 2013. Asymmetry for two new entrants of 1.5 in 2009 and symmetry to be gradually achieved until 2013. **Regulation of mobile-to-mobile termination rates** Same as fixed to mobile.
Spain	**Publication of termination rates** Yes, as part of the price conditions imposed by the NRA to SMP operators in the market for voice call termination on individual mobile networks www.cmt.es/es/documentacion_de_referencia/mercados_comunicaciones_electronicas/anexos/Resolucion_glide_path_AEM_2009_967.pdf **Determination of fixed-to-mobile termination rates** The CMT decision established a glide path: the three biggest MNOs and full MVNOs must charge EUR 0.061270 (October 2009 – April 2010), EUR 0.055074 (April 2010 – October 2010), EUR 0.049505 (October 2010 – April 2011), EUR 0.0445 (April 2011 – October 2011) and EUR 0.04 (October 2011 – April 2012). Xfera's (Yoigo) glide-path is: EUR 0.091182 (October 2009 – April 2010), EUR 0.078372 (April 2010 – October 2010), EUR 0.067361 (October 2010 – April 2011), EUR 0.057898 (April 2011 – October 2011) and EUR 0.049764 (October 2011 – April 2012). **Regulation of termination rates** See above **Regulation of mobile-to-mobile termination rates** Same as F2M.
Sweden	**Publication of termination rates** Yes **Determination of fixed-to-mobile termination rates** Yes, they are regulated on the basis of the cost incurred by the terminating network. **Regulation of termination rates** Yes, they must be cost oriented if operators have significant market power (every operator does). **Regulation of mobile-to-mobile termination rates** Yes, they are regulated on the basis of the cost incurred by the terminating network.
Switzerland	**Publication of termination rates** Yes, they are published. The dominant service provider is required every year to publish prices for a reference offer. The resources and services included in this offer are listed in the Ordinance of telecommunication Services. Swisscom publishes its tariffs for mobile termination in a standard offer. **Determination of fixed-to-mobile termination rates** Negotiations between operators on a single price (no peak or off-peak prices). Prices are set per minute but charged per second. **Regulation of termination rates** Legal requirements require that prices of operators having a dominant position in the market are transparent, non-discriminatory and cost oriented. The NRA (ComCom) cannot take decisions on prices except when it is required to arbitrate, and in this case consults the Competition commission (ComCo) to determine whether there is dominance. Comcom may only make a decision if there is a dispute between operators. So far, all disputes have been closed by an agreement between operators. Therefore, Comcom has not had an opportunity to issue a decision on MTRs so far, nor has it been able to undertake a cost analysis. **Regulation of mobile-to-mobile termination rates** Negotiations between operators on a single price (no peak or off-peak prices). Prices are set per minute, but charged per second.

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Table 2.11. **Mobile network interconnection** *(cont.)*

Turkey	**Publication of termination rates** Termination rates are published both in ICTA's and mobile network operators' websites (within the Reference Interconnection Offers). (please see: www.tk.gov.tr/Basin_Duyurular/Duyurular/ucretler/sarut.htm and www.tk.gov.tr/srth/ref_eri_araba_teklifleri.htm) **Determination of fixed-to-mobile termination rates** According to the ICTA decision, the interconnection charges for operators having SMP, published on 11 February 2010, are given below: • Turkcell: TL 3.13/min* • Vodafone: TL 3.23/min • Avea: TL 3.70/min (*TL/min≈ USD 0.65 cent/min) **Regulation of termination rates** The mobile termination rates of MNOs are subject to the principle of cost orientation. **Regulation of mobile-to-mobile termination rates** Same as fixed-to-mobile termination rates. Rates are determined per minute and there is no set-up fee.
United Kingdom	**Publication of termination rates** Yes. Changes to termination rates are required to be published not less than 28 days before those charges take effect. **Determination of fixed-to-mobile termination rates** In 2007, the UK regulator (Ofcom) set the total average charge (TAC) for termination rate charges that operators can impose for fixed-to-mobile and mobile-to-mobile calls. Ofcom also set glide path mobile termination rates for the period 2007-2011 (http://stakeholders.ofcom.org.uk/consultations/mobile_call_term/statement/). Ofcom is currently consulting (full consultation published April 2010 – see http://stakeholders.ofcom.org.uk/binaries/consultations/wmctr/summary/wmvct_consultation.pdf, Subsequent consultations published November 2010, see http://stakeholders.ofcom.org.uk/consultations/mtr/ for proposals to set a charge control for the next period 2011-15. This should be completed during the first quarter of 2011. **Regulation of termination rates** Yes, total average levels are set (see above). The reason for setting charge controls is because Ofcom determined that there are separate markets for the provision of wholesale mobile voice call termination to other Communications Providers by each of the four mobile operators in the UK market –- Vodafone, O2, Everything Everywhere (formed by the merger between Orange and T-Mobile, who both previously held a position of SMP in the relevant market) and H3G. Each of the four mobile operators has significant market power in the market for termination of voice calls on its network(s). **Regulation of mobile-to-mobile termination rates** See above
United States	**Regulation of mobile-to-mobile termination rates** Mobile-to-mobile termination in the United States is unregulated, as carriers are free to negotiate any termination arrangements that are mutually agreeable.

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Table 2.12. Spectrum allocations

	Has additional spectrum for new generation wireless services been made available since 2008? If so, which bands?	How was/will this spectrum been/be allocated? Comparative selection, auction, etc.
Australia	Yes. In October 2009, the Australian Communications and Media Authority (ACMA) announced the release of spectrum in the 3.6GHz band (3 575-3 700MHz) for fixed point-to-multipoint stations in specified regional and remote areas of Australia to support deployment of wireless access services. Spectrum was released on a staged basis over the period November 2009 to December 2010. A limit was applied of 30 MHz per licensee in any given area. In 2010, ACMA allocated public telecommunications services (PTS) licences in the 2 GHz band (1 920-1 980 / 2 110-2 170 MHz) primarily to support third-generation mobile services in regional and remote Australia. The ACMA has selected the 2.5 GHz band (2 500-2 690 MHz) as appropriate to address emerging demand for broadband wireless access services in Australia. In August 2010, it was announced that the 2.5 GHz band would be auctioned in 2012-13	3.6 GHz: an administrative allocation process was used where spectrum availability exceeded demand. A price-based allocation (auction) was used where demand exceeded spectrum supply. 2 GHz: administrative allocation process
Austria	Yes, parts of the 3.5 GHz spectrum. An assignment procedure for the 2.6 GHz spectrum has been completed, see www.rtr.at/de/tk/FRQ_2600MHz	Auction
Belgium	The following royal decrees have been developed: • A royal decree (24 March 2009) regarding the access to the 3 410-3 200 / 3 510-3 600 MHz and 10 150-10 300 / 10 500-10 650 MHz bands. • A royal decree for the identification of a fourth 3G operator has been prepared. After publication of this decree, the auction can start. • A royal decree for the identification of 4G-operators in the band 2 500-2 690 MHz has been prepared. After publication of this decree, the auction can start.	The following procedures apply: • Bands 3 410-3 500 / 3 510-3 600 MHz: comparative selection (beauty contest). • Fourth 3G operator: auction. • 4G networks in the band 2 500-2 690 MHz: auction.
Canada	**Advanced wireless services (AWS) auction** On 28 November, 2007, Industry Canada released its policy framework for the auction for 105 MHz of AWS and other spectrum. Of the 90 MHz of AWS spectrum, 40 MHz was set aside for new entrants. Under the licence conditions, licensees are mandated to negotiate roaming agreements with new entrants, under certain conditions. On 21 July, 2008, Industry Canada announced that 282 licences (worth USD 4.25 billion) were conditionally assigned to 15 companies in the auction. In September 2009, all 15 companies were issued licences. **700 MHz spectrum band** The CRTC has announced 31 August, 2011 as the shut-down date for analogue over-the-air television. The transition to digital transmission of over-the-air TV signals (DTV) will reduce the amount of radio spectrum currently dedicated to over-the-air TV, thereby freeing-up spectrum to be used for other purposes, including public safety and commercial uses (*e.g.* wireless broadband). On 20 December, 2008, Industry Canada published a post-transition DTV allotment plan, in consultation with the industry, that will accommodate DTV broadcasting in channels 2-51, and free-up spectrum in what is now TV channels 52 to 69. The same day, it also published an interim agreement between Canada and the United States concerning DTV, which deals with potential cross-border interferences.	Auction
Chile	The band for 3G services (1 710 ~ 1 755 paired with 2 110 ~ 2 155 MHz)	It was a comparative selection (beauty contest) process based on deployment plans and population coverage.
Czech Republic	Not yet. Preparations are under way; the frequency bands 800 MHz, 1 800 MHz and 2 600 MHz are to be opened for systems capable of providing electronic communication services	Auction form and timeframe are still under consideration

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Table 2.12. **Spectrum allocations** *(cont.)*

	Has additional spectrum for new generation wireless services been made available since 2008? If so, which bands?	**How was/will this spectrum been/be allocated? Comparative selection, auction, etc.**
Denmark	The frequency band 2 500-2 690 MHz was made available in 2010 on a service- and technology-neutral basis. It is most likely that the spectrum will be used for LTE, although this is not a requirement. The 900 / 1 800 MHz bands were liberalised on 1 January 2011 in accordance with the 2009 amendment of the GSM-directive and the Commission decision. A decision has been taken to make the 800 MHz band available for other uses than broadcasting, including mobile broadband services. The allocation is expected to take place by the end of 2011 through an auction process.	The frequency band 2 500-2 690 MHz was subject to auction during the spring of 2010. In the 900 and 1 800 frequency bands, one frequency block of 2 x 5 MHz in the 900 MHz band and one frequency block of 2 x 10 MHz in the 1 800 MHz band were awarded through auction in October 2010 to accommodate a new operator in each band. Hi3G received both licenses and may – as well as the three current operators – use wireless technologies other than GSM for testing since 1 January 2011, and for commercial use from 1 May 2011.
Estonia	No.	
Finland	The 2 500-2 690 MHz spectrum band in autumn 2009. For more details, see www.ficora.fi/en/index/palvelut/palvelutaiheittain/radiotaajuudet/huutokauppa.html	Auction
France	Yes: 1. ARCEP allocated 5 MHz in the 2.1 GHz band to Free Mobile (fourth 3G license) in January 2010. Free Mobile is also entitled to use 5 MHz duplex in the 900 MHz band, following reallocation of spectrum released by the three existing mobile operators. 2. ARCEP has allocated, also in the 2.1 GHz band, 5 MHz duplex to SFR and 4.8 MHz duplex to Orange France, in May 2010. 3. Finally, the 800 MHz (790-862 MHz) and 2.6 GHz (2 500-2 690 MHz) bands have been identified for the purpose of high-speed wireless broadband, and should be allocated in the following months.	1. The fourth 3G license has been allocated following a call for proposals (comparative selection process). There were nine selection criteria: coherence and feasibility of the project, service and tariff offers, coverage, deployment speed, coherence and feasibility of the business plan, QoS, relations with service providers and consumers, impacts on the environment and employment. 2. The remaining spectrum in the 2.1 GHz band has been allocated by means of a comparative selection process, based on two criteria: price commitments for future MVNO deals and financial offer. 3. Allocation in the 800 MHz and 2.6 GHz band for 4G mobile networks are under review. The allocation of the 800 MHz band will have to observe the needs for territorial cohesion (Law against the digital divide, 17 December 2009).

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Table 2.12. **Spectrum allocations** *(cont.)*

<table>
<tr><th></th><th>Has additional spectrum for new generation wireless services been made available since 2008? If so, which bands?</th><th>How was/will this spectrum been/be allocated? Comparative selection, auction, etc.</th></tr>
<tr><td>Germany</td><td>Yes, in the following frequency ranges:
800 MHz Band
791.0-821.0
823.0-862.0 MHz
1.8 GHz Band
1 710.0-1 725.0 MHz
1 730.1-1 735.1 MHz
1 805.0-1 820.0 MHz
1 825.1-1 830.1 MHz
1 853.1-1 858.1 MHz
2 GHz Band
1 900.1-1 905.1 MHz
1 930.2-1 940.1 MHz
1 950.0-1 959.9 MHz
2 010.5-2 024.7 MHz
2 120.2-2 130.1 MHz
2 140.0-2 149.9 MHz
2.6 GHz Band
2 500.0-2 690.0 MHz</td><td>The Federal Network Agency allocated these frequency ranges by auction in April/May 2010.
The results are given in the following table<table><tr><td>Frequency range
(MHz)</td><td>Results
(EUR)</td></tr><tr><td>800</td><td>3 576 475 000</td></tr><tr><td>1 800</td><td>104 355 000</td></tr><tr><td>2 000</td><td>359 521 000</td></tr><tr><td>2 600</td><td>344 295 000</td></tr><tr><td>Σ</td><td>4 384 646 000</td></tr></table></td></tr>
<tr><td>Hungary</td><td>Frequency bands:
2.6 GHz (2 500-2 690 MHz)
5.8 GHz (5 725-5 875 MHz)
26 GHz (25.5-26.5 GHz)</td><td>Methods for authorisation:
2.6 GHz: auction
5.8 GHz: licence exemption
26 GHz: comparative selection</td></tr>
<tr><td>Ireland</td><td>ComReg has issued licences to several local area broadband providers using spectrum in the 3.6 GHz, 10.5 GHz and 26 GHz frequency bands
In order to maximise the efficient use of the 3.6 GHz band, and particularly in light of a recent EC Decision which Ireland must implement, ComReg has to ultimately replace the current 3.6 GHz FWALA licensing scheme with a scheme that best facilitates the provision of fixed, nomadic and mobile wireless access services.
ComReg is also developing its plans for the liberalisation of the 900 MHz and 1 800 MHz frequency bands currently used for the provision of second-generation (2G) GSM-based mobile services to consumers.
With the liberalisation of spectrum in these bands, operators will be able to offer higher speed electronic communications services to consumers (such as mobile broadband and other innovative services) with better quality and more comprehensive coverage.</td><td>ComReg endorses the policy of technology neutrality in the drive to enhance competition and investment. Management of the radio frequency spectrum is becoming more market-oriented, with greater reliance placed on operators (following consumer preferences) to decide on the best use of spectrum.
The management of spectrum centres on facilitating early access to spectrum rights on a non-discriminatory basis, using competitive selection mechanisms where appropriate. ComReg strives to ensure an efficient and fair allocation of this resource.
In general, ComReg strives to apply appropriate competitive mechanisms such as auctions when making spectrum available in response to market demand.
ComReg is currently working towards liberalisation of the 900 MHz band, which will provide mobile network operators (MNOs) with the flexibility to upgrade current capacities. It has proposed an auction for allocation of this spectrum.</td></tr>
</table>

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Table 2.12. **Spectrum allocations** *(cont.)*

	Has additional spectrum for new generation wireless services been made available since 2008? If so, which bands?	**How was/will this spectrum been/be allocated? Comparative selection, auction, etc.**
Iceland	No.	
Israel	No allocations: spectrum tender for 2.1 GHz frequencies is currently underway. Granting of frequencies is planned for the first half of 2011.	
Italy	Yes: • 900 MHz: in 2008, Agcom Decision no. 541/08/CONS allowed the reassignment of the 900 MHz band by the Ministry of Economic Development (Communications Department) for 3G services, according to the new EC provisions (revised GSM Directive 2009/114/CE and accompanying EC Decision 2009/766/CE). The Agcom Decision paves the way for the completion of a new re-assignment plan for the 900 MHz band on the basis of 5 MHz blocks. One 5 MHz block has been made available for new 3G entrants, who previously had access only to the 2.1 GHz spectrum. The migration of operators is ongoing. In particular, it is foreseen that the new entrant will also obtain 3G roaming on the 900 MHz networks of incumbents, where technically feasible. • 2 100 MHz: on September 2008, three 5 MHz FDD blocks of 2 100 MHz were made available for 3G services by Agcom decision no. 541/08/CONS. The related rights of use of spectrum have been assigned in 2009 by the Ministry of Economic Development (Communications Department) by auction to existing 2G/3G mobile network operators. No 3G newcomers emerged during the assignment procedure. • 2 600 MHz: AGCOM is fine tuning the spectrum assignment rules, based on the results of consultation following Agcom decision no. 559/08/CONS, and is taking into account EC Decision no. 2008/477/EC. The process will be launched shortly. • 1 800 MHz: AGCOM is studying the spectrum assignation rules, based on information to be made available by the Ministry of Economic Development (Communications Department) on spectrum availability, and taking into account EC Decision 2009/766/CE. The process will be launched as soon as possible. Agcom Decision no. 541/08/CONS also introduced the possible reservation of two 5 MHz blocks at 1 800 MHz for new 3G entrants, who were also 900 MHz newcomers. • 800 MHz: Agcom decision no. 300/10/CONS regarding the new Italian National Frequency Assignment Broadcasting Plan has envisaged the allocation of the upper part of the UHF band for mobile services to be used by electronic communications services other than broadcasting. Specific regulation on 800 MHz should be defined by Agcom as soon as possible, taking into account the European Commission general framework and related provisions. • 2 500 MHz: This band has to be made available for telecommunication services and the Ministry of Economic Development and the Ministry of Defence (the current assignee) are discussing the conditions under which this will be possible.	In 2009, the Ministry of Economic Development (Communications Department) released spectrum in the 2 100 MHz band, which was assigned to TLC mobile applications on the basis of Agcom rules/decisions, by means of auctions. Spectrum in the 800, 1 800 and 2 600 MHz bands (TLC new generation wireless services) is expected to be auctioned (see also Agcom decision no. 300/10/CONS for 800 MHz band and decision no. 559/08/CONS for 2 600 MHz band). Procedures will be defined shortly.
Japan	In June 2009, spectrum was allocated in the 1.5 / 1.7 GHz band for LTE (3.9G) technology.	Deployment projects are approved upon revision by the MIC, which also publishes deployment guidelines for specific base stations.
Korea	Spectrum in the 800 / 900 MHz and 2.1 GHz bands for IMT-Advanced was allocated (The spectrum allocation plan was announced on 22 February, 2009, and the allocation was completed in May 2010.) Allocated spectrum was in the 800 MHz, 900MHz and 2.1G Hz bands with 20 MHz bandwidth.	Method of spectrum charge assignment: comparative selection plus spectrum assignment charge taking into consideration its economic value Spectrum charge is calculated based on the expected sales revenue during the period of spectrum use, bandwidth and the characteristics of the spectrum.
Luxembourg	No	No
Mexico	The process of spectrum tenders for bands 1 850-1 910 / 1 930-1 990 MHz and 1 710-1 770 / 2 110-2 170 MHz took place during 2009, and the bands were allocated on 25 May, 2010.	By a simultaneous ascending auction process.

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Table 2.12. **Spectrum allocations** *(cont.)*

	Has additional spectrum for new generation wireless services been made available since 2008? If so, which bands?	How was/will this spectrum been/be allocated? Comparative selection, auction, etc.
Netherlands	1 January 2008: 2 010-2 019.7 MHz. Allocated to Mobile Communications. 1 January 2008: 2 500-2 690 MHz. Allocated to Mobile Communications (excluding aeronautical applications). 20 January 2010: 1 900-1 980 MHz. The restricted use of IMT 2000 technology in the NFP (National table of allocations) has been cancelled. 20 January 2010: 2 019.7-2 025 MHz. The restricted use of IMT 2000 technology in the NFP (National table of allocations) has been cancelled. 20 January 2010: 2 010-2 170 MHz. The restricted use of IMT 2000 technology in the NFP (National table of allocations) has been cancelled. August 2010: 900 MHz frequency band and 1 800 MHz frequency band. The restricted use of GSM technology in the NFP (National table of allocations) has been cancelled.	2008: 2 010-2 019.7 MHz. This frequency band process is not licensed. (It was the subject of the 2.6 GHz auction in 2010) 2008: 2 500-2 600 MHz. Auction. 2010: 1 900-1 980 MHz. Auction. 2010: 2 019.7-2 025 MHz. Auction. 2010: 2 110-2 170 MHz. Auction.
New Zealand	No.	When it is allocated it will likely be done by auction.
Norway	Norway allocated the 2 500-2 690 MHz band in 2007 on a technology-neutral basis through an auction. Norway has also made the frequency band 790-862 MHz band available for new services. The allocation has not yet taken place, but will take place during 2011.	The 790-862 MHz band will be allocated through an auction. The 2.6 GHz band was allocated through an auction.
Poland	Mobyland: 1 800 GHz Centernet: 1 800 GHz Aero2: 2 620 GHz	Auction
Portugal	Additional spectrum for new generation wireless services has been made available since 2008. In 2008, 2 x 1.25 MHz in the 450-470 MHz were allocated on a national basis. In 2009/2010, 36 lots of 2 x 28 MHz in the 3.4-3.8 GHz band were allocated on a regional basis (4 lots per region). ICP-ANACOM launched a public consultation for the 2.5-2.69 GHz band. They plan to awarded the band during 2011, probably in conjunction with remaining spectrum in the 1 800MHz and 2 100 MHz bands. Additional spectrum in the MHz band is also available (e-GSM), and is envisaged to be assigned in the near future.	For the 450-470 MHz spectrum a beauty contest was used, while for the 3.4-3.8 GHz band a spectrum auction was implemented. ICP-ANACOM is planning to conduct an auction for the 2.6 GHz band, probably in conjunction with the remaining spectrum (*e.g.* the 1 800 MHz and 2 100 MHz).
Slovak Republic	No	
Slovenia	No	
Spain	The awarding processes of bands 2 500-2 690 MHz and 790-862 MHz are foreseen for the second quarter of 2011. The 790-862 MHz band will be effectively made available in 2014, after the reallocation of the digital television programmes using channels 61 to 69 in frequencies below 790 MHz.	Spectrum in both bands will be allocated by auction.
Sweden	The 900 MHz band has been opened up to services other than 2G, such as 3G.	Renewal of existing licenses and one additional license (awarded to a single application).
Switzerland	Spectrum belonging to the digital dividend (781-862 MHz band), the 2 500-2 690 MHz band and the free frequencies in the 1 800 and 2 100 MHz bands will be allocated in 2011. The 900 MHz and 1 800 MHz band frequencies that will be released by the end of 2013 (expiration of GSM licenses) and the 2,100 frequency bands that will be released by the end of 2016 (expiration of UMTS licenses) will also be integrated into the procedure. www.comcom.admin.ch/aktuell/00429/00457/00560/index.html?lang=en&msg-id=36440	An auction-based, technology neutral process.
Turkey	The 2.1 GHz band (1 920-1 980 / 2 110-2 200 MHz and 2 010-2 025 MHz) has been made available for IMT 2000/UMTS services and assigned to operators. The 2.6 GHz band (2 520-2 690 MHz) has been made available as extention band for IMT 2000/IMT Advanced services. The 3.6 GHz (3 400-3 600 MHz) and 3.8 GHz (3 600-3 800 MHz) bands are planned for broadband wireless services.	The 2.1 GHz band was assigned to the operators by auction. The method for 2.6 GHz and 3.6 GHz bands will be determined shortly.
United Kingdom	No, but Ofcom announced in November 2010 that it plans to award the 800 MHz / 2.6 GHz bands in 2012 to pave the way for the creation of new LTE networks in the UK.	When it is allocated it will be done by auction.
United States	The United States' 2010 National Plan recommends making an additional 500 MHz) of spectrum available for mobile broadband within the next ten years. To achieve this and other key spectrum goals – including improving the transparency of spectrum allocation and utilization, increasing opportunities for unlicensed devices and innovative spectrum access models, and expanding incentives and mechanisms to reallocate or repurpose spectrum to higher-valued uses – the Commission intends to conduct more than a dozen actions, proceedings and initiatives in 2011. Specifically, the Plan recommends that the FCC make 500 MHz newly available for broadband use within the next ten years, of which 300 MHz of high-value spectrum between 225 MHz and 3.7 GHz should be made newly available for mobile use by 2015.	Allocation by auction.

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Chapter 3

Telecommunication Market Size

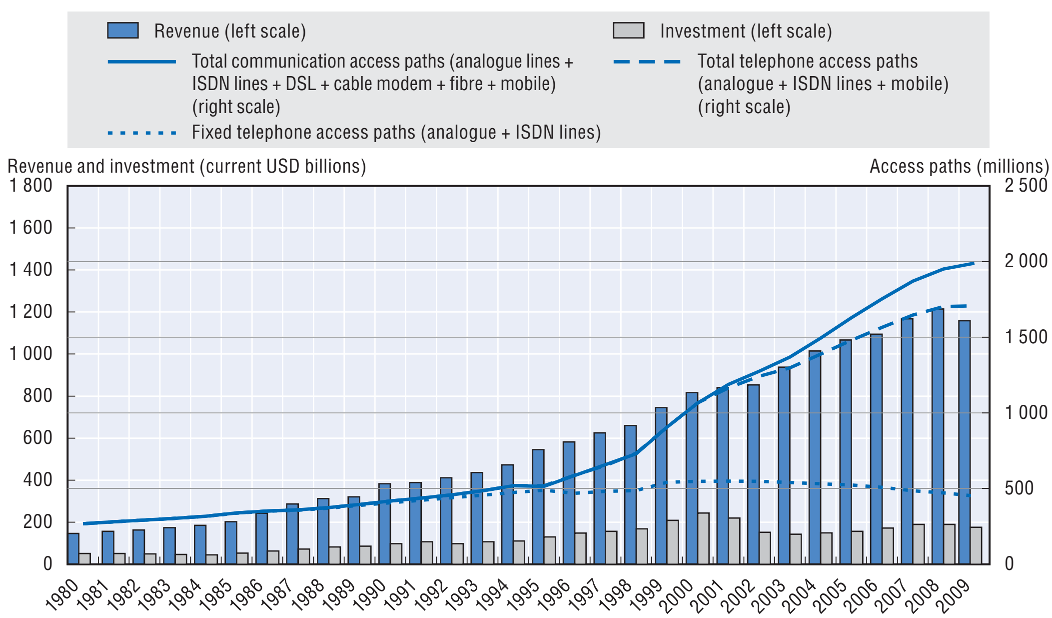
In 2009, the telecommunication market was valued at USD 1.16 trillion in the OECD area. Telecommunication markets have expanded at a fairly constant annual growth rate of 3.9% since 2000, and have withstood two severe economic downturns. Voice remained the largest revenue source for operators despite declines in calling prices for both fixed and mobile. Mobile revenues accounted for 45% of all telecommunication revenues in the OECD in 2009, up from 24% just a decade earlier. In 2009, 13 countries had mobile sectors larger than their fixed sectors in revenue terms.

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.

Introduction

Mobile communication markets have continued to demonstrate resilience during the global financial crisis (GFC); however, overall telecommunication revenue declined by 5.1% in 2009, compare to its 2008 peak (Figure 3.1, Table 3.1). In 2009, the market was valued at USD 1.16 trillion, compared to USD 1.17 trillion in 2007 and USD 1.21 trillion in 2008 (excluding Israel for 2008 and 2007).

Figure 3.1. **Trends in public telecommunication revenue, investment and access paths, 1980-2009**



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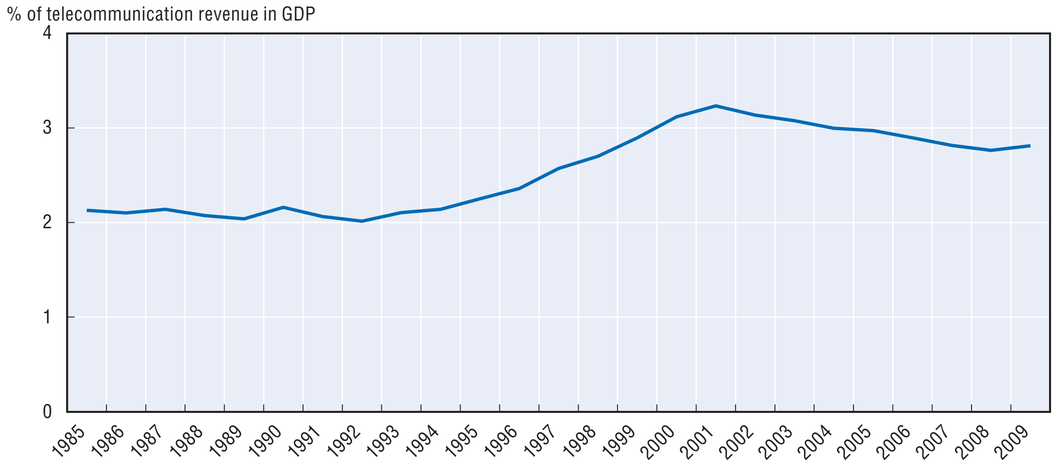
The sizeable effect of the crisis saw the GDP of OECD countries decline by 6.2%, from 2008 to 2009. However, its impact was less significant in the telecommunication sector than for the overall economy, and telecommunication revenues as a percentage of GDP increased slightly, from 2008 to 2009 (Figure 3.2, Table 3.2).

In 2009, telecommunication revenue was equivalent to around 3% of GDP across the OECD area. Since 2000, it has fluctuated around the 3% level, up from 2% during the final years of the last century. Telecommunication revenue as a percentage of GDP was highest in Estonia (5.2%), Korea (4.7%) and Portugal (4.5%), and lowest in Chile (1.5%), Norway (1.4%) and Luxembourg (1.3%). Luxembourg and Norway have among the highest levels of GDP per capita, among OECD countries, which is reflected in the relative share of telecommunication revenue. In addition, telecommunication services are purchased both as intermediate input and final goods, which influences these data.

Figure 3.2. **Telecommunication revenue as a percentage of GDP for total OECD, 1985-2009**



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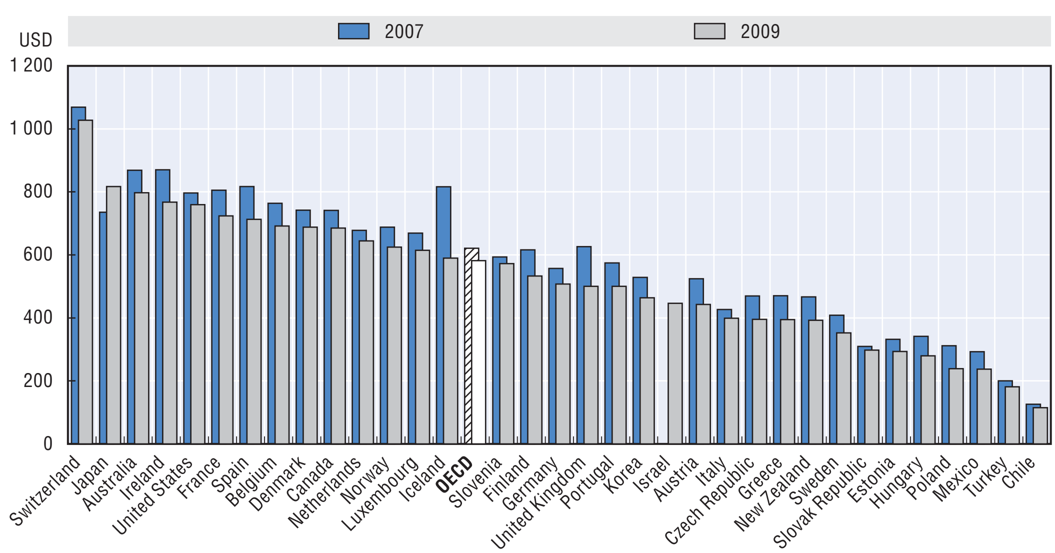
Revenue trends per access path

Revenue per access path continued to decline (Figure 3.3, Table 3.3) during this period. In 2009, each access path produced, on average across the OECD, USD 582 per annum; in other words, slightly less than USD 2 billion subscriptions generating USD 1.16 trillion in revenue.

Figure 3.3. **Public telecommunication revenue per communication access path, 2007 and 2009**



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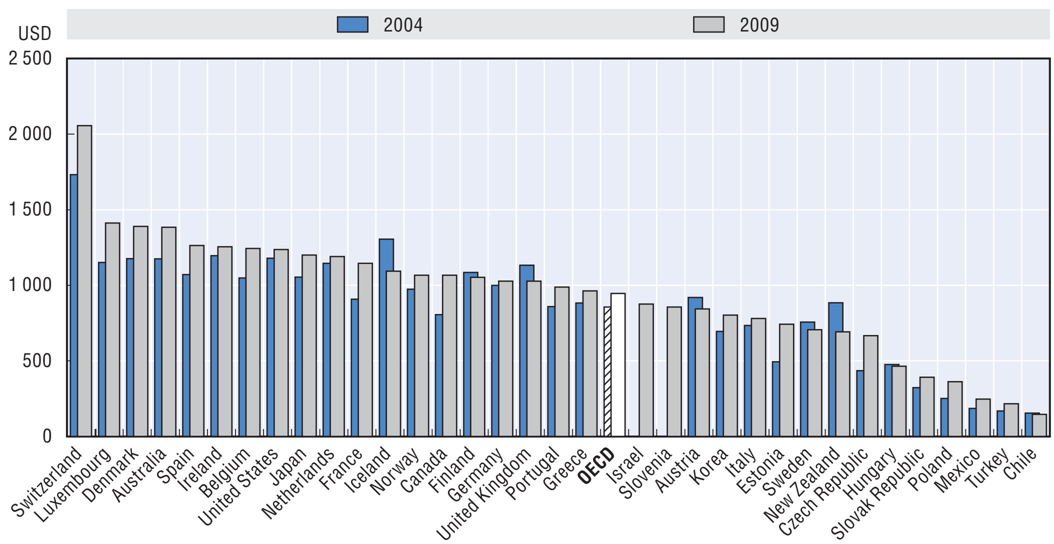
There are substantial differences between OECD countries with Japan, Switzerland and Australia having the highest ratio for revenue per access path. In contrast, Chile, Mexico, Poland and Turkey had among the lowest ratios. These countries, which traditionally had lower penetration rates for fixed-line communications, have witnessed substantial growth in mobile communications. During this time the popularity of prepaid subscriptions for mobile services has contributed to lower average revenue per access path. These four had among the lowest ratios for revenue per capita (Figure 3.4).

Per capita telecommunication revenue increased, in contrast to the ratio for access paths. In 2000, the average per capita revenue was USD 709 per annum across the OECD area. In 2009, the same measure was USD 946 per annum. The year 2000 was the last in which revenue per access path exceeded revenue per capita, underlining the long-term increase in individual mobile ownership.

Figure 3.4. **Public telecommunication revenue per capita, 2004 and 2009**



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Mobile revenue

Mobile revenues reached USD 527 billion in 2009, up from USD 182 billion a decade earlier. In line with this trend, mobile services have provided the main source of growth in the telecommunication industry over recent years. Revenue in this area was up by 4% per annum from 2007 to 2009, while its share of total telecommunications revenues moved from a modest 24% to 45% over the previous decade (Figure 3.5, Table 3.4).

Some 13 out of 34 OECD countries had a share of mobile revenues over 50% of their total national telecommunications revenue (Figure 3.6). Of these countries, the majority had relatively low fixed network penetration rates prior to the onset of mobile communications. The exceptions among those surpassing 50%, and who had relatively high fixed penetration rates in the 1990s, were Norway (50.6%), Finland (51.9%), Austria (64.7%) and Japan (74.4%). In the other countries, mobile services had undoubtedly met previously unsatisfied demand for basic telecommunication access, as well as providing new features and services.

Of note is the ratio recorded by Austria in the balance between fixed and mobile revenue, which may relate to greater use of mobile communications for Internet access. Generally, countries that exceeded 50% mobile revenue of total revenue tended to have lower fixed-line broadband penetration rates. The high penetration of dedicated mobile data cards in Austria, normally used from the customer's residential location, may have constituted a

Figure 3.5. **OECD share of mobile and fixed telecommunication revenues, 1998-2009**

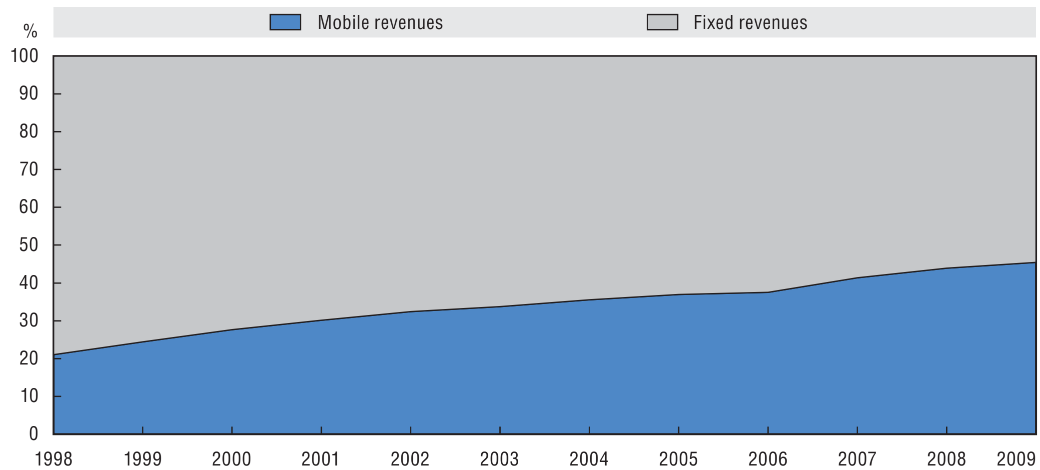

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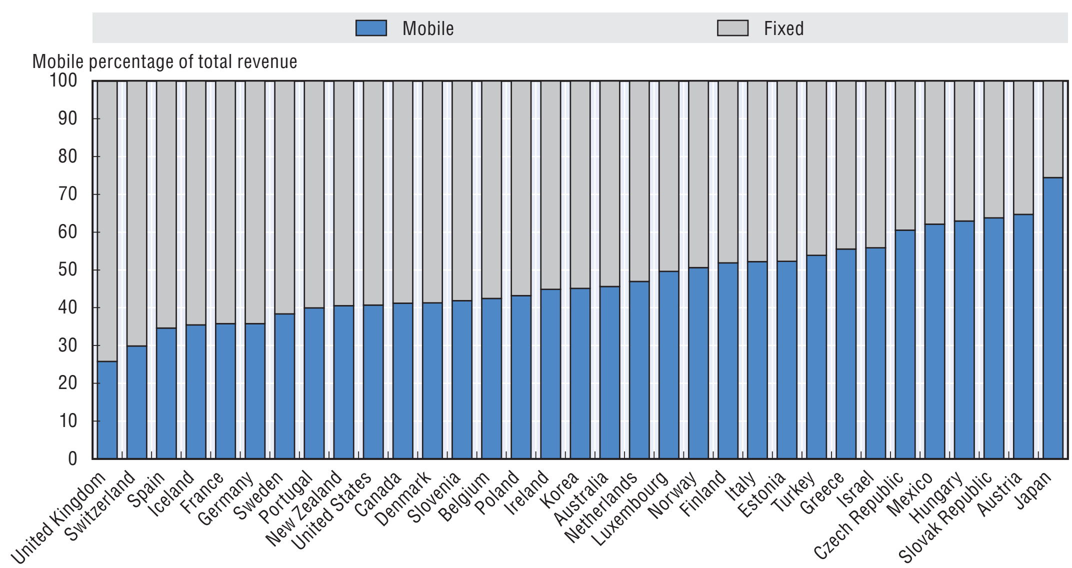
Figure 3.6. **Share of mobile revenue in total telecommunication revenue, 2009**



StatLink http://dx.doi.org/10.1787/888932394775

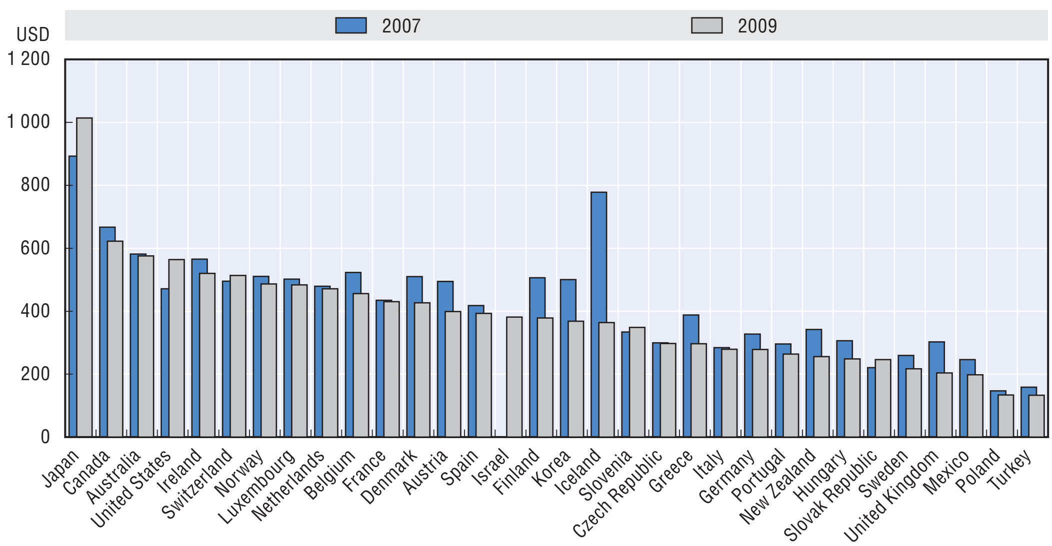
greater part of the Internet access market than in other countries. Mobile broadband was widely used as a close substitute to fixed broadband services and represents up to 35% of broadband connections (see Chapter 2). Following evidence gathered by the Austrian regulator, both were included in the relevant fixed broadband market.

The standout nation in terms of the ratio between fixed and mobile revenue, however, was Japan. In 2009, some 74% of all telecommunication revenue came from mobile communications. A key factor in the data for Japan was that inexpensive charges for fixed network broadband connections were in play. In addition, use of prepaid cards was much lower relative to most other OECD countries. As a result, the average revenue from a Japanese household with a fixed connection tended to be much lower than from individual use of mobile subscriptions in the same household.

Also of note was the high level of fixed revenue, relative to mobile revenue, in the United Kingdom and the United States. One factor in this ratio may be that both are large centres for business use of telecommunications. Traditionally, the routes between the two countries have been among the highest for international traffic, including transit traffic. An additional factor may have been the well-developed cable television market in the United States.

Mobile revenue per subscription declined or remained stable in almost all countries with the notable exception of Japan (Figure 3.7, Table 3.5). A key reason was the increasing use of prepaid subscriptions, which are usually associated with lower consumptions and tended to reduce average revenue per subscriber. It may have also been the case that some mobile operators may have been more successful in capturing a greater share of the value chain than others. Declining unit prices (*i.e.* consumers getting more for less – minutes, texts or even data) also played a role in this trend.

Figure 3.7. **Mobile revenue per subscriber, 2007 and 2009, USD**



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In Japan, the large share of mobile revenue was related to an increase in data use. For example, NTT Docomo, the largest mobile operator in Japan, provided a number of value-added mobile data services including entertainment (*e.g.* games, music, video), location-based information services (*e.g.* traffic information, weather), child-location systems and so on, most of which are charged according to usage. In Japan, mobile operators provided integrated services including handsets, content applications, network services and platforms (*i.e.* billing).

While operators in other OECD countries also provided these services, in many cases their business models involved third-party application stores (*e.g.* iTunes). This has meant that any application revenue associated with their business models may not be included in their sales, in a similar way to NTT. In addition, many services were categorised as "pay-per-use" rather than sold as part of a bundle. Finally, the yen strengthened considerably against the dollar during this period.

In the future, average revenue per mobile subscription will likely decline. While operators may be able to increase revenue per subscriber, the number of subscriptions added to networks is likely to outstrip growth from individual customers joining the network. Revenue accruing to operators from connected devices, for example, may be less than for traditional connections. Conversely, the trend towards greater revenue per capita will likely continue as individuals make greater use of these devices in areas such as games, navigation and e-books.

Broadband

Recent years have seen fixed broadband penetration still growing in most OECD countries, although at a slower pace than in previous years. Yearly growth, from December 2008 to December 2009, was roughly 6.6% on average in the OECD area. In contrast, traditional public switched telephone network (PSTN) lines declined 5.4% during the same period. This number would have decreased more markedly had broadband not been used by operators to promote retention of fixed lines. Mobile operators also use this infrastructure to provide triple-play services, as data traffic cannot only rely on mobile infrastructure, especially in cases of services that require greater bandwidth and generate significant traffic.

Mobile operators in the OECD area shifted their commercial focus to wireless broadband services. This is an area of high revenue growth for most operators. In 2009, the Vodafone Group's data revenue exceeded USD 1.4 billion for the first time, up 17.7% year on year, and fuelled by increased uptake of data-enabled smartphones across Europe (over 20% of handset sales). Telefonica's 2009 revenue growth for data services was 38%, in contrast with 10% total revenue growth. AT&T reported a mobile broadband traffic growth of more than 5 000 over the past three years. For 2009, Bell and Rogers Wireless in Canada, Telstra in Australia and Turkcell in Turkey reported mobile data revenue growth higher than 30% year on year.

Mobile broadband growth is not without challenges. As noted earlier, traffic growth is forcing some operators to weigh investment to support this growth against likely returns (Chapter 2). In some cases, operators are changing their tariff structures, which they say will enable them to better manage demand and support the investment required. At the same time, smartphones are creating new revenue opportunities from the services they enable to income from developments such as mobile advertising. The current debate within the wireless industry concerns the share of revenue accruing to different parts of the value chain – whereas operators once provided access and services in so-called "walled gardens". Convergence with the Internet in a similar manner to the experience of fixed networks has, however, significantly grown the size of the overall market.

The previous *Communications Outlook* noted slower growth in broadband revenues in mature broadband markets. In the most developed and competitive markets it was not unusual for the share of revenue for some leading companies to decrease in respect to total market size. In Korea, for example, KT's share of broadband Internet access revenues decreased from 11.1% in 2007 to 9.9% in 2009 (from USD 1.63 billion to USD 1.61 billion).

In 2009, less-developed markets experienced faster relative growth rates for fixed broadband. Telmex in Mexico reported a 21.4% revenue increase in 2009 and 13.9% in 2008 for fixed-line data services, including broadband Internet access. However, the company noted decreasing revenues per line. Broadband penetration in Mexico grew 30% (from 7.14 to 9.23 lines per 100 inhabitants) in 2009. In many countries, fixed broadband services were still a significant source of revenue growth, although operators are exploring new opportunities, such as wireless data services.

Some operators provide a breakdown of revenues between voice and data services. Broadband usually accounts for between 25% and 30% of wireline revenues, although this proportion varies heavily by country. Factors such as the market share of the mobile subsidiary and the share of the pay-television market (*e.g.* cable operators) have a strong impact on the composition of revenue. Rogers, a Canadian cable operator, reported that 20% of its cable revenues (wireless and content business excluded) originated from Internet services. TDC in Denmark reported 18% of domestic revenues generated by Internet and network services (less than 46% of revenue from mobility services and 28% from landline telephony). Telefonica in Spain reported that its broadband revenues represented 25% of its fixed-line business.

Television

Cable television providers were increasingly selling multiple services to win new customers or retain existing ones over the same technological platform. Cable operators were first movers in bundling services, providing double and triple-play offers over the cable connection by upgrading existing television networks. In countries such as the United States, cable operators have significantly increased revenue in recent years, although this has been curtailed by the crisis and the increasingly competitive market for video services.

The response by DSL operators has been to introduce Internet Protocol television (IPTV). This has proven more successful in some countries than in others, with alternative providers relying heavily on the unbundling policy of the incumbent's local loop. The global leader in terms of IPTV penetration was France, with 25% penetration. This shift was triggered by Free's disruptive entry into the French market, offering inexpensive triple-play services with optional pay-TV channels. Only Belgium, Norway, Sweden and the United States had an IPTV subscription share of 5% or more. Free's parent company, Illiad, reported a 25% revenue growth to over USD 2.6 billion in 2009, with 75% growth in consolidated net profit to USD 235 million.

The main change affecting broadcasting in recent years has been the shift from analogue to digital services (see Chapter 6, Table 6.6). This shift has significant technological, commercial and policy implications. Greater choice for consumers is accompanied by potential audience (and advertising revenue) fragmentation. Digital television allows for a higher number of channels. When these are added to the expansion of over-the-top services, the changes are likely to be significant for traditional business models and their associated revenue streams. This will also, of course, create new opportunities for greater consumer choice and interactive devices and services.

The Portuguese operator Zon was one example of a triple-play cable operator using its media business strengths to expand into telecommunications markets. Zon Multimedia boasts one of the most advanced and pervasive cable/FTTH networks in Europe (offering speeds up to 1 Gbps), and leads the Portuguese pay-television, movie distribution and content provision markets, owning 213 cinema theatres in Portugal. Another example of a media group targeting telecommunication markets is Mexico's Televisa, which recently bought a stake in Nextel, a new entrant into the Mexican mobile market. However, it has lately divested its share of this company, following legal concerns about the licensing procedure.

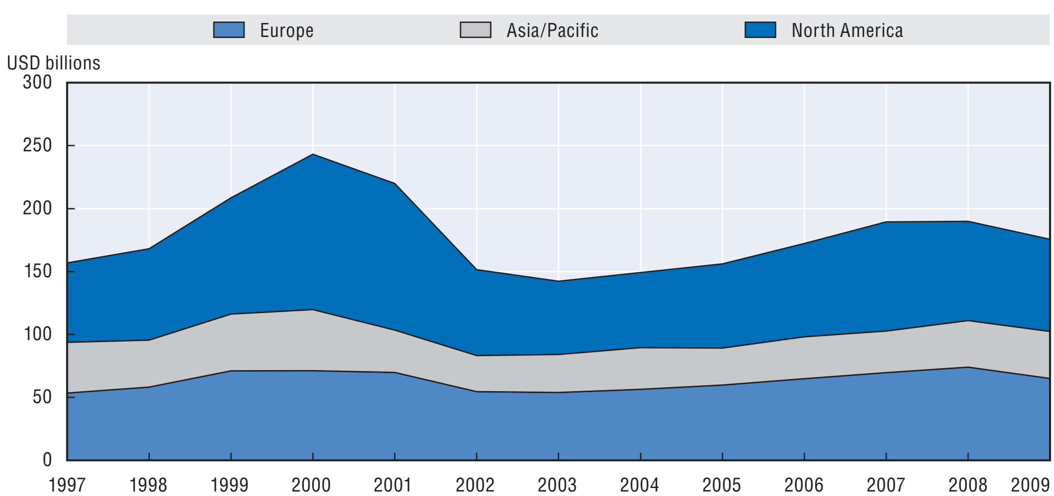
Investment

In 2009, telecommunication operators invested USD 175 billion in networks across the OECD area. This constituted a 7.7% decline in 2009, compared to 2008, and halted the increases that had occurred as the industry recovered from the bursting of the dotcom bubble (Table 3.6).

Significant differences exist between current investment trends and those that led to the dotcom bubble. The late 1990s and the early part of this century witnessed a tremendous amount of new investment in so-called long-distance networks. More recently, investment has been tied more to local access networks, including investment in new wireless networks (3G and the first 4G), upgraded copper networks (*e.g.* DSL), cable television networks and new fibre optic access (FTTH).

With respect to telecommunication services, the dotcom crisis was associated with new backbone capacity running ahead of demand. One contributory factor was narrow-band access networks which formed a bottleneck between entities wanting to develop new services and potential customer demand for these services. Recent years have seen the development of new and popular services, with the rolling out of the first generation of broadband networks. While demand for data continues to grow, the crisis has dampened revenue growth and investment. Nevertheless, operators in some countries have increased network investment, as in the case of the Asia-Pacific region in 2009 (Figure 3.8).

Figure 3.8. **Public telecommunications investment by region, 1997-2009, excluding spectrum fees**



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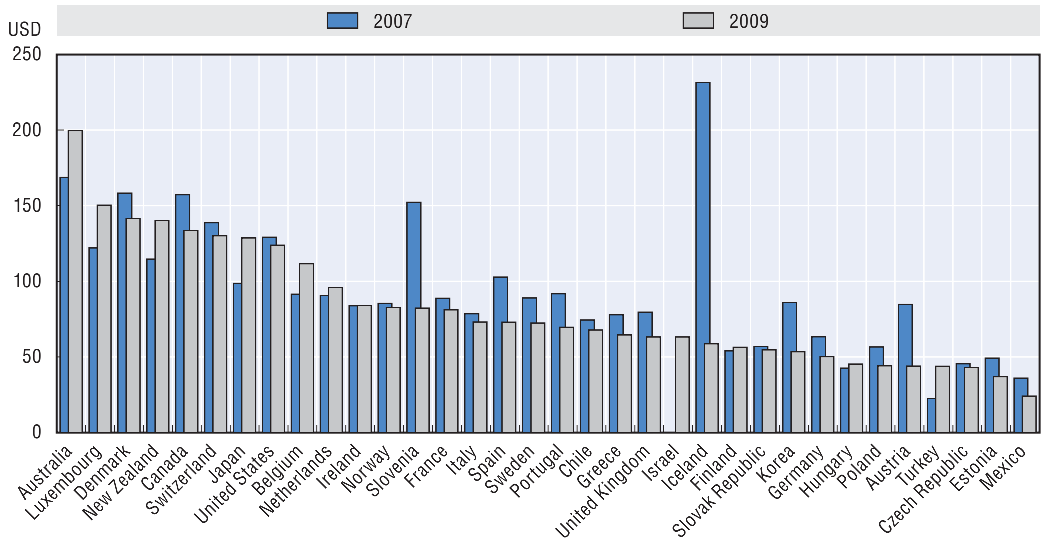
From 2007 to 2009, investment per access path and per capita decreased in most OECD countries (Figures 3.9 and 3.10, Tables 3.11 and 3.12). For the future, investment per access path might be expected to continue to decline as ever more devices (*e.g.* M2M) are connected to existing infrastructure, not all of which will represent significant data use (*e.g.* e-book readers may generate less data than video applications).

Figure 3.9. **Public telecommunications investment per access path, USD**



Note: Total communication access paths = (analogue lines + ISDN lines + DSL + cable modem + mobile subscribers)

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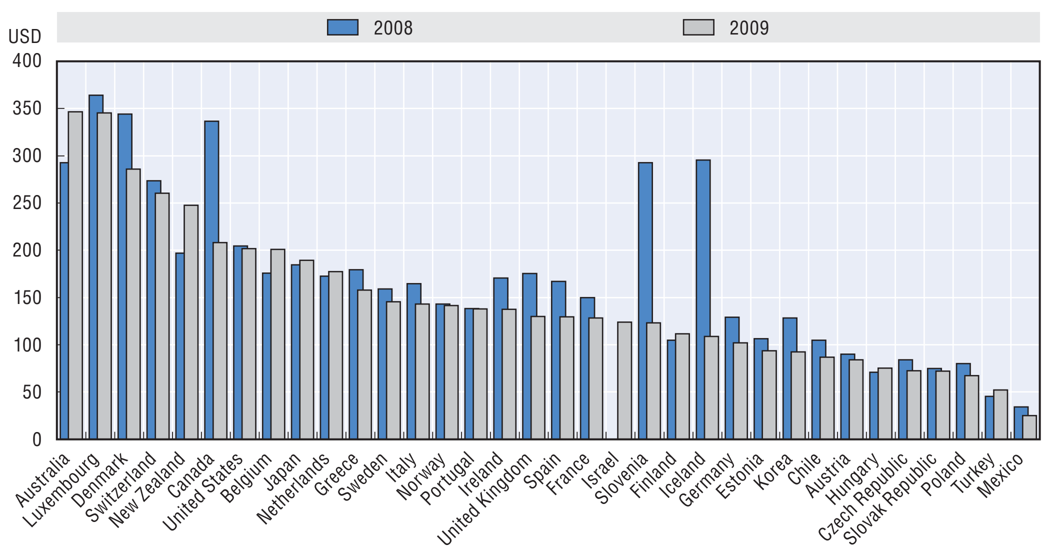
Figure 3.10. **Public telecommunications investment per capita, USD**



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The effects of the crisis may partly explain some investment trends in OECD countries. For example, public telecommunication investment in Australia, which fared much better than most countries during the crisis, increased both in terms of investment per communications path and per capita. In contrast, Iceland's investment figures in 2009 were only 30% of those in 2007, most likely as a result of the considerable effects of the crisis in that country.

From the firms' perspective, revenue for the global 100 largest telecommunications firms fell both for firms headquartered inside and outside the OECD area (Chapter 1). However, firms headquartered in the OECD area experienced increases in net income in 2009, which means that they remained profitable during the crisis. Reasons for this may include the prevalence of longer contract durations in OECD countries and bundled offers, as well as new sources of revenue growth (*e.g.* mobile broadband), which have not yet expanded to the same extent outside the OECD area.

America was the leading region in telecommunication investment across the OECD (USD 73 billion, Table 3.8), followed by Europe (USD 65 billion) and the Asia-Pacific region (37 billion). The average telecommunication investment accounted for 15% of revenue in 2009, little change from two years before (Table 3.9). The United States (USD 62 billion), Japan (USD 24 billion), Italy, France, Germany and the United Kingdom (around USD 8 billion each) received the highest investment in the OECD area. Six operators invested more than USD 10 billion, with NTT investing more than USD 20 billion. In the case of Japan, a major contributory factor has been the roll-out of fibre to the home networks, with the most extensive coverage in the OECD average. By 2010, more than 90% of households could access FTTH/B. If calculated by country, the highest investment levels in telecommunications revenue occurred in Chile (59%), New Zealand (36%), Australia (25%), Turkey (24%) and Luxembourg (25%).

An additional way to compare investment levels is by analysing telecommunication access paths (Table 3.11). This provides an indicator of relative investment levels. On average, the investment per total communication access path in 2007-09 was USD 92.7 in the OECD area. Australia (USD 180.2), Canada (USD 170.6) and Denmark (USD 157.6) had the highest figures. Mexico (USD 31.7) and Turkey (USD 34.1) had among the lowest. These data reflect different levels of development of fixed networks, as investment in fixed-network infrastructure is typically more demanding in terms of resources than mobile networks. It may also indicate, however, insufficient competition in some regions, especially for fixed networks.

Some countries have reported a breakdown of investment by fixed and mobile networks (Table 3.7). Investment in cellular mobile infrastructure for these countries represented, on average, 36% of total investment, which is in line with the revenue proportion of mobile revenues in those countries. The percentage ranged from 21% in Switzerland to 79% in Turkey.

Voice traffic

The substitution of mobile and Voice over Internet Protocol (VoIP) for traditional fixed services has been building over the past decade. This trend was influenced by decreasing communication prices (both for fixed and mobile), and a steep increase in communications usage. The influence of VoIP services was sometimes overlooked, compared to mobile, because statistics tend to be less widely available for over-the-top services. In many ways, the growth of VoIP, following the launch of services such as Skype, or their incorporation into DSL offers, represents a turning point in this trend, and traditional domestic fixed telephone traffic decreased overall by 2005-06.

PSTN operators responded to the increasing use of VoIP and mobile by encouraging customers to maintain fixed-line subscriptions, mainly by launching flat-rate offers, some of which included international calls. Reductions to voice prices, such as for international services, were a result of end-to-end border competition, including the dismantling of the international accounting rate system. The current trend for decreasing mobile termination rates makes it increasingly likely that there will be more competition and innovation in mobile pricing in the same way as occurred with fixed networks.

In mobile communications there are significant differences between the levels of use made by users in some OECD countries. The lowest traffic, per mobile subscriber, was in the Slovak Republic (29 minutes per month). Other countries below the OECD average were Chile, Czech Republic, Germany and New Zealand. Users in the United States tended to make far larger average use of mobile telephony than in other countries, because of the more widespread use of unlimited voice services or large buckets of minutes. They used these devices to talk for an average of 691 minutes each month (see Table 3.14 and Chapter 7, Figure 7.9), including outgoing and incoming minutes.

Data for average traffic per mobile subscriber should be interpreted with caution. In some European countries, the overall number of subscribers decreased as a result of the obligation to register prepaid card users. This resulted in several million subscribers no longer being counted in official mobile telephony statistics. In Estonia, a MVNO operator has sold more than 1 million prepaid subscriptions (more than 50% of SIM-cards in that country), oriented towards international roaming services. This means that monthly traffic for these subscribers is likely to be low, which may distort average traffic overall. Outside the OECD area, for example in Africa, it is quite common for subscribers to have more than one SIM-card, which lowers average traffic per subscription.

International telecommunications traffic decreased slightly between 2007 and 2009, down to 230 minutes per capita and 120 minutes per access path (Table 3.15). This may be, in part, the result of an increasing number of access paths across the OECD area, which is not matched by similar traffic increases. The more likely scenario is that VoIP traffic is undercounted. Where this has been done effectively, such as in France, it accounted for a large share of international communications.

Employment trends

Employment in telecommunications firms has remained relatively stable over the last two years (2007-09). The global financial crisis has accelerated certain consolidation processes underway in the industry. For example, France Telecom and Deutsche Telekom merged in 2010 in the United Kingdom, forming a joint venture, which has reduced the number of mobile network operators in the United Kingdom from five to four. Verizon Wireless and Alltel completed their merger in the United States to form the largest wireless carrier in that country.

Employment data from the 100 largest global telecommunication firms (from OECD and non-OECD countries) reveal that employment has remained relatively stable over 2008-09 (less than 1% increase), while it increased markedly from 2007 to 2008 (8% increase). Some employment trends, however, may also be explained by mergers, acquisitions and divestures. Other factors, such as corporate structure, may play a role too. For example, America Movil, Carso Telecom, Telmex and Telmex Internacional are now listed as different companies, but will merge if America Movil's bid for takeover is successful. France Telecom's labour force dropped to 167 000 employees in 2008 from 183 000 one year earlier.

Today, employment related to telecommunication networks, construction and maintenance is frequently outsourced. Whereas once, the building and operating of a new mobile network would be done by direct employees of a telecommunication services operator, it may now be undertaken by an equipment manufacturer. The telecommunication service firms with the largest number of employees at the end of 2010 were China Telecom

(312 520), ATT (272 450), Telefonica (261 649), Deutsche Telekom AG (251 258) and Verizon Communications (210 800). All of these firms, with the exception of Telefonica, have slightly reduced their number of employees over the last two years. Vivendi, a large telecommunications and media group in France, and one of the main shareholders of SFR, increased its workforce from 39 919 in 2007 to 48 284 employees in 2009.

Research and development

Research and development in the telecommunication sector has been shifting to segments of the value chain other than service provision. Nowadays, it is also mainly undertaken by equipment manufacturers.

Telecommunication-related patents granted in large markets are one proxy to measure the amount of telecommunication research. The United States Patent and Trademark Office (USPTO) and the European Patent Office (EPO) publish data on the number of patents awarded to certain companies or in a related field. Patents are typically filed in a company's home country, and then internationally, depending on the markets that a company wants to target. The number of telecommunication patent applications filed at the USPTO and the EPO are presented in Tables 3.16 and 3.17.

Table 3.1. **Telecommunication revenue in the OECD area**

USD millions

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 2007-09	CAGR 2000-09
Australia	8 730	9 554	8 991	8 458	9 943	11 130	13 109	13 463	12 850	16 385	16 053	15 454	16 220	19 391	23 796	26 614	27 017	30 833	31 990	30 575	-0.4	7.4
Austria	2 809	2 930	3 261	3 313	3 655	4 321	4 010	3 721	4 118	4 991	4 423	5 043	5 307	6 662	7 509	7 731	7 557	7 830	7 890	7 058	-5.1	5.3
Belgium	2 689	2 808	3 205	3 198	3 495	4 317	4 465	4 229	5 100	5 896	7 267	6 747	7 458	9 456	10 920	11 453	11 949	13 225	14 204	13 421	0.7	7.1
Canada	12 123	12 667	12 433	12 059	11 763	12 180	13 361	17 080	19 251	19 272	20 578	20 876	21 161	22 854	25 745	28 516	31 917	35 541	37 639	35 980	0.6	6.4
Chile	..	..	..	..	..	..	1 665	1 917	2 202	2 412	2 535	2 600	2 421	2 438	2 492	2 499	2 488	2 462	2 479	2 485	0.5	-0.2
Czech Republic	502	485	478	602	786	995	1 130	1 452	1 833	2 110	2 316	2 558	3 270	4 000	4 439	4 882	5 396	6 849	8 430	7 008	1.2	13.1
Denmark	2 354	2 389	2 580	2 818	3 119	3 730	3 641	3 485	3 760	4 430	4 173	4 246	4 384	5 527	6 356	6 574	6 786	8 162	8 125	7 674	-3.0	7.0
Estonia	..	..	..	..	..	..	..	..	..	..	..	340	418	558	667	757	886	1 014	1 058	995	-0.9	..
Finland	2 233	2 138	1 980	1 628	1 809	2 550	2 700	3 081	3 634	4 041	4 004	4 189	4 728	5 169	5 670	5 312	5 638	6 131	6 269	5 624	-4.2	3.8
France	18 918	20 522	23 079	22 442	23 190	30 159	30 612	28 630	29 803	33 781	34 016	36 734	40 123	49 270	56 730	62 157	62 212	70 314	78 498	73 894	2.5	9.0
Germany	25 004	28 388	34 485	36 151	39 302	46 296	41 899	43 430	49 111	51 170	51 560	54 018	58 491	71 798	82 469	84 125	82 875	87 534	91 618	84 167	-1.9	5.6
Greece	1 277	1 357	1 582	1 893	2 468	2 797	3 117	3 291	4 291	4 240	5 089	5 603	6 658	8 551	9 769	9 656	10 451	11 626	12 081	10 840	-3.4	8.8
Hungary	359	466	867	1 014	1 281	1 541	1 841	2 138	2 513	3 071	3 210	3 440	3 869	4 686	4 810	5 099	5 009	5 779	5 820	4 656	-10.2	4.2
Iceland	85	89	103	103	107	133	156	151	167	191	253	216	228	319	382	464	471	579	485	349	-22.3	3.6
Ireland	1 290	1 266	1 378	1 285	1 463	1 759	1 977	2 126	1 910	1 927	2 249	2 478	3 197	4 022	4 864	4 898	5 357	6 214	6 640	5 607	-5.0	10.7
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6 515	..	..
Italy	16 029	18 175	19 604	17 086	18 180	18 513	24 094	23 868	26 370	26 657	24 486	27 061	30 148	36 517	42 716	45 125	44 774	49 068	51 472	47 083	-2.0	7.5
Japan	46 333	52 115	58 045	74 593	86 785	113 012	118 336	116 505	113 184	143 183	163 253	156 796	129 352	139 225	134 732	132 042	129 868	129 990	139 372	152 862	8.4	-0.7
Korea	5 167	6 112	6 791	7 365	8 282	10 623	14 919	9 097	12 784	15 932	23 630	20 559	23 066	24 434	33 359	37 894	44 768	48 534	43 959	39 162	-10.2	5.8
Luxembourg	146	153	231	225	269	301	317	305	341	363	340	372	394	473	528	567	612	676	744	702	2.0	8.4
Mexico	4 027	5 390	6 701	7 885	8 643	6 492	6 755	8 770	9 649	11 298	14 371	16 057	17 076	17 214	19 052	22 218	26 023	29 055	30 260	26 607	-4.3	7.1
Netherlands	4 986	5 183	5 948	6 391	6 936	8 468	8 413	7 890	9 491	10 719	10 150	11 607	12 988	16 604	18 655	18 993	19 202	18 410	21 030	19 669	3.4	7.6
New Zealand	1 448	1 484	1 330	1 350	1 681	2 097	2 142	2 249	2 041	2 173	2 224	2 117	2 465	2 965	3 576	4 178	3 195	3 603	3 437	2 963	-9.3	3.2
Norway	2 336	2 204	2 442	2 456	2 612	3 132	3 437	3 609	2 466	2 603	2 620	2 814	3 360	3 991	4 475	4 754	4 851	5 336	5 641	5 153	-1.7	7.8
Poland	520	1 160	1 403	1 508	1 615	2 158	2 535	2 593	3 620	4 592	5 427	6 583	6 905	7 650	9 589	11 443	12 915	15 153	17 884	13 849	-4.4	11.0
Portugal	1 381	1 673	2 023	2 220	2 229	3 048	3 822	3 959	4 215	4 730	5 049	5 995	6 452	7 844	9 030	9 218	9 223	9 941	11 332	10 514	2.8	8.5
Slovak Republic	..	..	180	205	232	316	425	504	562	610	1 229	1 511	1 540	1 642	1 738	1 912	1 929	2 076	2 237	2 123	1.1	6.3
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1 190	1 311	1 508	1 813	1 747	7.6	..
Spain	8 715	10 140	11 574	9 648	9 524	11 000	11 649	18 002	19 627	22 389	22 737	23 992	31 462	38 812	45 735	51 090	52 850	60 567	64 938	58 007	-2.1	11.0
Sweden	5 330	5 717	6 047	4 543	5 036	6 993	7 577	6 910	7 393	4 623	4 416	4 826	5 186	6 251	6 805	6 636	6 618	7 386	7 510	6 601	-5.5	4.6
Switzerland	4 890	5 173	5 772	6 056	6 756	8 064	7 687	6 794	7 699	8 729	8 244	8 745	9 516	11 368	12 909	12 917	13 041	14 316	16 092	16 032	5.8	7.7
Turkey	2 063	2 744	2 484	2 793	2 175	1 672	3 120	4 033	5 031	5 446	6 168	5 867	6 714	10 423	11 441	12 390	12 025	16 253	17 808	15 543	-2.2	10.8
United Kingdom	25 796	26 031	26 500	24 083	25 940	28 552	30 539	35 782	34 227	38 789	43 862	47 146	48 813	56 836	67 824	70 158	74 042	82 615	77 299	63 457	-12.4	4.2
United States	146 147	153 942	160 353	172 860	183 214	199 147	212 645	245 696	260 256	288 604	320 535	333 844	339 678	340 830	346 236	363 772	370 739	379 614	388 717	380 053	0.1	1.9
OECD	353 688	382 457	411 850	436 232	472 490	545 497	582 095	624 760	659 498	745 357	816 468	840 435	853 047	937 775	1 015 019	1 067 233	1 093 993	1 168 195	1 214 768	1 158 978	-0.7	3.9

Note: Data for Australia (2006, 2008 and 2009), Belgium (2009), Finland (2009), Hungary (2009) and for the United States (2009) are estimates. The total OECD CAGR (2000-2009) calculation excludes Estonia, Israel and Slovenia and the total OECD CAGR (2007-2009) calculation excludes Israel.

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Table 3.2. **Telecommunication revenue as a percentage of GDP**

	1985	1990	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	GDP per capita 2009 (USD)
Australia	1.92	2.81	2.99	3.07	3.28	3.83	3.90	3.93	3.71	3.45	3.50	3.48	3.29	3.13	3.04	3.07	44 999
Austria	1.68	1.75	1.82	1.81	1.94	2.37	2.32	2.66	2.57	2.66	2.61	2.54	2.35	2.10	1.90	1.85	45 558
Belgium	1.27	1.37	1.56	1.70	2.00	2.32	3.14	2.91	2.95	3.05	3.04	3.03	3.00	2.88	2.80	2.85	43 657
Canada	2.21	2.12	2.09	2.67	3.11	2.92	2.85	2.92	2.88	2.64	2.59	2.51	2.49	2.49	2.52	2.69	39 706
Chile	..	..	2.20	2.31	2.77	3.30	3.36	3.78	3.59	3.29	2.61	2.11	1.70	1.50	1.45	1.52	9 647
Czech Republic	..	1.69	1.91	2.54	2.96	3.51	4.08	4.14	4.34	4.38	4.05	3.92	3.78	3.93	3.90	3.68	18 105
Denmark	1.49	1.77	2.07	2.04	2.17	2.55	2.61	2.64	2.52	2.60	2.60	2.55	2.47	2.63	2.38	2.47	56 165
Estonia	..	..	..	..	..	..	..	5.45	5.71	5.67	5.55	5.44	5.27	4.68	4.49	5.17	14 369
Finland	1.50	1.62	1.95	2.50	2.81	3.11	3.30	3.37	3.49	3.16	3.02	2.70	2.72	2.49	2.31	2.36	44 567
France	1.65	1.55	1.94	2.01	2.03	2.32	2.57	2.75	2.75	2.75	2.77	2.88	2.76	2.71	2.74	2.79	41 071
Germany	1.60	2.91	1.87	2.02	2.25	2.39	2.72	2.86	2.89	2.95	3.02	3.00	2.85	2.63	2.51	2.53	40 663
Greece	1.33	1.55	2.38	2.42	3.15	3.03	4.00	4.29	4.51	4.41	4.27	3.97	3.98	3.76	3.49	3.35	28 745
Hungary	..	..	3.45	4.53	5.15	6.26	6.78	6.44	5.79	5.58	4.68	4.63	4.44	4.19	3.74	3.62	12 847
Iceland	1.29	1.35	1.92	2.04	2.01	2.18	2.91	2.72	2.56	2.91	2.88	2.85	2.83	2.83	2.88	2.87	38 021
Ireland	2.31	2.15	2.08	2.63	2.17	2.00	2.33	2.37	2.60	2.56	2.64	2.41	2.42	2.40	2.51	2.53	49 626
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3.33	26 277
Italy	1.48	1.46	1.68	2.00	2.17	2.22	2.24	2.43	2.47	2.43	2.49	2.53	2.41	2.32	2.23	2.23	35 052
Japan	1.58	1.52	2.14	2.73	2.93	3.28	3.50	3.83	3.30	3.29	2.93	2.90	2.98	2.97	2.85	3.02	39 810
Korea	2.05	2.05	2.17	1.71	3.58	3.45	4.43	4.07	4.01	3.80	4.62	4.49	4.70	4.63	4.72	4.70	17 078
Luxembourg	1.03	1.33	1.66	1.65	1.76	1.72	1.68	1.85	1.74	1.63	1.56	1.50	1.44	1.32	1.28	1.33	106 190
Mexico	0.52	1.53	2.27	2.00	2.09	2.14	2.26	2.35	2.40	2.46	2.51	2.63	2.74	2.84	2.79	3.05	8 119
Netherlands	1.45	3.75	2.05	2.05	2.36	2.61	2.65	2.90	2.96	3.10	3.08	2.96	2.84	2.35	2.40	2.48	48 068
New Zealand	2.46	3.33	3.44	3.30	3.65	3.70	4.18	4.00	4.02	3.60	3.56	3.70	2.92	2.70	2.64	2.54	27 294
Norway	1.91	2.02	2.14	2.28	1.63	1.64	1.56	1.65	1.75	1.77	1.73	1.57	1.44	1.38	1.26	1.36	78 379
Poland	..	0.88	1.69	1.65	2.10	2.74	3.17	3.45	3.48	3.53	3.80	3.77	3.78	3.57	3.38	3.22	11 288
Portugal	2.66	1.93	2.83	3.41	3.45	3.76	4.33	5.01	4.88	4.88	4.91	4.80	4.60	4.30	4.48	4.52	21 898
Slovak Republic	..	..	1.72	2.37	2.51	2.98	6.04	7.19	6.28	4.94	4.12	4.00	3.47	2.77	2.36	2.41	16 236
Slovenia	..	..	..	..	..	..	..	..	..	..	..	3.31	3.38	3.18	3.30	3.55	24 070
Spain	1.44	1.69	1.89	3.14	3.27	3.63	3.93	3.95	4.57	4.41	4.40	4.50	4.30	4.20	4.06	3.96	31 870
Sweden	1.78	2.24	2.91	2.73	2.90	1.79	1.79	2.12	2.07	1.99	1.88	1.79	1.66	1.60	1.54	1.62	43 494
Switzerland	2.15	2.14	2.62	2.57	2.82	3.25	3.30	3.43	3.42	3.51	3.55	3.48	3.32	3.30	3.19	3.26	62 968
Turkey	1.03	1.37	1.08	1.56	1.86	2.19	2.33	3.00	2.89	3.44	2.93	2.56	2.27	2.51	2.44	2.53	8 560
United Kingdom	2.36	2.59	2.50	2.63	2.34	2.59	2.96	3.18	3.04	3.04	3.10	3.08	3.02	2.95	2.88	2.91	35 311
United States	2.67	2.54	2.71	2.97	2.98	3.10	3.24	3.26	3.21	3.07	2.93	2.89	2.78	2.71	2.72	2.71	45 674
OECD	2.13	2.23	2.36	2.57	2.70	2.90	3.12	3.23	3.14	3.08	3.00	2.97	2.89	2.82	2.76	2.81	33 634

Note: Calculations make use of estimates in Table 3.1.

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Table 3.3. **Telecommunication revenue ratios**

USD

	2000		2001		2002		2003		2004		2005		2006		2007		2008		2009	
	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita	Per total communication access path	Per capita
Australia	867.1	833.1	711.3	791.3	692.2	820.5	761.7	969.1	838.1	1 175.1	849.6	1 295.6	806.1	1 294.5	860.1	1 451.9	868.9	1 478.1	797.3	1 383.4
Austria	459.4	552.1	497.3	627.1	511.5	656.6	613.6	820.6	629.5	919.1	615.8	939.9	559.2	914.0	551.6	943.3	524.1	946.5	442.8	844.0
Belgium	709.0	709.3	541.8	656.3	561.8	722.0	673.3	911.6	732.9	1 048.3	731.7	1 093.5	733.9	1 133.3	757.1	1 245.1	763.6	1 326.6	691.6	1 243.9
Canada	693.8	670.6	628.6	673.0	603.7	674.9	614.1	722.3	648.1	806.0	665.7	884.3	695.4	979.8	732.7	1 079.2	741.5	1 129.4	685.3	1 066.4
Chile	378.2	164.7	301.3	167.0	245.1	153.8	224.8	153.1	191.3	154.9	170.1	153.6	147.7	151.4	131.6	148.4	125.6	147.9	114.7	146.8
Czech Republic	280.6	225.5	240.7	250.2	272.1	320.5	306.9	392.1	316.9	434.9	318.9	477.0	335.3	525.5	397.7	663.5	469.5	808.2	395.2	667.0
Denmark	628.4	781.7	576.1	792.6	548.3	815.4	652.3	1 025.3	698.1	1 176.4	685.0	1 213.1	667.2	1 248.2	769.1	1 494.9	742.1	1 479.3	688.3	1 389.7
Estonia	..	..	272.3	248.9	307.2	307.4	358.8	411.2	371.6	493.7	377.2	561.7	393.1	658.8	385.1	755.1	331.8	789.2	293.2	742.2
Finland	587.5	773.6	571.7	807.4	610.7	909.1	647.9	991.5	679.9	1 084.7	601.3	1 012.8	617.9	1 070.6	642.8	1 159.3	615.8	1 179.8	532.8	1 053.5
France	572.0	560.2	549.4	600.6	579.3	651.3	665.5	794.2	712.9	907.8	726.8	987.3	684.7	981.4	742.6	1 102.4	805.2	1 223.8	724.1	1 145.7
Germany	585.4	627.3	552.6	656.0	573.3	709.1	660.0	870.1	685.5	999.6	652.6	1 020.1	596.7	1 006.2	570.2	1 064.1	556.7	1 115.7	507.2	1 028.0
Greece	435.2	466.1	406.7	511.7	441.4	606.0	534.5	775.7	584.2	883.1	532.8	869.6	528.3	937.5	510.4	1 038.7	470.5	1 075.1	394.7	962.7
Hungary	481.3	314.4	407.1	337.6	377.3	380.8	411.0	462.6	391.6	475.9	393.5	505.5	349.0	497.3	367.5	574.7	341.1	579.8	279.7	464.5
Iceland	669.2	899.5	533.4	756.1	514.8	793.9	674.6	1 103.6	773.3	1 304.8	870.8	1 567.9	845.5	1 548.9	1 012.1	1 858.1	816.1	1 517.3	590.0	1 092.9
Ireland	614.9	591.3	559.2	641.3	661.5	813.2	779.7	1 006.1	868.9	1 196.0	788.2	1 177.4	770.9	1 257.1	830.8	1 423.5	870.2	1 494.4	767.8	1 254.9
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	446.5	875.7
Italy	366.0	430.0	354.8	474.9	382.2	527.5	429.0	633.9	461.0	734.3	439.2	770.0	401.6	759.6	405.1	826.4	426.3	860.3	399.2	781.3
Japan	1 261.9	1 286.2	1 128.2	1 231.6	865.2	1 014.6	865.9	1 090.3	791.6	1 054.4	743.0	1 033.5	708.5	1 016.4	693.9	1 017.4	735.6	1 093.0	816.8	1 200.5
Korea	443.3	502.7	339.7	434.1	348.3	484.4	354.2	510.5	460.5	694.4	504.8	787.2	578.9	926.9	596.7	1 001.6	528.3	904.4	464.1	803.4
Luxembourg	616.8	775.5	544.0	843.1	539.8	883.8	590.8	1 047.5	564.2	1 151.6	549.7	1 218.7	578.4	1 295.5	632.8	1 407.5	669.0	1 521.8	614.8	1 411.5
Mexico	544.0	146.3	450.5	161.3	415.0	169.5	367.4	169.0	331.0	185.2	322.3	214.0	332.6	248.4	319.7	274.9	292.9	283.9	236.8	247.6
Netherlands	522.2	637.5	577.6	723.5	624.8	804.3	731.8	1 023.5	705.8	1 146.2	720.9	1 164.0	688.3	1 175.1	608.9	1 124.1	677.9	1 279.2	644.1	1 190.1
New Zealand	563.7	578.8	502.3	547.4	559.7	632.0	651.7	746.9	706.5	884.1	726.5	1 018.8	520.0	770.2	525.5	858.3	466.5	810.3	392.3	692.0
Norway	463.8	583.4	469.2	623.6	535.3	740.1	600.8	874.3	610.3	974.7	615.8	1 028.6	622.2	1 040.8	667.6	1 133.9	687.9	1 183.0	624.4	1 067.0
Poland	788.9	141.9	601.4	172.1	481.6	180.6	420.5	200.3	391.9	251.2	273.6	299.9	253.9	338.7	275.6	397.5	311.7	469.2	238.9	363.0
Portugal	482.9	493.7	507.6	582.4	490.8	622.3	555.5	751.2	603.3	859.9	575.1	873.8	541.8	871.4	547.2	937.1	574.4	1 066.9	500.0	988.9
Slovak Republic	410.9	227.6	408.0	280.9	356.0	286.3	328.9	305.3	311.7	322.9	325.7	355.0	304.6	357.9	272.0	384.7	309.1	413.8	297.4	391.9
Slovenia	..	..	..	..	..	..	..	..	..	..	441.0	594.7	465.3	652.7	515.8	747.0	593.4	896.5	572.0	855.7
Spain	544.7	564.7	504.5	589.2	600.6	761.5	678.7	924.0	762.3	1 071.3	760.8	1 177.2	731.8	1 199.3	790.2	1 349.7	816.9	1 424.3	713.2	1 263.0
Sweden	352.8	497.8	357.6	542.5	360.4	581.1	402.3	697.8	432.8	756.6	404.9	734.9	386.1	728.7	415.5	807.4	408.5	811.4	351.9	706.7
Switzerland	936.0	1 143.5	918.8	1 200.4	930.4	1 295.9	1 034.7	1 535.1	1 119.4	1 731.8	1 037.2	1 722.0	983.5	1 725.4	998.0	1 879.0	1 068.9	2 086.9	1 027.7	2 055.6
Turkey	184.3	96.0	157.1	90.1	158.8	101.7	221.7	155.9	210.5	168.9	193.2	180.7	161.9	173.2	192.1	231.3	199.9	250.5	181.2	216.2
United Kingdom	610.1	744.9	610.9	797.6	594.3	822.8	653.2	954.3	700.2	1 133.3	662.4	1 164.7	656.3	1 222.1	694.4	1 354.9	626.4	1 259.3	500.1	1 027.4
United States	1 070.8	1 135.0	1 025.3	1 170.0	989.6	1 178.9	935.6	1 171.9	881.6	1 179.7	866.0	1 228.0	822.9	1 239.7	806.7	1 256.9	796.6	1 275.2	759.1	1 236.0
OECD	764.1	708.9	704.8	724.3	666.9	730.0	683.0	796.9	677.7	856.6	653.5	894.6	622.3	911.0	622.7	966.0	621.3	997.8	581.6	946.2

Notes: Total communication access paths = analogue lines + ISDN lines + DSL + cable modem + fibre + mobile subscribers. Revenue calculations rely on estimates derived for Table 3.1.

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Table 3.4. **Mobile telecommunication revenue**

USD millions

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	..	..	..	..	..	..	..	..	..	..	12 357	14 097	13 942
Austria	763	1 358	1 736	2 126	2 438	2 759	3 574	4 396	4 678	4 648	4 878	5 036	4 564
Belgium	659	1 167	1 600	1 581	2 687	3 121	4 086	4 835	5 116	5 283	5 617	6 011	5 701
Canada	2 092	2 957	2 955	3 604	3 852	4 593	5 759	7 292	9 105	11 236	13 527	14 987	14 819
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	368	597	850	1 162	1 414	1 651	2 208	974	1 798	3 385	3 959	5 004	4 243
Denmark	762	829	897	983	1 037	1 276	1 768	2 133	2 418	2 652	3 219	3 276	3 169
Estonia	..	..	..	..	115	137	188	263	288	333	392	565	520
Finland	5 299	1 295	1 588	1 666	1 796	2 137	2 528	2 948	2 672	2 825	3 078	2 980	2 917
France	4 708	4 385	6 393	7 146	8 954	11 121	14 880	18 356	20 249	20 964	24 068	27 454	26 460
Germany	10 092	10 556	13 936	15 963	17 143	18 774	23 708	28 148	28 750	28 875	31 781	33 529	30 139
Greece	787	1 127	1 564	1 819	2 096	2 925	4 022	5 043	4 949	5 663	6 293	6 615	6 022
Hungary	768	712	764	1 043	1 312	1 574	2 016	2 249	2 656	2 731	3 375	3 522	2 929
Iceland	27	36	46	111	104	96	112	159	199	220	254	179	124
Ireland	291	385	777	1 045	1 252	1 110	1 569	2 230	2 282	2 407	2 810	3 025	2 517
Israel	..	..	..	..	..	..	..	..	..	..	..	..	3 641
Italy	6 630	7 706	8 785	9 404	12 411	14 386	17 865	22 469	24 500	22 606	25 510	26 985	24 583
Japan	43 619	45 697	60 028	74 948	75 383	74 706	74 706	78 942	82 983	87 140	95 804	103 685	113 732
Korea	3 489	3 798	7 758	10 735	10 617	12 172	13 182	15 039	17 634	19 574	21 776	19 801	17 662
Luxembourg	23	26	81	82	112	123	193	242	284	310	344	371	348
Mexico	659	1 025	1 772	3 511	4 983	6 226	6 978	8 660	10 958	13 664	16 371	17 735	16 519
Netherlands	1 423	2 164	2 580	3 412	4 129	4 434	6 067	5 108	5 136	5 128	8 844	9 794	9 240
New Zealand	207	315	481	625	612	660	828	1 121	1 380	1 251	1 452	1 394	1 200
Norway	830	622	760	832	999	1 319	1 588	1 850	2 091	2 254	2 574	2 795	2 606
Poland	368	668	1 416	1 931	2 621	2 941	3 617	4 704	5 282	6 092	6 071	7 620	5 981
Portugal	984	1 155	1 541	1 721	1 791	2 015	2 618	3 224	3 358	3 432	3 993	4 474	4 199
Slovak Republic	24	30	17	422	568	625	877	1 019	1 151	1 254	1 340	1 431	1 354
Slovenia	..	..	..	..	..	..	..	..	507	507	643	753	732
Spain	3 183	4 327	3 638	4 490	5 639	7 025	9 848	12 712	14 977	16 564	20 233	22 158	20 074
Sweden	1 104	1 351	1 532	1 505	1 465	1 577	1 837	1 987	2 068	2 138	2 621	2 782	2 531
Switzerland	946	1 237	1 670	1 868	2 298	2 703	3 313	3 820	3 843	3 787	4 065	4 671	4 781
Turkey	575	336	669	854	756	2 512	3 658	4 750	6 436	6 758	9 841	9 602	8 369
United Kingdom	5 093	6 067	7 760	9 188	10 067	10 352	13 114	17 594	18 730	19 720	22 327	20 516	16 337
United States	32 950	36 775	48 495	62 000	74 687	81 521	89 718	98 568	107 861	107 076	123 841	150 600	154 700
OECD	128 723	138 703	182 091	225 777	253 340	276 570	316 425	360 836	394 339	410 475	483 254	533 448	526 655

% of total revenue

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	..	..	..	..	..	..	..	..	..	..	40.1	44.1	45.6
Austria	20.5	33.0	34.8	48.1	48.3	52.0	53.7	58.5	60.5	61.5	62.3	63.8	64.7
Belgium	15.6	22.9	27.1	21.8	39.8	41.8	43.2	44.3	44.7	44.2	42.5	42.3	42.5
Canada	12.2	15.4	15.3	17.5	18.5	21.7	25.2	28.3	31.9	35.2	38.1	39.8	41.2
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	25.3	32.6	40.3	50.2	55.3	50.5	55.2	21.9	36.8	62.7	57.8	59.4	60.5
Denmark	21.9	22.1	20.3	23.6	24.4	29.1	32.0	33.6	36.8	39.1	39.4	40.3	41.3
Estonia	..	..	..	..	33.7	32.8	33.7	39.5	38.1	37.6	38.6	53.4	52.3
Finland	172.0	35.6	39.3	41.6	42.9	45.2	48.9	52.0	50.3	50.1	50.2	47.5	51.9
France	16.4	14.7	18.9	21.0	24.4	27.7	30.2	32.4	32.6	33.7	34.2	35.0	35.8
Germany	23.2	21.5	27.2	31.0	31.7	32.1	33.0	34.1	34.2	34.8	36.3	36.6	35.8
Greece	23.9	26.3	36.9	35.7	37.4	43.9	47.0	51.6	51.2	54.2	54.1	54.8	55.6
Hungary	35.9	28.3	24.9	32.5	38.1	40.7	43.0	46.8	52.1	54.5	58.4	60.5	62.9
Iceland	17.9	21.4	24.2	43.8	48.2	42.2	35.2	41.8	42.9	46.8	43.8	36.9	35.5
Ireland	13.7	20.2	40.3	46.5	50.5	34.7	39.0	45.8	46.6	44.9	45.2	45.6	44.9
Israel	..	..	..	..	..	..	..	..	..	..	..	..	55.9
Italy	27.8	29.2	33.0	38.4	45.9	47.7	48.9	52.6	54.3	50.5	52.0	52.4	52.2
Japan	37.4	40.4	41.9	45.9	48.1	57.8	53.7	58.6	62.8	67.1	73.7	74.4	74.4
Korea	38.3	29.7	48.7	45.4	51.6	52.8	53.9	45.1	46.5	43.7	44.9	45.0	45.1
Luxembourg	7.4	7.6	22.2	24.1	30.0	31.2	40.9	45.9	50.2	50.6	50.9	49.9	49.6
Mexico	7.5	10.6	15.7	24.4	31.0	36.5	40.5	45.5	49.3	52.5	56.3	58.6	62.1
Netherlands	18.0	22.8	24.1	33.6	35.6	34.1	36.5	27.4	27.0	26.7	48.0	46.6	47.0
New Zealand	9.2	15.4	22.2	28.1	28.9	26.8	27.9	31.3	33.0	39.2	40.3	40.6	40.5
Norway	23.0	25.2	29.2	31.8	35.5	39.3	39.8	41.3	44.0	46.5	48.2	49.5	50.6
Poland	14.2	18.5	30.8	35.6	39.8	42.6	47.3	49.1	46.2	47.2	40.1	42.6	43.2
Portugal	24.9	27.4	32.6	34.1	29.9	31.2	33.4	35.7	36.4	37.2	40.2	39.5	39.9
Slovak Republic	5.3	5.3	2.8	34.3	37.6	40.6	53.4	58.6	60.2	65.0	64.5	64.0	63.8
Slovenia	..	..	..	..	..	..	..	..	42.6	38.7	42.7	41.6	41.9
Spain	17.7	22.0	16.3	19.7	23.5	22.3	25.4	27.8	29.3	31.3	33.4	34.1	34.6
Sweden	16.0	18.3	33.1	34.1	30.4	30.4	29.4	29.2	31.2	32.3	35.5	37.0	38.3
Switzerland	13.9	16.1	19.1	22.7	26.3	28.4	29.1	29.6	29.8	29.0	28.4	29.0	29.8
Turkey	14.3	6.7	12.3	13.9	12.9	37.4	35.1	41.5	51.9	56.2	60.5	53.9	53.8
United Kingdom	14.2	17.7	20.0	20.9	21.4	21.2	23.1	25.9	26.7	26.6	27.0	26.5	25.7
United States	13.4	14.1	16.8	19.3	22.4	24.0	26.3	28.5	29.7	28.9	32.6	38.7	40.7
OECD	20.6	21.0	24.4	27.7	30.1	32.4	33.7	35.5	36.9	37.5	41.4	43.9	45.4

Note: Data for Australia are estimates based on Telstra mobile services revenues. Revenues for June 2010 are used for year 2009 in this report (the same apply to the previous years). Data for Hungary (2009), Japan (2008 and 2009), Switzerland (2009) and the United States (2009) are estimates.

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Table 3.5. **Cellular mobile telecommunication revenue per cellular mobile subscriber**

USD

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Monthly 2009
Australia	..	..	..	..	..	..	..	..	..	..	635	581	637	576	48
Austria	..	655	590	404	347	373	410	504	550	559	502	495	475	399	33
Belgium	..	676	664	502	281	349	385	475	529	533	536	523	508	456	38
Canada	610	499	553	428	413	362	383	433	485	535	599	667	678	622	52
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	755	705	618	437	267	204	192	227	90	153	273	299	362	298	25
Denmark	581	528	429	341	292	262	285	371	413	444	455	510	477	427	36
Estonia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Finland	2 765	2 533	455	485	447	430	473	533	590	496	498	506	436	379	32
France	1329	818	391	310	241	242	288	357	412	421	406	435	473	430	36
Germany	1 571	1 234	759	594	331	305	318	366	379	363	337	327	313	278	23
Greece	915	839	548	402	307	263	314	389	456	398	408	388	350	297	25
Hungary	1 284	1 088	687	477	339	264	229	254	258	285	274	306	288	248	21
Iceland	434	413	337	267	515	441	369	402	549	654	683	778	530	364	30
Ireland	698	569	407	486	518	452	355	459	589	542	513	565	599	521	43
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	381	32
Italy	724	564	380	292	222	243	271	315	356	341	281	284	299	279	23
Japan	1 388	1 140	966	1 056	1 122	1 008	921	862	863	860	857	893	925	1 014	84
Korea	1 338	506	272	331	400	366	376	392	411	460	487	501	434	368	31
Luxembourg	465	335	199	387	271	258	260	359	375	395	434	502	525	484	40
Mexico	501	378	306	229	249	229	240	232	225	233	247	246	236	198	16
Netherlands	732	843	647	380	310	359	376	463	321	315	301	479	496	471	39
New Zealand	..	292	251	312	286	253	260	319	370	391	329	342	305	255	21
Norway	572	495	300	285	256	278	348	391	409	440	463	511	536	486	41
Poland	..	453	347	363	286	244	212	208	204	181	166	147	173	133	11
Portugal	1 023	653	376	330	258	225	219	262	305	295	280	296	299	264	22
Slovak Republic	..	120	64	26	326	265	214	238	238	254	256	221	259	246	21
Slovenia	..	..	..	..	..	..	..	..	..	288	279	334	367	349	29
Spain	767	735	614	244	188	190	210	265	329	351	362	418	447	393	33
Sweden	444	348	329	299	236	204	198	209	226	227	223	259	255	217	18
Switzerland	1 134	906	728	546	403	436	471	535	609	562	509	495	525	514	43
Turkey	345	357	96	86	57	41	108	131	137	148	128	159	146	133	11
United Kingdom	571	602	467	324	230	225	209	248	293	285	281	303	267	204	17
United States	532	596	531	564	566	581	575	559	534	530	466	497	576	564	47
OECD	810	719	562	499	436	408	402	417	421	416	393	421	439	419	35

Note: Revenue calculations rely on estimates derived for Table 3.4.

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Table 3.6. **Public telecommunication investment in the OECD area**

USD millions (excluding spectrum fees)

	Average 1988-90	Average 1991-93	Average 1994-96	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	2 285	2 130	3 050	4 009	3 463	4 145	3 842	3 333	2 649	4 166	4 158	4 440	4 721	6 050	6 332	7 660
Austria	965	1 308	1 283	996	1 662	2 002	2 619	1 620	905	411	436	949	937	1 203	749	701
Belgium	614	779	927	719	670	746	952	1 427	1 203	1 181	1 238	1 328	1 313	1 599	1 883	2 167
Canada	3 479	3 353	2 811	4 181	4 357	3 904	4 943	5 138	4 154	3 272	3 978	4 573	6 099	7 633	11 215	7 018
Chile	..	..	..	..	..	..	..	..	..	..	577	735	1 199	1 393	1 754	1 470
Czech Republic	..	226	818	1 421	1 164	854	471	599	455	1 267	512	576	627	783	877	763
Denmark	490	431	612	890	1 077	986	1 116	1 324	970	851	955	1 137	1 237	1 681	1 891	1 579
Estonia	..	..	..	91	94	85	100	86	61	67	63	75	99	130	143	126
Finland	670	510	632	835	595	572	629	657	475	493	511	453	475	515	556	596
France	4 548	6 081	6 175	6 423	6 153	6 286	7 194	8 198	5 376	6 109	6 781	7 928	8 769	8 411	9 601	8 285
Germany	9 263	15 808	12 717	11 896	8 000	8 298	9 083	10 268	6 698	6 180	7 037	7 250	8 125	9 726	10 588	8 333
Greece	291	808	751	843	1 552	1 398	1 346	1 534	1 291	1 263	1 358	901	1 006	1 774	2 016	1 775
Hungary	216	456	754	764	662	812	820	750	713	625	653	638	635	669	711	754
Iceland	12	23	30	29	52	56	69	37	24	44	80	90	78	132	94	35
Ireland	174	202	260	462	515	460	704	442	575	575	638	767	900	627	759	614
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	922
Italy	7 365	8 657	5 065	5 555	5 959	7 187	6 526	7 208	8 936	8 862	8 746	8 609	8 444	9 515	9 837	8 621
Japan	15 389	20 339	33 120	32 815	29 023	33 546	36 516	23 917	19 257	20 422	23 191	18 930	21 037	18 487	23 549	24 088
Korea	2 587	3 167	4 615	3 049	4 495	7 038	7 766	5 990	6 396	5 205	5 283	5 199	6 251	6 996	6 244	4 509
Luxembourg	39	72	96	79	30	55	15	30	49	44	73	56	88	130	178	172
Mexico	1 409	2 214	1 862	1 971	3 164	4 028	5 226	5 751	3 130	2 584	3 615	3 513	3 699	3 272	3 636	2 701
Netherlands	1 144	1 572	1 511	3 274	5 900	10 418	3 174	2 671	1 564	1 821	3 057	2 162	2 645	2 741	2 836	2 932
New Zealand	362	367	340	389	298	352	379	377	320	376	418	515	596	787	835	1 059
Norway	500	483	361	541	477	541	578	597	707	524	550	576	640	683	683	683
Poland	140	489	896	1 006	1 365	1 862	2 434	1 965	2 326	1 363	1 492	2 086	2 598	3 113	3 058	2 560
Portugal	562	973	938	1 078	1 216	1 248	1 179	1 274	967	645	838	916	974	1 667	1 470	1 464
Slovak Republic	..	..	287	384	343	1 050	1 359	1 405	641	345	455	433	436	435	405	391
Slovenia	..	..	..	..	..	..	..	..	..	..	..	237	311	445	592	251
Spain	4 517	4 265	3 220	2 654	5 090	6 573	9 346	7 313	5 242	5 104	5 821	6 894	7 107	7 884	7 605	5 940
Sweden	1 079	1 164	1 197	1 404	1 159	1 014	1 637	1 714	1 423	1 452	1 577	1 182	1 382	1 583	1 470	1 358
Switzerland	1 597	1 786	1 761	1 637	1 275	2 034	2 245	1 643	1 653	1 580	1 661	1 624	5 190	1 992	2 110	2 030
Turkey	548	787	500	553	4 225	3 777	3 541	2 949	2 159	2 204	368	1 389	1 154	1 907	3 212	3 755
United Kingdom	4 830	3 738	4 887	9 971	8 987	12 800	14 122	14 159	10 185	10 933	11 478	10 328	9 556	9 467	10 776	8 020
United States	23 401	26 064	37 751	56 963	65 079	84 433	113 301	105 607	61 000	52 362	51 558	58 130	63 113	60 809	62 277	62 066
OECD	88 514	108 296	129 227	156 879	168 100	208 558	243 230	219 987	151 504	142 330	149 155	154 619	171 440	174 239	189 942	175 398

Note: Data for Autralia (2002, 2004, 2006, 2008 and 2009), Belgium (2009), Estonia (2009), Finland (2009), Hungary (2009), Ireland (2009), the Netherlands (2009), Norway (2008 and 2009), Sweden (2009) and the United States (2009) are estimates.

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Table 3.7. **Investment in cellular mobile infrastructure in the OECD area**

USD millions, excluding spectrum fees

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Percent of total investment 2009 (or 2008)
Australia	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Austria	..	1 211	1 069	1 958	833	502	205	212	483	534	726	..	..	..
Belgium	..	..	..	..	571	368	302	410	402	513	474	..	491	22.7
Canada	1 371	988	811	1 346	1 223	1 232	929	846	1 157	1 504	1 776	5 701	1 930	27.5
Chile	..	..	..	..	..	..	..	281	361	696	703	906	722	27.5
Czech Republic	337	101	317	731	625	355	238	250	368	515	246	279	238	31.1
Denmark	124	..	..	..	..	..	..	..	..	..	..	..	..	..
Estonia	..	..	..	..	..	33	43	32	31	42	62	76	..	53.2
Finland	1 352	..	..	..	..	..	..	..	..	..	..	..	..	..
France	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Germany	2 247	2 000	2 872	3 211	2 768	2 264	2 809	3 210	3 125	3 375	2 740	3 235	2 778	33.3
Greece	170 000	..	..	620	533	489	522	730	530	595	666	710	668	37.6
Hungary	163	..	..	376	422	419	210	265	251	..	..	..	..	..
Iceland	3	6	10	..	..	..	10	10	19	8	64	..	..	48.0
Ireland	162	..	..	..	..	..	..	..	..	..	346	353	272	46.5
Israel	..	..	..	..	..	..	..	..	..	..	..	..	382	..
Italy	1 170	1 745	2 274	3 034	3 318	4 840	4 135	4 605	4 129	3 956	4 375	4 551	3 354	38.9
Japan	12 227	12 073	13 734	16 807	13 978	10 472	..	..	..	..	..	..	..	..
Korea	1 609	2 088	3 147	3 545	2 045	2 645	2 864	2 640	2 441	3 236	3 379	2 843	..	45.5
Luxembourg	..	..	..	..	..	..	101	41	46	35	28	37	..	25.0
Mexico	276	732	1 053	1 844	1 661	1 043	957	1 404	1 195	778	771	..	..	24.1
Netherlands	267	..	..	..	..	..	..	..	..	..	..	..	..	..
New Zealand	..	..	..	..	..	..	40	45	63	162	221	..	..	28.0
Norway	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Poland	..	..	..	..	..	279	355	..	728	902	1 181	1 371	1 105	43.2
Portugal	329	674	739	552	484	460	372	501	522	545	1 008	634	422	28.8
Slovak Republic	..	..	..	383	..	255	160	148	166	210	307	256	133	34.1
Slovenia	..	..	..	..	..	..	..	..	..	116	146	351	110	44.0
Spain	478	..	..	2 642	1 756	..	1 612	2 277	2 753	2 824	3 061	..	..	..
Sweden	302	174	192	162	224	591	640	530	392	293	477	..	..	..
Switzerland	171	248	745	616	509	586	627	695	515	389	417	429	419	20.6
Turkey	..	3 619	3 162	2 835	2 589	1 961	..	..	1 038	766	1 112	2 003	2 972	79.1
United Kingdom	1 866	..	..	..	..	..	..	..	..	..	..	3 069	2 444	30.5
United States	..	8 228	14 422	25 482	24 028	20 490	20 989	24 000	27 300	27 900	22 200	25 556	20 651	33.3

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Table 3.8. **Telecommunication investment by region**

USD millions (excluding spectrum fees)

	Average 1988-90	Average 1991-93	Average 1994-96	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2007-09
Europe	39 603	50 662	45 678	53 504	58 221	71 111	71 257	69 873	54 598	53 942	56 378	58 584	64 725	68 812	74 100	64 827	69 246
(%)	*45*	*47*	*35*	*34*	*35*	*34*	*29*	*32*	*36*	*38*	*38*	*38*	*38*	*39*	*39*	*37*	*39*
America	28 289	31 631	42 424	63 115	72 599	92 365	123 470	116 496	68 284	58 219	59 728	66 951	74 110	73 107	78 882	73 255	75 081
(%)	*32*	*29*	*33*	*40*	*43*	*44*	*51*	*53*	*45*	*41*	*40*	*43*	*43*	*42*	*42*	*42*	*42*
Asia/Pacific	20 622	26 003	41 125	40 261	37 279	45 081	48 503	33 618	28 622	30 169	33 049	29 083	32 605	32 320	36 960	37 316	35 532
(%)	*23*	*24*	*32*	*26*	*22*	*22*	*20*	*15*	*19*	*21*	*22*	*19*	*19*	*19*	*19*	*21*	*20*
OECD	88 514	108 296	129 227	156 879	168 100	208 558	243 230	219 987	151 504	142 330	149 155	154 619	171 440	174 239	189 942	175 398	179 859

Notes: Calculations include unofficial estimates derived for Table 3.6.

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Table 3.9. **Public telecommunication investment as a percentage of telecommunications revenue**

	Average 1988-90	Average 1991-93	Average 1994-96	Average 1997-99	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	50.8	24.1	33.4	27.3	29.8	27.0	25.3	23.9	21.6	16.3	21.5	17.5	16.7	17.5	19.6	19.8	25.1
Austria	47.9	48.6	37.5	35.7	26.8	40.4	40.1	59.2	32.1	17.0	6.2	5.8	12.3	12.4	15.4	9.5	9.9
Belgium	32.9	30.5	28.1	14.3	17.0	13.1	12.6	13.1	21.1	16.1	12.5	11.3	11.6	11.0	12.1	13.3	16.1
Canada	38.0	27.6	23.3	22.5	24.5	22.6	20.3	24.0	24.6	19.6	14.3	15.5	16.0	19.1	21.5	29.8	19.5
Chile	..	..	..	..	..	..	..	..	..	..	..	23.1	29.4	48.2	56.6	70.7	59.2
Czech Republic	..	68.6	131.5	67.3	97.9	63.5	40.5	20.4	23.4	13.9	31.7	11.5	11.8	11.6	11.4	10.4	10.9
Denmark	29.9	19.3	21.6	25.5	25.5	28.7	22.2	26.7	31.2	22.1	15.4	15.0	17.3	18.2	20.6	23.3	20.6
Estonia	..	..	..	..	..	..	..	..	25.3	14.5	12.0	9.5	10.0	11.2	12.8	13.5	12.6
Finland	47.8	25.1	35.1	19.2	27.1	16.4	14.2	15.7	15.7	10.0	9.5	9.0	8.5	8.4	8.4	8.9	10.6
France	30.6	32.7	26.9	20.6	22.4	20.6	18.6	21.1	22.3	13.4	12.4	12.0	12.8	14.1	12.0	12.2	11.2
Germany	47.8	48.5	34.6	20.0	27.4	16.3	16.2	17.6	19.0	11.5	8.6	8.5	8.6	9.8	11.1	11.6	9.9
Greece	32.7	66.8	38.0	31.6	25.6	36.2	33.0	26.4	27.4	19.4	14.8	13.9	9.3	9.6	15.3	16.7	16.4
Hungary	82.9	122.3	71.5	29.5	35.7	26.3	26.4	25.6	21.8	18.4	13.3	13.6	12.5	12.7	11.6	12.2	16.2
Iceland	17.6	27.8	28.8	26.4	18.9	31.1	29.2	27.5	17.3	10.6	13.7	20.9	19.5	16.6	22.9	19.5	10.0
Ireland	21.7	20.2	24.0	24.2	21.7	26.9	23.9	31.3	17.8	18.0	14.3	13.1	15.7	16.8	10.1	11.4	11.0
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14.2
Italy	64.3	54.0	27.7	24.3	23.3	22.6	27.0	26.7	26.6	29.6	24.3	20.5	19.1	18.9	19.4	19.1	18.3
Japan	40.2	43.1	45.3	25.7	28.2	25.6	23.4	22.4	15.3	14.9	14.7	17.2	14.3	16.2	14.2	16.9	15.8
Korea	87.5	59.6	61.7	37.6	33.5	35.2	44.2	32.9	29.1	27.7	21.3	15.8	13.7	14.0	14.4	14.2	11.5
Luxembourg	49.6	53.5	39.8	16.6	25.8	8.9	15.1	4.5	8.1	12.4	9.3	13.8	9.9	14.3	19.3	23.9	24.5
Mexico	112.5	55.9	24.0	30.3	22.5	32.8	35.7	36.4	35.8	18.3	15.0	19.0	15.8	14.2	11.3	12.0	10.2
Netherlands	33.2	17.8	23.5	67.0	41.5	62.2	97.2	31.3	23.0	12.0	11.0	16.4	11.4	13.8	14.9	13.5	14.9
New Zealand	32.2	25.6	23.4	16.0	17.3	14.6	16.2	17.0	17.8	13.0	12.7	11.7	12.3	18.7	21.8	24.3	35.8
Norway	25.5	21.9	14.4	18.4	15.0	19.3	20.8	22.0	21.2	21.1	13.1	12.3	12.1	13.2	12.8	12.1	13.2
Poland	29.8	69.8	59.4	39.0	38.8	37.7	40.5	44.8	29.9	33.7	17.8	15.6	18.2	20.1	20.5	17.1	18.5
Portugal	62.1	70.2	43.5	27.5	27.2	28.8	26.4	23.4	21.3	15.0	8.2	9.3	9.9	10.6	16.8	13.0	13.9
Slovak Republic	..	..	197.3	103.1	76.2	61.0	172.1	110.6	93.0	41.6	21.0	26.2	22.6	22.6	20.9	18.1	18.4
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..	19.9	23.8	29.5	32.6	14.4
Spain	109.0	51.5	31.3	23.3	14.7	25.9	29.4	41.1	30.5	16.7	13.1	12.7	13.5	13.4	13.0	11.7	10.2
Sweden	34.5	23.2	23.0	19.3	20.3	15.7	21.9	37.1	35.5	27.4	23.2	23.2	17.8	20.9	21.4	19.6	20.6
Switzerland	45.1	39.0	28.4	21.3	24.1	16.6	23.3	27.2	18.8	17.4	13.9	12.9	12.6	39.8	13.9	13.1	12.7
Turkey	52.6	37.3	20.8	55.7	13.7	84.0	69.4	57.4	50.3	32.2	21.1	3.2	11.2	9.6	11.7	18.0	24.2
United Kingdom	28.6	15.3	19.2	29.0	27.9	26.3	33.0	32.2	30.0	20.9	19.2	16.9	14.7	12.9	11.5	13.9	12.6
United States	17.6	17.6	21.9	25.8	23.2	25.0	29.3	35.3	31.6	18.0	15.4	14.9	16.0	17.0	16.0	16.0	16.3
OECD	31.6	29.7	29.4	26.2	25.1	25.5	28.0	29.8	26.2	17.8	15.2	14.7	14.5	15.7	14.9	15.6	15.1

Notes: Calculations include unofficial estimates derived from Tables 3.1 and 3.6.

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Table 3.10. **Public telecommunication investment as a percentage of gross fixed capital formation (GFCF)**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2007-09
Australia	3.84	3.17	4.21	3.50	3.52	2.82	3.68	2.81	2.43	2.21	2.64	2.21	2.51	2.45
Austria	1.77	3.37	3.93	5.30	3.55	2.05	0.92	0.77	1.50	1.42	1.77	0.94	0.76	1.16
Belgium	1.31	1.32	1.42	1.81	2.92	2.50	2.45	2.12	1.87	1.67	1.92	1.89	1.91	1.91
Canada	3.78	3.43	3.17	3.77	3.69	2.94	2.28	2.34	2.27	2.53	2.66	3.45	1.92	2.68
Chile	..	..	..	..	..	..	..	3.87	3.99	4.79	4.99	5.40	3.52	4.64
Czech Republic	7.14	6.81	4.90	2.90	3.78	2.63	6.12	2.10	2.03	2.02	2.22	2.00	1.48	1.90
Denmark	2.60	3.22	2.78	3.24	4.10	3.06	2.50	2.33	2.41	2.46	2.83	2.73	2.22	2.59
Estonia	..	..	..	..	5.89	3.69	3.07	2.03	2.03	2.22	2.23	1.93	1.82	2.00
Finland	3.60	2.57	2.26	2.47	2.71	1.89	1.95	1.65	1.25	1.20	1.24	1.06	1.02	1.11
France	2.28	2.48	2.39	2.63	3.18	2.06	2.23	2.01	2.00	2.04	1.80	1.72	1.33	1.62
Germany	2.24	1.73	1.76	1.94	2.47	1.72	1.61	1.57	1.47	1.61	1.77	1.64	1.16	1.53
Greece	3.41	6.29	5.31	4.63	5.57	4.56	3.80	3.01	1.77	2.00	3.13	3.04	2.61	2.93
Hungary	7.74	6.58	7.46	7.25	6.77	5.80	4.05	3.50	2.77	2.50	2.73	2.43	2.33	2.50
Iceland	2.05	3.55	2.84	3.73	1.91	1.45	2.82	3.73	2.98	1.71	2.66	1.45	0.63	1.58
Ireland	3.29	3.16	2.41	3.17	1.99	2.47	2.17	1.81	1.70	1.67	1.05	1.12	1.06	1.08
Israel	..	..	..	..	..	..	..	..	..	..	..	..	2.54	..
Italy	2.34	2.64	3.07	2.77	3.25	3.94	3.47	2.86	2.44	2.28	2.43	2.19	1.79	2.14
Japan	2.50	2.46	3.36	3.28	2.04	1.91	2.24	2.41	1.81	1.98	1.80	2.32	2.42	2.18
Korea	1.45	2.44	6.71	5.87	3.75	4.40	3.16	2.80	2.47	2.56	2.56	2.09	1.65	2.10
Luxembourg	1.91	0.76	1.30	0.31	0.72	1.08	0.86	1.13	0.75	1.10	1.59	1.74	1.54	1.62
Mexico	3.03	3.69	4.18	4.68	4.22	2.29	1.89	2.73	2.35	2.16	1.64	1.66	1.11	1.47
Netherlands	3.62	6.93	11.57	3.37	3.23	1.88	2.10	2.92	1.88	2.16	2.06	1.82	1.64	1.84
New Zealand	2.62	2.10	3.18	3.13	3.51	2.93	2.89	2.27	2.19	2.20	3.11	2.72	3.75	3.19
Norway	1.67	1.37	1.43	1.66	1.93	2.28	1.53	1.41	1.24	1.13	1.03	0.79	0.71	0.85
Poland	3.25	3.88	4.48	5.95	4.84	5.90	3.67	3.77	4.57	4.70	4.63	3.34	2.12	3.36
Portugal	3.98	4.28	3.98	3.62	4.20	3.16	2.02	2.35	2.28	2.35	3.95	3.02	2.75	3.24
Slovak Republic	5.73	4.75	13.14	22.46	26.74	10.69	5.14	5.52	4.28	3.43	2.95	2.06	1.66	2.22
Slovenia	..	..	..	..	..	..	..	..	2.81	3.40	4.32	4.51	1.59	3.48
Spain	2.12	3.68	4.34	6.26	4.90	3.32	2.82	2.43	2.37	2.13	2.09	1.72	1.29	1.70
Sweden	3.14	2.90	2.39	3.62	3.86	3.49	3.33	2.98	1.92	2.08	2.12	1.62	1.39	1.71
Switzerland	2.43	2.23	3.37	3.76	2.90	2.97	2.66	2.50	2.14	6.61	2.39	2.25	1.99	2.21
Turkey	0.95	6.66	6.12	7.51	5.47	6.93	5.68	0.71	1.75	1.13	1.61	2.27	2.31	2.06
United Kingdom	4.90	3.96	4.92	5.41	5.59	4.09	4.06	3.75	2.81	2.48	2.21	2.15	1.42	1.92
United States	4.04	4.24	5.05	6.19	5.33	3.08	2.71	2.56	2.62	2.57	2.32	2.35	2.44	2.37

Notes: Calculations include unofficial estimates derived for Table 3.6.

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Table 3.11. **Public telecommunication investment per total communication access path**

USD

	Average 1988-90	Average 1991-93	Average 1994-96	Average 1997-99	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2007-09	Monthly average 2007-09
Australia	294.8	248.8	328.4	253.0	280.6	225.7	250.0	207.5	153.4	113.0	163.6	146.4	141.7	140.9	168.8	172.0	199.8	180.2	15.0
Austria	310.4	377.6	343.3	251.9	210.5	288.8	256.5	272.0	159.8	87.2	37.9	36.5	75.6	69.3	84.7	49.7	44.0	59.5	5.0
Belgium	164.3	183.1	196.8	106.1	119.7	103.2	95.3	92.9	114.6	90.6	84.1	83.1	84.9	80.7	91.5	101.2	111.7	101.5	8.5
Canada	238.6	206.1	159.4	167.9	182.4	174.9	146.3	166.6	154.7	118.5	87.9	100.2	106.7	132.9	157.3	220.9	133.7	170.6	14.2
Chile	..	..	..	..	..	..	..	..	..	..	..	44.3	50.1	71.2	74.5	88.8	67.8	77.0	6.4
Czech Republic	25.2	123.4	333.2	256.9	374.4	247.7	148.5	57.1	56.4	37.9	97.2	36.5	37.6	39.0	45.5	48.9	43.0	45.8	3.8
Denmark	171.9	143.4	189.4	190.8	193.1	209.8	169.5	168.0	179.7	121.3	100.4	104.9	118.5	121.6	158.3	172.7	141.6	157.6	13.1
Estonia	..	..	..	..	148.8	126.1	94.8	91.3	68.7	44.7	42.9	35.2	37.6	43.9	49.2	44.8	37.0	..	..
Finland	260.2	186.1	221.1	120.1	166.6	102.6	91.0	92.3	89.7	61.3	61.8	61.3	51.3	52.1	54.0	54.6	56.4	55.0	4.6
France	168.6	199.9	187.3	146.2	169.6	145.6	123.4	121.0	122.6	77.6	82.5	85.2	92.7	96.5	88.8	98.5	81.2	89.5	7.5
Germany	312.2	438.3	298.6	173.7	243.5	147.2	130.5	103.1	105.0	65.6	56.8	58.5	56.2	58.5	63.4	64.3	50.2	59.3	4.9
Greece	76.8	180.4	145.7	161.1	132.3	204.3	146.7	115.1	111.3	85.6	78.9	81.2	49.7	50.9	77.9	78.5	64.6	73.7	6.1
Hungary	233.8	349.5	337.7	166.3	198.0	146.1	154.9	123.0	88.8	69.5	54.8	53.2	49.3	44.3	42.5	41.7	45.3	43.2	3.6
Iceland	96.6	166.5	198.5	164.0	129.1	195.7	167.3	183.7	92.2	54.7	92.7	161.9	169.6	140.4	231.6	159.0	58.7	149.8	12.5
Ireland	191.4	182.2	197.8	191.3	229.6	203.3	141.0	192.4	99.8	119.1	111.5	114.0	123.4	129.5	83.9	99.4	84.1	89.1	7.4
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	63.2	21.1	1.8
Italy	346.8	366.0	202.7	137.2	150.1	131.2	130.5	97.5	94.5	113.3	104.1	94.4	83.8	75.7	78.6	81.5	73.1	77.7	6.5
Japan	294.8	350.9	530.4	290.1	324.6	264.0	281.6	282.2	172.1	128.8	127.0	136.3	106.5	114.8	98.7	124.3	128.7	117.2	9.8
Korea	194.5	202.8	244.8	130.7	109.8	129.2	153.6	145.7	99.0	96.6	75.5	72.9	69.3	80.8	86.0	75.0	53.4	71.5	6.0
Luxembourg	222.5	353.6	409.7	151.5	240.6	85.0	129.0	27.5	44.2	67.2	54.7	77.6	54.2	82.7	122.1	160.1	150.4	144.2	12.0
Mexico	289.7	325.6	213.8	211.1	179.2	238.3	215.9	197.8	161.3	76.1	55.2	62.8	51.0	47.3	36.0	35.2	24.0	31.7	2.6
Netherlands	170.7	212.4	185.0	507.0	302.7	530.9	687.6	163.3	132.9	75.2	80.3	115.6	82.1	94.8	90.6	91.4	96.0	92.7	7.7
New Zealand	254.5	242.8	205.2	121.1	157.8	98.8	106.8	96.1	89.4	72.6	82.5	82.5	89.5	97.0	114.8	113.3	140.3	122.8	10.2
Norway	241.1	213.1	145.1	113.6	130.2	104.9	105.7	102.2	99.6	112.7	78.9	75.1	74.6	82.0	85.4	83.2	82.7	83.8	7.0
Poland	44.8	123.1	155.6	130.2	120.9	131.1	138.5	353.8	179.5	162.2	74.9	61.0	49.9	51.1	56.6	53.3	44.1	51.4	4.3
Portugal	267.6	325.2	257.7	173.6	200.5	174.5	145.7	112.8	107.9	73.5	45.7	56.0	57.1	57.2	91.8	74.5	69.6	78.7	6.6
Slovak Republic	..	71.8	256.0	288.3	241.2	170.9	452.8	454.4	379.4	148.2	69.2	81.5	73.7	68.8	57.0	56.0	54.7	55.9	4.7
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..	87.8	110.6	152.3	193.7	82.3	142.8	11.9
Spain	383.1	309.4	212.5	183.8	130.0	216.4	205.0	223.9	153.8	100.1	89.2	97.0	102.7	98.4	102.9	95.7	73.0	90.5	7.5
Sweden	188.7	196.3	197.6	118.5	151.8	113.7	90.3	130.8	127.0	98.9	93.4	100.3	72.1	80.6	89.0	80.0	72.4	80.5	6.7
Switzerland	421.7	425.0	389.3	268.2	307.3	215.3	282.1	254.9	172.6	161.7	143.8	144.1	130.4	391.4	138.9	140.1	130.2	136.4	11.4
Turkey	92.9	79.1	35.8	128.1	31.9	206.4	146.1	105.8	79.0	51.1	46.9	6.8	21.7	15.5	22.5	36.1	43.8	34.1	2.8
United Kingdom	195.4	141.7	166.5	231.0	260.4	202.2	230.3	196.4	183.5	124.0	125.7	118.5	97.5	84.7	79.6	87.3	63.2	76.7	6.4
United States	178.8	182.2	238.3	312.7	304.1	320.3	314.1	378.5	324.4	177.7	143.7	131.3	138.4	140.1	129.2	127.6	124.0	126.9	10.6
OECD	227.8	246.2	261.7	234.8	240.5	229.0	229.3	227.6	184.5	118.4	103.7	99.6	94.7	97.5	92.9	97.1	88.0	92.7	7.7

Note: Calculations include unofficial estimates derived from Tables 3.6 and 4.2. Total communication access paths = analogue lines + ISDN lines + DSL + cable modem + fibre + mobile subscribers.

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Table 3.12. **Public telecommunication investment per capita**

USD

	Average 1988-90	Average 1991-93	Average 1994-96	Average 1997-99	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 2007-09	Monthly average 2009
Australia	136.0	121.8	168.7	205.8	215.4	184.1	217.7	199.4	170.7	134.0	208.2	205.3	216.1	226.2	284.9	292.6	346.6	308.0	25.7
Austria	126.2	165.6	159.4	194.6	125.0	208.4	250.5	326.9	201.5	111.9	50.7	53.3	115.3	113.3	144.9	89.8	83.8	106.2	8.8
Belgium	61.8	77.6	91.4	69.7	70.7	65.7	72.9	92.9	138.8	116.5	113.9	118.8	126.8	124.6	150.5	175.9	200.8	175.8	14.6
Canada	127.6	118.2	95.8	137.6	139.8	144.5	128.4	161.1	165.6	132.5	103.4	124.6	141.8	187.2	231.8	336.5	208.0	258.8	21.6
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	104.6	86.8	..	..
Czech Republic	3.8	21.9	79.2	111.4	137.9	113.1	83.1	45.9	58.6	44.6	124.2	50.2	56.2	61.1	75.8	84.1	72.6	77.5	6.5
Denmark	95.4	83.4	117.0	185.6	168.3	203.2	185.2	209.0	247.2	180.4	157.9	176.8	209.9	227.4	307.8	344.3	286.0	312.7	26.1
Estonia	..	..	..	64.6	64.4	67.4	61.8	72.8	62.9	44.7	49.2	46.7	56.0	73.6	96.5	106.5	93.7	98.9	8.2
Finland	134.9	101.1	123.8	129.6	162.4	115.5	110.8	121.5	126.7	91.2	94.5	97.8	86.4	90.2	97.5	104.6	111.6	104.5	8.7
France	80.6	106.3	106.8	104.7	107.4	102.5	104.2	118.5	134.0	87.3	98.5	108.5	125.9	138.3	131.9	149.7	128.5	136.7	11.4
Germany	148.8	196.2	155.7	114.5	145.0	97.5	101.1	110.5	124.7	81.2	74.9	85.3	87.9	98.6	118.2	128.9	101.8	116.3	9.7
Greece	28.9	78.4	71.9	116.6	78.2	143.2	128.5	123.3	140.1	117.5	114.6	122.8	81.2	90.3	158.5	179.4	157.6	165.2	13.8
Hungary	20.8	44.2	73.7	72.7	74.2	64.5	79.3	80.3	73.7	70.2	61.7	64.6	63.3	63.1	66.5	70.9	75.2	70.9	5.9
Iceland	47.1	89.1	112.5	165.3	105.3	189.4	201.2	247.0	130.7	84.4	151.6	273.2	305.3	257.2	425.2	295.6	108.8	276.6	23.0
Ireland	49.5	57.0	72.2	129.1	126.1	138.6	122.4	185.0	114.4	146.4	143.9	156.9	184.3	211.1	143.7	170.7	137.4	150.6	12.6
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	123.9	..	..
Italy	128.7	152.7	89.3	109.5	97.7	104.7	126.3	114.6	126.5	156.3	153.8	150.3	146.9	143.3	160.3	164.4	143.1	155.9	13.0
Japan	125.1	163.5	263.9	251.6	260.1	229.5	264.8	287.7	187.9	151.1	159.9	181.5	148.2	164.6	144.7	184.7	189.2	172.9	14.4
Korea	60.9	72.4	102.4	104.8	66.3	97.1	151.0	165.2	126.5	134.3	108.8	110.0	108.0	129.4	144.4	128.5	92.5	121.8	10.1
Luxembourg	103.1	182.7	234.2	128.5	187.1	71.3	127.0	34.6	68.6	109.9	97.0	158.4	120.2	185.1	271.7	364.2	345.3	327.0	27.3
Mexico	17.0	26.1	20.6	32.0	21.0	33.2	41.7	53.2	57.8	31.1	25.4	35.1	33.8	35.3	31.0	34.1	25.1	30.1	2.5
Netherlands	77.0	103.6	97.8	414.8	209.8	375.7	659.0	199.4	166.5	96.9	112.3	187.8	132.5	161.9	167.3	172.5	177.4	172.4	14.4
New Zealand	108.6	104.5	93.0	90.9	103.7	78.6	92.2	98.6	97.4	82.0	94.6	103.3	125.5	143.7	187.4	196.8	247.5	210.5	17.5
Norway	118.3	112.7	82.9	117.2	122.7	107.6	121.2	128.6	132.3	155.8	114.8	119.9	124.6	137.2	145.0	143.2	141.4	143.2	11.9
Poland	3.7	12.8	23.2	36.9	26.3	35.6	48.6	63.6	51.4	60.8	35.7	39.1	54.7	68.1	81.7	80.2	67.1	76.3	6.4
Portugal	56.7	98.8	95.2	116.5	106.8	120.0	122.6	115.3	123.8	93.2	61.8	79.8	86.8	92.0	157.2	138.4	137.7	144.4	12.0
Slovak Republic	..	7.7	53.6	109.8	71.3	63.5	194.6	251.7	261.3	119.2	64.2	84.5	80.4	80.9	80.5	74.9	72.1	75.9	6.3
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..	118.4	155.1	220.5	292.7	123.1	212.1	17.7
Spain	116.5	109.3	82.1	119.9	67.0	128.1	164.6	232.1	179.6	126.9	121.5	136.3	158.8	161.3	175.7	166.8	129.3	157.3	13.1
Sweden	127.1	134.3	135.7	134.7	158.7	131.0	114.4	184.5	192.7	159.4	162.1	175.4	130.9	152.2	173.0	158.8	145.4	159.1	13.3
Switzerland	239.1	260.0	250.0	232.2	230.2	178.8	283.8	311.4	225.5	225.2	213.3	222.9	216.5	686.6	261.5	273.6	260.3	265.1	22.1
Turkey	10.0	13.5	8.1	44.7	9.0	67.6	59.6	55.1	45.3	32.7	33.0	5.4	20.3	16.6	27.1	45.2	52.2	41.5	3.5
United Kingdom	84.2	64.4	83.4	180.9	171.0	153.7	218.1	239.8	239.5	171.7	183.6	191.8	171.5	157.7	155.3	175.5	129.8	153.6	12.8
United States	94.6	102.1	143.5	248.9	208.7	235.7	302.3	401.2	370.1	211.7	180.0	175.7	196.2	211.0	201.3	204.3	201.9	202.5	16.9
OECD	86.8	102.2	119.2	159.8	139.1	148.1	182.4	211.2	189.6	129.7	120.9	125.9	129.6	142.8	144.1	156.0	143.2	147.8	12.3

Notes: Calculations include unofficial estimates derived for Table 3.6.

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Table 3.13. **Cellular mobile voice traffic**

Millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Austria	..	..	..	3 674	5 760	7 055	7 902	9 130	10 408	11 590	13 728	16 977	19 596	21 113
Belgium	..	..	..	..	..	..	..	7 912	8 904	10 498	12 242	12 951	13 685	13 905
Canada	..	..	10 924	12 611	18 270	21 705	29 820	41 166	49 243	64 253	..	..	..	..
Chile	..	..	..	..	2 471	3 442	4 464	5 238	6 004	7 089	7 846	10 858	14 842	17 315
Czech Republic	..	..	..	..	1 316	2 442	2 853	3 456	3 691	4 010	9 598	11 501	12 615	13 758
Denmark	979	1 301	1 621	2 117	2 600	3 023	3 501	4 165	5 149	6 485	7 569	8 718	9 747	10 363
Estonia	..	..	..	..	..	586	736	855	1 145	1 250	1 697	2 065	2 173	2 221
Finland	919	1 832	3 198	4 514	5 294	6 520	7 276	8 161	9 643	10 848	12 493	13 546	14 548	15 120
France	..	..	9 968	20 571	35 437	44 419	51 844	63 469	74 248	81 711	94 026	99 525	101 779	101 193
Germany	..	..	..	17 401	25 004	31 288	33 970	37 089	41 019	43 000	57 110	70 030	86 140	91 000
Greece	..	..	..	..	..	..	4 738	6 826	9 053	11 309	13 997	16 854	20 857	23 957
Hungary	..	..	..	1 664	2 766	4 055	5 028	6 114	7 453	9 454	11 582	13 610	15 758	17 190
Iceland	..	..	..	..	187	220	252	360	410	476	472	547	703	724
Ireland	..	..	..	..	..	..	..	4 305	4 784	5 699	7 086	8 770	11 191	10 188
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	24 092
Italy	..	..	..	..	34 216	42 355	46 253	51 110	61 838	71 027	80 355	93 358	108 667	113 770
Japan	19 140	34 146	50 186	68 104	87 204	97 900	105 200	113 000	109 500	112 980	118 020	123 120	133 500	139 620
Korea	..	..	..	28 687	41 687	50 883	60 466	66 621	75 940	80 881	86 154	92 812	99 555	102 661
Luxembourg	..	..	..	..	..	..	..	383	444	488	535	570	722	792
Mexico	1 241	1 480	2 762	5 151	10 973	15 919	19 991	26 386	38 460	51 506	65 949	98 025	138 422	165 463
Netherlands	..	..	..	..	..	9 700	11 326	14 737	17 174	18 914	20 157	21 045	21 679	22 132
New Zealand	..	..	..	..	..	..	..	1 700	1 900	2 200	2 760	3 165	3 660	4 240
Norway	..	..	2 235	2 623	2 993	3 595	4 164	4 698	5 605	6 750	7 897	9 258	10 501	11 394
Poland	..	..	..	..	..	11 900	8 659	12 577	14 536	16 352	26 238	34 692	42 529	49 484
Portugal	..	..	..	..	6 187	8 691	9 346	10 004	10 649	11 608	12 452	13 646	15 272	17 753
Slovak Republic	70	226	483	662	626	526	919	942	1 119	1 147	1 252	1 471	1 740	1 912
Slovenia	..	..	..	..	..	..	..	..	..	2 426	2 614	2 875	3 133	3 504
Spain	..	..	..	..	15 041	20 210	24 816	30 942	37 120	48 267	57 857	67 981	71 111	70 557
Sweden	..	..	..	3 988	5 021	5 529	6 283	6 739	7 619	9 924	12 642	15 631	18 078	19 760
Switzerland	..	..	..	2 623	4 148	4 757	4 941	5 151	5 413	5 931	7 111	8 311	9 524	10 914
Turkey	..	..	..	..	..	5 859	6 255	11 715	20 319	35 508	48 118	57 664	74 872	108 065
United Kingdom	6 306	8 782	12 903	22 154	35 384	44 633	52 004	58 921	64 157	71 433	82 498	99 875	110 861	118 340
United States[1]	28 654	47 767	94 280	166 021	295 792	426 733	485 279	575 845	645 219	1 495 000	1 798 000	2 119 000	2 203 000	2 275 000

1. Values for the United States include both incoming and outgoing calls. Data for other countries are for outgoing calls only.

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Table 3.14. **Cellular mobile traffic per mobile subscription per year**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2009 (monthly)
Australia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Austria	..	..	..	855	942	1 079	1 173	1 287	1 302	1 385	1 483	1 723	1 848	1 846	154
Belgium	..	..	..	..	..	..	..	919	975	1 093	1 243	1 206	1 158	1 112	93
Canada	..	..	2 043	1 825	2 094	2 038	2 486	3 097	3 278	3 776	..	..	..	..	..
Chile	..	..	..	..	727	675	715	721	648	671	630	778	1 003	1 053	88
Czech Republic	..	..	..	..	303	352	331	356	342	341	774	869	914	965	80
Denmark	743	901	840	805	772	763	782	874	997	1 190	1 299	1 381	1 420	1 396	116
Estonia	..	..	..	..	..	795	836	813	912	865	1 023	1 042	861	817	68
Finland	622	876	1 124	1 379	1 420	1 561	1 611	1 719	1 929	2 015	2 203	2 228	2 130	1 964	164
France	..	..	889	998	1 194	1 201	1 343	1 522	1 667	1 699	1 820	1 799	1 755	1 646	137
Germany	..	..	..	742	519	557	575	572	552	543	667	721	803	841	70
Greece	..	..	..	..	..	..	509	661	819	908	1 009	1 039	1 102	1 180	98
Hungary	..	..	..	1 040	899	816	730	770	854	1 014	1 162	1 234	1 289	1 458	107
Iceland	..	..	..	..	871	933	965	1 289	1 414	1 564	1 461	1 679	2 087	2 132	178
Ireland	..	..	..	..	..	..	..	1 258	1 264	1 352	1 511	1 764	2 217	2 107	176
Israel					..	..	..	..	..	..	..	..	..	2 523	210
Italy	..	..	..	..	809	829	871	901	979	989	999	1 040	1 203	1 292	108
Japan	711	893	1 061	1 198	1 306	1 308	1 297	1 304	1 197	1 171	1 160	1 147	1 191	1 245	104
Korea	..	..	..	1 224	1 555	1 752	1 870	1 983	2 076	2 109	2 143	2 134	2 183	2 141	178
Luxembourg	..	..	..	..	..	..	..	711	687	678	749	833	1 021	1 100	92
Mexico	1 215	850	824	666	779	732	771	877	1 000	1 093	1 191	1 473	1 838	1 981	165
Netherlands	..	..	..	..	..	843	960	1 125	1 079	1 161	1 182	1 140	1 098	1 129	94
New Zealand	..	..	..	..	..	..	..	654	628	623	726	746	800	903	75
Norway	..	..	1 079	985	922	1 000	1 099	1 157	1 239	1 420	1 622	1 838	2 015	2 126	177
Poland	..	..	..	..	..	1 107	623	723	629	561	714	838	968	1 104	92
Portugal	..	..	..	..	928	1 089	1 016	1 000	1 007	1 021	1 018	1 012	1 021	1 114	93
Slovak Republic	2 428	1 131	1 038	998	484	245	314	256	262	253	256	242	315	348	29
Slovenia	..	..	..	..	..	..	..	..	..	1 379	1 437	1 491	1 524	1 668	139
Spain	..	..	..	..	628	681	740	831	961	1 131	1 266	1 404	1 433	1 381	115
Sweden	..	..	..	778	788	770	790	766	867	1 090	1 316	1 545	1 660	1 697	141
Switzerland	..	..	..	858	894	902	861	832	863	868	956	1 012	1 071	1 172	98
Turkey	..	..	..	..	..	318	268	420	585	814	914	930	1 137	1 721	143
United Kingdom	925	1 038	992	925	884	997	1 050	1 114	1 069	1 086	1 177	1 353	1 445	1 475	123
United States[1]	651	864	1 362	1 929	2 702	3 321	3 422	3 586	3 493	7 339	7 830	8 499	8 431	8 294	691

1. Values for the United States include both incoming and outgoing calls. Data for other countries are for outgoing calls only.

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Table 3.15. **International telecommunication traffic**

Outgoing MiTT per capita

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	89.8	111.1	..	..	..	..	..	..	..	216.5	160.4	..
Austria	139.5	147.4	158.8	129.8	135.8	148.7	144.6	149.5	187.8	184.3	189.0	171.1
Belgium	..	..	94.9	125.8	133.8	150.2	165.9	169.5	151.7	136.7	131.5	127.9
Canada	159.3	191.8	171.3	185.6	202.1	..	..	..	..	..	..	..
Chile	..	..	14.6	16.4	17.4	15.9	16.5	15.5	14.1	13.3	12.7	12.7
Czech Republic	33.0	44.2	42.3	47.1	52.3	50.0	50.6	50.5	59.4	47.2	47.6	39.0
Denmark	109.8	123.2	164.0	162.2	147.2	149.5	154.4	156.2	156.1	155.2	165.4	168.3
Estonia	..	..	..	..	..	..	..	..	..	..	..	..
Finland	79.8	83.5	90.4	104.2	90.3	..	..	..	..	..	..	..
France	66.6	72.7	73.3	75.4	78.0	79.1	68.5	65.4	77.5	102.7	124.5	132.4
Germany[1]	71.6	96.3	..	..	..	..	..	2231.3	2246.1	2261.0	2277.2	2308.4
Greece	63.2	67.1	..	65.6	73.7	105.0	120.8	125.9	137.8	164.1	179.9	..
Hungary	28.9	31.9	32.3	30.5	29.4	30.0	35.9	39.2	42.4	45.2	49.7	46.9
Iceland	166.1	181.7	151.4	147.6		147.1	112.5	106.5	162.2	139.2	111.4	96.8
Ireland	238.5	270.6	..	..	289.6	258.4	281.8	271.8	609.0	577.4	473.7	402.1
Israel	..	..	..	..	..	..	..	..	..	..	..	..
Italy	40.2	44.7	49.0	53.9	64.5	64.0	101.1	103.0	122.0	140.3	161.2	152.7
Japan	14.4	14.1	17.2	20.2	20.5	20.9	26.8	30.1	30.9	33.6	29.9	29.7
Korea	..	..	..	..	..	..	24.4	26.1	23.6	29.6	41.4	42.6
Luxembourg	689.1	738.0	867.8	893.7	..	823.7	811.1	771.7	742.7	714.6	695.9	675.2
Mexico	13.8	16.2	19.2	20.5	19.8	20.8	22.3	21.4	24.0	26.4	29.7	23.5
Netherlands	114.9	136.0	..	132.6	..	..	..	..	..	109.5	108.0	100.4
New Zealand	124.7	149.4	163.4	157.4	..	141.6	150.6	0.0	194.1	194.1	198.1	214.9
Norway	104.2	127.1	146.8	165.1	154.4	153.3	149.1	165.0	201.4	205.8	239.5	228.5
Poland	15.7	16.3	17.7	11.2	11.7	9.5	11.7	11.9	10.5	11.3	10.5	10.2
Portugal	46.4	40.3	50.0	62.5	94.4	92.3	97.0	106.9	107.0	113.9	117.5	114.5
Slovak Republic	28.6	30.1	30.0	32.1	31.1	39.9	36.9	31.2	46.3	54.2	71.3	83.5
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..
Spain	34.4	41.4	54.5	65.9	67.1	77.5	86.4	108.4	120.2	122.1	137.4	128.6
Sweden	143.0	171.1	123.0	152.8	152.8	153.4	155.6	153.6	155.8	174.3	183.1	160.0
Switzerland	285.2	336.8	390.6	416.5	435.4	398.1	426.6	381.4	368.4	398.2	377.9	396.5
Turkey	10.3	11.9	11.4	10.4	9.8	9.6	10.6	10.5	9.9	9.1	13.9	14.3
United Kingdom	93.6	110.9	114.7	119.0	105.8	105.1	103.1	93.8	93.2	96.6	100.6	100.2
United States	87.8	102.1	106.6	116.7	124.9	164.9	216.5	236.5	242.2	..	..	..

Outgoing MiTT per access path (fixed + mobile)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	107.9	121.0	..	..	..	..	..	..	..	128.3	94.3	..
Austria	193.4	150.9	132.1	102.9	105.8	111.2	99.0	98.0	114.9	107.8	104.7	89.8
Belgium	..	..	94.9	103.8	104.1	110.9	116.0	113.4	98.2	83.1	75.7	71.1
Canada	192.9	218.5	177.3	173.4	180.9	..	..	..	..	..	..	..
Chile	..	..	33.4	29.5	27.7	23.4	20.4	17.1	13.8	11.8	10.8	9.9
Czech Republic	72.2	78.9	52.7	45.3	44.4	39.1	36.9	33.8	37.9	28.3	27.7	23.1
Denmark	113.4	112.8	131.9	117.9	99.0	95.1	91.6	88.2	83.5	79.8	83.0	83.4
Estonia	..	..	..	..	..	..	..	..	..	..	..	..
Finland	70.9	68.6	68.7	73.8	60.6	..	..	..	..	..	..	..
France	94.6	86.1	74.9	68.9	69.4	66.3	53.8	48.1	54.0	69.2	81.9	83.7
Germany[1]	..	..	..	..	..	..	..	1427.4	1332.1	1211.7	1136.2	1138.9
Greece	90.1	76.6	..	..	68.6	72.4	79.9	77.1	77.7	80.6	78.7	..
Hungary	65.4	62.3	49.4	36.8	29.1	26.6	29.5	30.5	29.7	28.9	29.2	28.2
Iceland	171.6	151.0	112.6	104.1	..	89.9	66.6	59.1	88.6	75.8	59.9	52.2
Ireland	349.7	311.2	..	..	235.2	200.2	204.8	181.9	373.5	337.0	275.8	246.0
Israel	..	..	..	..	..	..	..	..	..	..	..	..
Italy	50.3	46.2	41.7	40.3	46.7	43.3	63.5	58.7	64.5	68.8	79.9	78.0
Japan	16.5	15.0	16.8	18.5	17.5	16.6	20.1	21.6	21.6	22.9	20.1	20.2
Korea	..	..	..	..	..	..	16.2	16.7	14.7	17.7	24.2	24.6
Luxembourg	821.6	749.5	690.2	576.6	..	464.6	397.4	348.1	331.6	321.3	305.9	294.1
Mexico	99.1	83.8	71.3	57.2	48.5	45.2	39.9	32.3	32.2	30.7	30.6	22.5
Netherlands	162.4	141.9	..	105.8	..	..	..	..	..	59.3	57.2	54.3
New Zealand	156.7	173.0	159.1	144.5	..	123.5	120.4	..	131.0	118.9	114.0	121.8
Norway	101.6	110.9	116.7	124.2	111.7	105.4	93.3	98.8	120.4	121.1	139.2	133.7
Poland	57.9	46.5	98.3	39.2	31.3	20.0	18.2	10.8	7.8	7.8	7.0	6.7
Portugal	67.4	47.8	48.9	54.4	74.4	68.3	68.0	70.4	66.5	66.5	63.2	57.9
Slovak Republic	77.0	70.0	54.2	46.6	38.6	42.9	35.6	28.6	39.4	38.4	53.3	63.4
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..
Spain	58.1	51.6	52.6	56.4	52.9	56.9	61.5	70.1	73.3	71.5	78.8	72.6
Sweden	124.1	135.0	87.2	100.8	94.7	88.4	89.0	84.6	82.5	89.7	92.2	79.7
Switzerland	343.4	334.8	319.7	318.7	312.6	268.3	275.8	229.7	210.0	211.5	193.6	198.2
Turkey	31.5	29.1	21.9	18.1	15.4	13.6	13.2	11.2	9.2	7.5	11.1	12.0
United Kingdom	123.1	117.1	94.0	91.2	76.4	71.9	63.7	53.4	50.0	49.5	50.0	48.8
United States	119.3	106.1	100.6	102.2	104.8	131.7	161.8	166.8	160.8	..	..	..

Note : MiTT = minutes of international telecommunications traffic. For Germany the MiTT includes VoIP and local traffic.

Source: OECD, ITU.

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Table 3.16. **Telecommunications patent applications filed at the US Patent Office (USPTO)**

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	50	46	73	52	56	63	83	49	25
Austria	58	34	54	79	72	58	63	101	70
Belgium	75	77	77	92	85	94	98	83	83
Canada	221	235	258	331	307	428	501	360	323
Chile	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	1	1	4	4	5	9	3
Denmark	75	57	52	50	57	57	50	50	40
Finland	566	520	489	444	385	416	418	359	227
France	686	710	757	737	774	757	775	815	584
Germany	1 386	1 452	1 445	1 359	1 278	1 206	1 222	1 150	1 021
Greece	6	4	5	4	10	6	8	11	6
Hungary	10	16	14	10	17	15	11	30	19
Iceland	8	5	1	1	1	0	0	0	0
Ireland	29	20	32	32	17	31	22	30	25
Israel	113	168	134	115	124	113	140	148	73
Italy	113	142	163	187	204	211	214	206	160
Japan	1 655	1 982	1 680	1 668	1 726	1 911	1 744	1 697	1 209
Korea	2 059	2 440	2 118	2 231	2 562	2 871	2 886	2 766	1 904
Luxembourg	2	1	4	1	5	3	5	5	2
Mexico	2	1	2	1	0	1	0	2	1
Netherlands	260	323	424	275	218	218	200	189	188
New Zealand	4	11	10	7	10	8	2	8	5
Norway	23	21	22	21	22	21	25	20	11
Poland	0	1	3	2	3	3	10	11	10
Portugal	1	0	4	2	4	3	24	19	19
Slovak Republic	0	0	1	0	2	2	3	4	4
Slovenia	0	2	3	4	5	1	3	1	4
Spain	37	50	65	61	61	51	63	74	54
Sweden	426	377	279	231	305	382	400	410	349
Switzerland	106	112	131	105	110	132	99	97	83
Turkey	3	4	0	2	2	2	2	6	3
United Kingdom	559	617	569	534	501	467	487	532	383
United States	2 893	2 967	2 679	2 960	3 116	3 193	3 417	3 094	1 895
OECD	9 450	10 010	9 562	9 643	10 026	10 601	10 936	10 333	7 461
World	9 637	10 302	9 866	10 025	10 509	11 216	11 911	11 428	8 426

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Table 3.17. **Telecommunications patent applications filed at the European Patent Office (EPO)**

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	62	48	84	85	50	40	32	7	2
Austria	48	36	35	43	35	24	16	15	9
Belgium	56	47	44	35	40	18	13	3	0
Canada	507	587	492	521	426	348	212	121	60
Chile	0	0	0	0	0	0	0	0	0
Czech Republic	1	1	0	2	3	2	0	0	0
Denmark	36	37	46	34	29	16	14	7	3
Finland	379	287	301	242	198	144	75	45	12
France	427	417	393	321	276	160	88	35	10
Germany	740	695	683	568	441	325	167	75	30
Greece	1	0	2	2	2	6	2	1	1
Hungary	5	8	9	11	6	3	3	0	0
Iceland	15	5	4	1	1	0	0	0	0
Ireland	32	33	38	30	25	22	19	8	3
Israel	255	299	238	207	139	115	105	72	20
Italy	47	94	86	87	78	43	32	15	6
Japan	2 939	3 075	2 800	2 450	2 211	1 857	1 075	540	148
Korea	465	511	632	753	894	683	393	173	38
Luxembourg	1	1	1	0	1	0	0	0	0
Mexico	2	5	4	2	1	0	1	0	0
Netherlands	81	108	112	101	91	49	20	11	8
New Zealand	5	11	9	8	6	2	1	5	0
Norway	17	19	14	15	16	17	10	2	1
Poland	0	3	6	3	3	4	6	0	0
Portugal	1	0	3	1	1	2	0	0	0
Slovak Republic	0	0	0	0	1	1	0	0	0
Slovenia	0	0	2	1	1	0	0	0	0
Spain	19	24	30	26	18	16	10	4	5
Sweden	343	299	167	140	98	63	50	35	17
Switzerland	74	85	69	61	55	39	24	11	8
Turkey	1	3	3	2	0	1	1	1	0
United Kingdom	473	510	450	360	280	160	116	52	21
United States	9 334	10 014	9 682	9 120	7 754	6 297	4 726	2 571	1 159
OECD	16 112	16 964	16 202	15 024	13 039	10 341	7 107	3 737	1 543
World	16 623	17 660	16 915	15 830	13 862	11 111	7 843	4 193	1 772

StatLink http://dx.doi.org/10.1787/888932397853

Chapter 4

Network Dimensions and Development

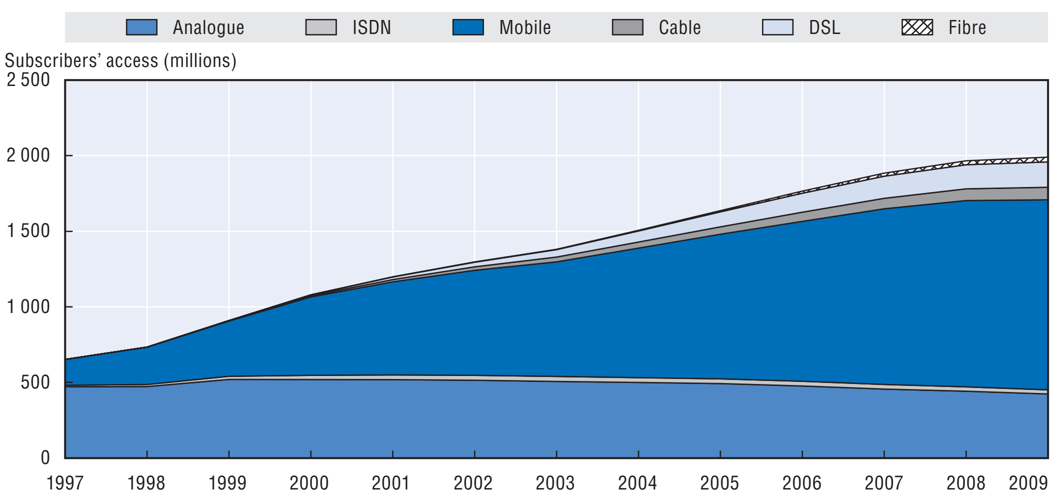
The total number of fixed, mobile and broadband subscriptions, in the OECD area, grew to 2 billion in 2009, with mobile accounting for 63% – some 1.3 billion subscriptions. The number of fixed broadband subscriptions reached 292 million in June 2010. The share of fibre has developed significantly, accounting for 12% of fixed broadband subscriptions. It grew at 25% over the two years leading to the end of 2009. Significant developments included a rapid increase in higher speed wireless broadband and the range of new access devices, as well as new business models including the growing popularity of "application stores".

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.

Introduction

The total number of OECD communication access paths (analogue + ISDN + DSL + cable modem + fibre + other + mobile) has been increasing for more than a decade. This growth has been mainly led by the increase in mobile subscriptions, the number of which exceeded fixed telephone access paths (analogue + ISDN) in 2001, and accounted for 63% of total communication access paths in 2009. In contrast, the number of fixed telephone access paths peaked in 2001 and subsequently decreased (Figure 4.1).

Figure 4.1. **Total fixed, mobile and broadband access paths**



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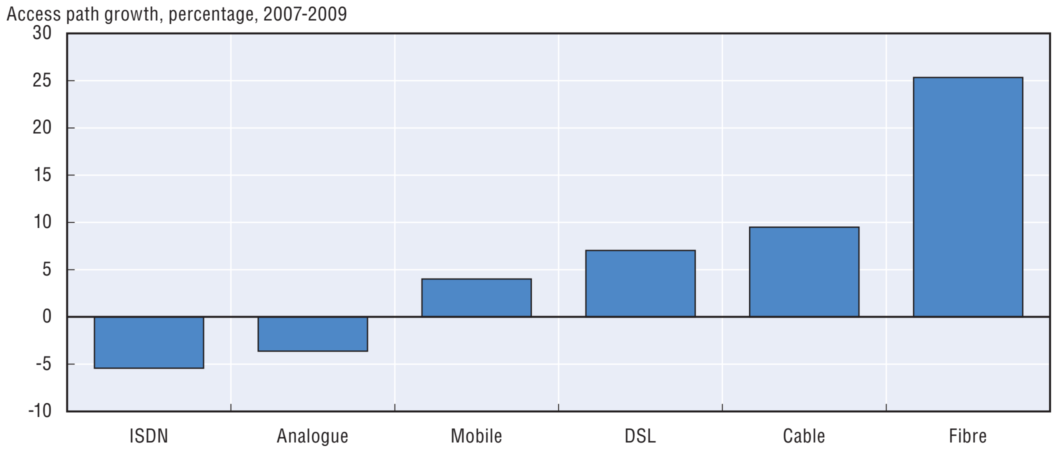
In 2009, there were 2.7 times as many mobile subscriptions (1 257 million) as fixed telephone subscriptions (458 million). The number of DSL lines, cable modem and fibre subscriptions accounted for 23%, 11% and 4% respectively of fixed communication access paths in 2009 (Table 4.2).

The short-term trend provides a view of recent network developments (Figure 4.2). The largest compound annual growth since 2007 was seen in fibre, at 25%. Cable and DSL also grew at a compound annual growth rate (CAGR) of 9% and 7% between 2007 and 2009 respectively, but their growth was lower than that of fibre. A higher growth for fibre reflected a shift in fixed-broadband subscriptions from DSL and cable to fibre. Standard analogue access lines and ISDN lines fell by 3.7% and 4.3% respectively each year, on average, as more subscribers switched from copper lines to other communication paths, such as cable, fibre, naked DSL (DSL services provided without an analogue voice service), or subscription-only wireless services without a fixed line. The number of mobile subscriptions grew at a CAGR of 5% during the last two years, but the growth rate is relatively small as the market is mature in many OECD countries.

Figure 4.2. **Average annual growth rate in communication access paths, by technology, 2007-09**



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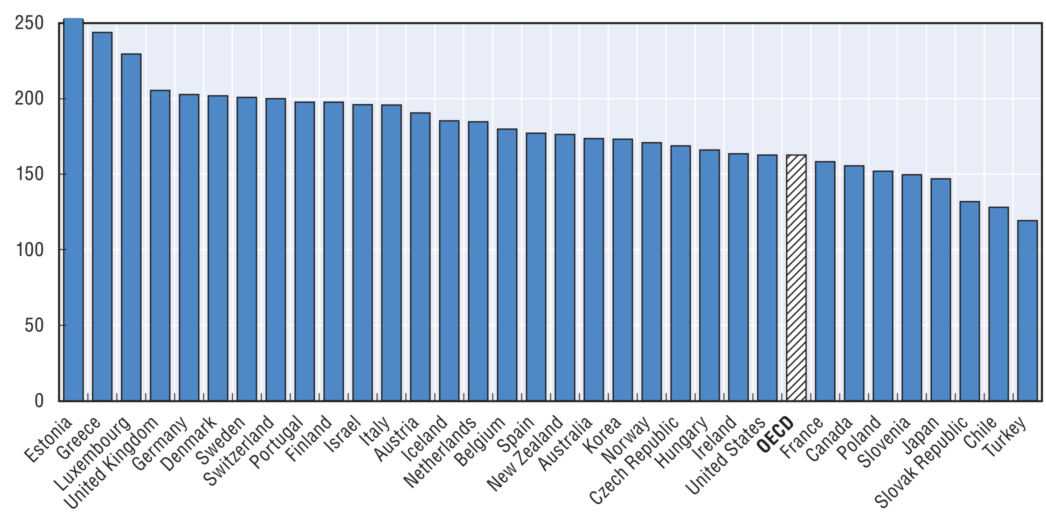
The total number of OECD communication access paths was 1 993 million in 2009 (Table 4.3). This broad measure indicates that there is at least one path per capita in the OECD area (Figure 4.3). Estonia had the highest number of paths per capita, at 253 subscriptions per 100 inhabitants (Table 4.4). A few countries, such as Greece, Luxembourg and the United Kingdom, also had at least 200 subscriptions per 100 inhabitants. In contrast, Mexico had only 105 subscriptions per 100 inhabitants.

Figure 4.3. **Total communication access paths per 100 inhabitants, 2009**



Note: Total communication access paths = analogue + ISDN lines + DSL + cable modem + fibre + mobile subscribers. Data for the United States are interim estimates.

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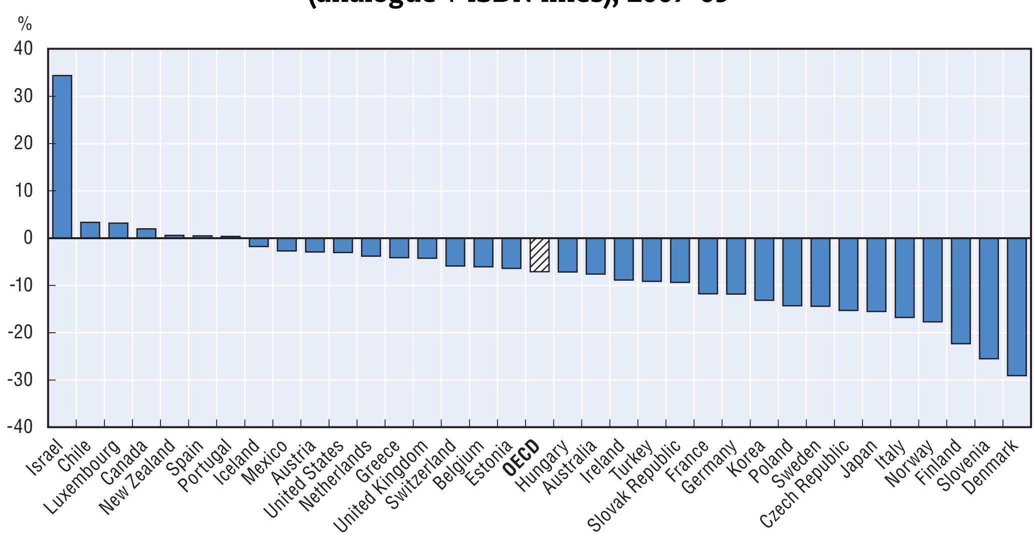
Fixed line developments

The number of fixed telephone access paths in the OECD was 458 million in 2009. This has fallen by 4% per year since 2007 (Table 4.5). Most countries saw a decrease during this period; in particular, Denmark, Finland and Slovenia experienced a steep reduction. One reason for the decline is the increasing number of users selecting mobile-only subscriptions, as mobile operators sell increasingly large buckets of minutes for voice calling, and in some cases, data services. The large take-up of broadband services, which do not require a traditional landline, has also increased the user incentive to give up first and second lines. Furthermore, many broadband services include free or cheap Voice over Internet Protocol (VoIP) call as a bundled service, or enable subscribers to add third-party VoIP applications to make and receive calls.

The growth in the number of cable voice-telephony subscriptions has also contributed to the reduction in traditional public switched telephone network (PSTN) lines (Figure 4.4). In the United States, for example, the number of cable voice-telephony subscriptions in September 2010 was 23.5 million, up from 14.9 million at the close of 2007.[1] Some cable operators require basic, fixed voice services with broadband subscriptions, as is the case of Numericable in France, Kabel Deutschland in Germany and Ono in Spain.

Figure 4.4. **Net growth rate of fixed telephone access paths (analogue + ISDN lines), 2007-09**



Note: Data for the United States are interim estimates. The change in the data for Israel is due to a methodological change, by which tracking "line equivalents" was introduced. Line equivalents record the ability to make or receive a telephone call, regardless of technology.

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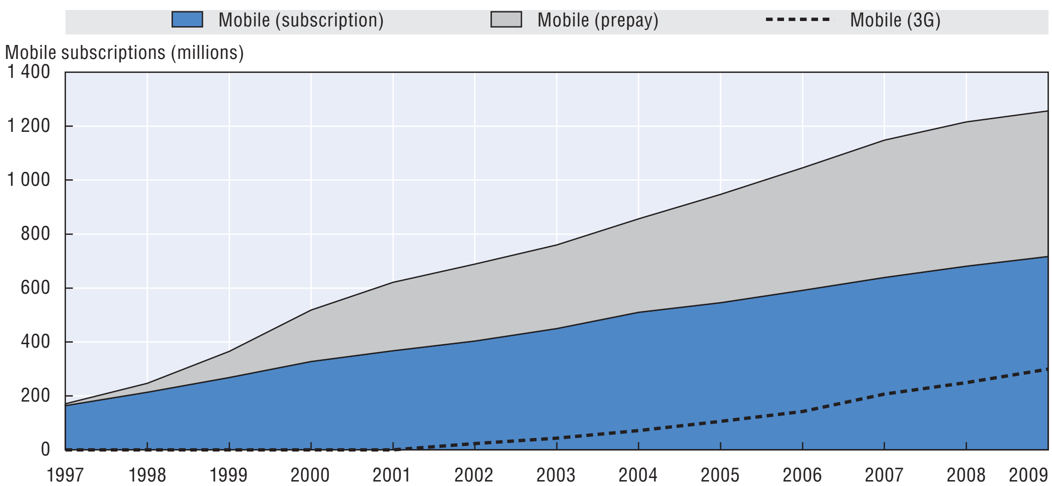
In 2009, there were 37.4 fixed telephone access paths per 100 inhabitants in the OECD area. Canada had the highest penetration of fixed telephone access paths with 55.4 lines per 100 inhabitants. Luxembourg followed with 53 lines per 100 inhabitants. Mexico had the lowest penetration with 18 lines per 100 inhabitants. The penetration of fixed paths should take into account that lines are usually installed on a household rather than on an individual basis.

The number of ISDN lines in 2009 was 28 million in the OECD, accounting for only 6% of total fixed telephone lines (Table 4.7). ISDN lines provide a certain number of channels, which support both voice and data connection. For example, ISDN "basic-rate" connection consists of two 64 kbit/s channels (comparable to two analogue phone lines), while ISDN "primary-rate" connection consists of either 23 or 30 channels (comparable to 23 or 30 analogue lines) of 64 kbit/s of bandwidth. Each channel can be used independently, so basic connection lines can be used as two voice lines, one voice and one 64 kbit/s data connection, or one 128 kbit/s data connection. Several OECD countries no longer collected ISDN subscription data as of 2009, indicating that ISDN has largely been replaced by cheaper and faster broadband, although it is still used in some businesses.

Mobile developments

Mobile is the primary communication access path in the OECD area. In 2009, the total number of mobile subscriptions in the area reached 1 257 million. Although this number is still on the increase, growth has slowed from earlier in the decade – the result of a fall in the CAGR from 46% between 1997 and 1999, to only 5% between 2007 and 2009 (Figure 4.5). The OECD area now accounts for only around one in every four mobile phones (Table 4.8), while developing countries account for the momentum in mobile subscription growth in recent years.

Figure 4.5. **Cellular mobile subscriptions in OECD countries**



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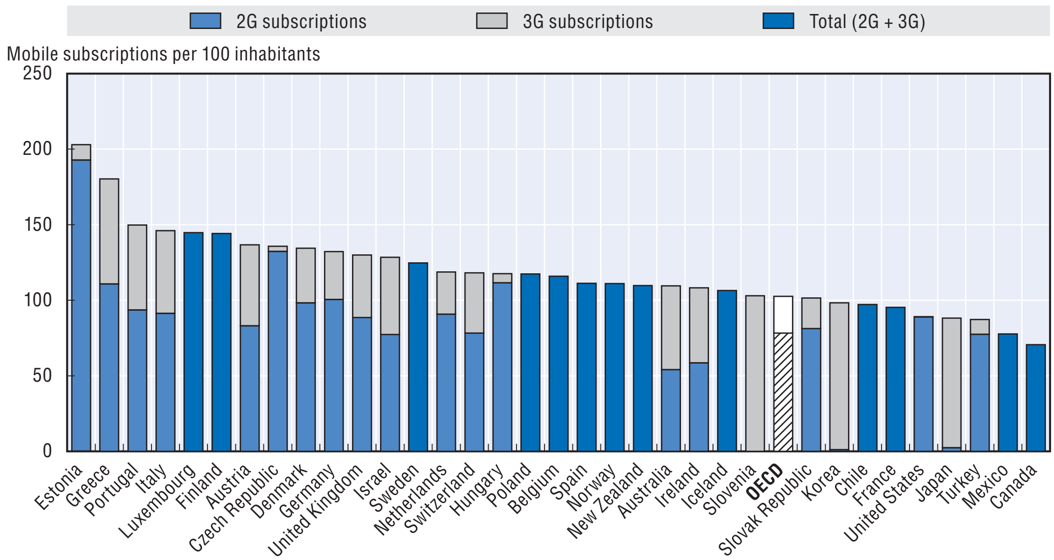
In 2009, the mobile subscription penetration rate in the OECD was 103% (Table 4.9). The strongest annual growth between 2007 and 2009 occurred in Estonia (17%), followed by Finland (12%), Greece (12%) and Mexico (11%). Estonia had the highest mobile penetration with 203 subscriptions per 100 inhabitants, followed by Greece, Portugal, Italy, Luxembourg and Finland (Figure 4.6). These six OECD economies had more than 140 subscriptions per 100 inhabitants. This can be mostly attributed to the high percentage of prepaid users who have multiple SIM cards and switch between them to avoid the most expensive calls. This option exists because most Global System for Mobile Communication (GSM) SIM cards usually allow users to associate the same handset with multiple subscriptions. As such, it is difficult to accurately estimate the number of active GSM users. Frequent travellers also use local SIM cards to avoid international roaming charges. The lowest penetration was seen in Canada with 71 subscriptions per 100 inhabitants.

The number of 3G subscriptions has increased in the OECD area: 299 million in 2009, up 20% per annum over the last two years (Table 4.10). As many countries have achieved mobile penetration rates that exceed 100%, suggesting a highly mature market for traditional services, mobile users are shifting from 2G to 3G (Figure 4.7). The highest penetration rate of 3G mobile in 2009 took place in Slovenia (100%), followed by Korea (99%) and Japan (97%). Ireland saw the most dramatic one-year 3G growth at 76%, from 1.3 million to 2.2 million. Hungary and Denmark also experienced high growth of more than 60% during the same time period. The significant take-up of 3G mobile has been driven by data connections rather than voice services (discussed in detail in later sections).

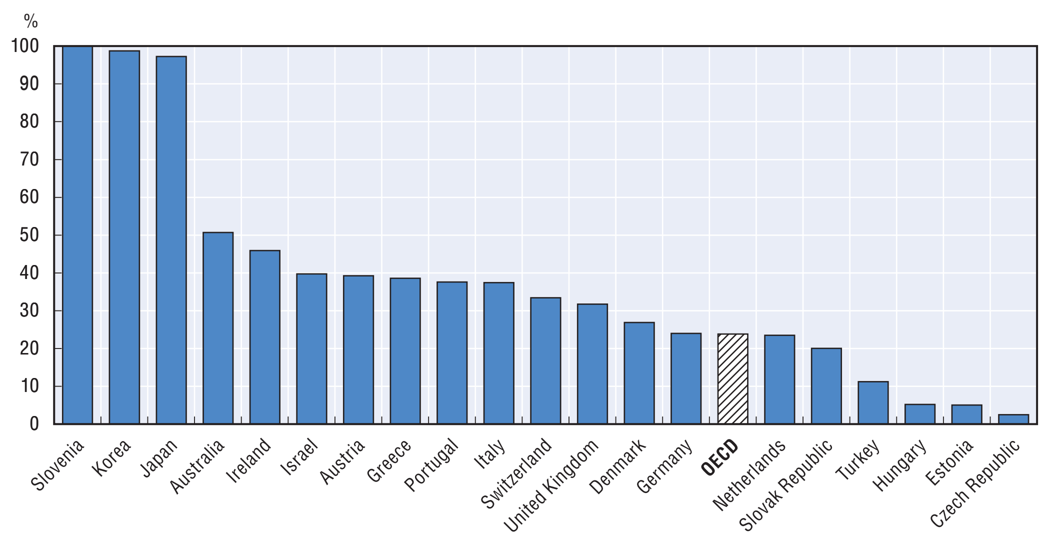
Figure 4.6. **Cellular mobile subscriptions per 100 inhabitants, 2009**



Note: Portugal's 2G data include both 2G and 3G subscriptions.

StatLink http://dx.doi.org/10.1787/888932394965

Figure 4.7. **3G cellular mobile adoption, as a percentage of total subscriptions, 2009**



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By 2009, 3G coverage had reached almost 100% in Japan, Sweden and the Slovak Republic. However, coverage in some OECD countries remains in the early stages. Many governments have established national plans to develop broadband infrastructure as widely as practically possible with mobile services playing a central role in meeting goals. For example, the Australian government "National Broadband Network" has set a broadband development target of 93% coverage of its FTTP network with remaining coverage to be delivered through next generation fixed wireless and satellite technologies by 2021.

Prepaid subscriptions account for 43% of all mobile subscriptions in the OECD, but the percentage is uneven across countries (Table 4.11). In Japan and Korea, prepaid subscriptions account for less than 2% of all mobile subscriptions. In contrast, Mexico has the highest rate of prepaid subscriptions, with 88% of total mobile subscriptions, followed by Italy (85%) and Greece (77%).

Prepaid services have been widely viewed as an economic option for users with low usage requirements and basic or inexpensive handsets. More recently, the options associated with prepaid mobile services have been expanded – sometimes associated with smartphones or tablet computers, as is the case in the United States.

Competition from VoIP services

Traditional voice telephony is facing increasing pressure from VoIP services. In general, VoIP services provide low prices to consumers and uncharged services for some types of calls. VoIP uses the Internet to route voice calls in the form of services that mirror standard phone services bundled with broadband access or computer software applications. As such, VoIP services can be provided by DSL, cable or fibre broadband network operators, or third-party application providers. VoIP's replacement of conventional voice calls poses a threat to the traditional business models of incumbent voice telephony providers. In order to retain their customers, some network operators have provided VoIP services, often bundled with their broadband services.

The increasing use of VoIP service occurred first on fixed broadband networks. There was little use of independent VoIP service on mobile networks with some operators blocking the provision of VoIP services by other entities on their network. However, the recent rise of smartphones has seen some growth in the use of VoIP over third-party applications, and a few mobile operators have moved towards permitting the use of VoIP services on their network.

In the United States, the Federal Communications Commission (FCC) has released statistics of VoIP services that interconnect with PSTN for December 2008 and after. According to this data, the number of interconnected VoIP subscriptions in the United States was 26 million in December 2009, up 22% during the year, while the number of switched access lines was 127 million, a decrease of 10% during the same period. The interconnected VoIP subscriptions accounted for 17% of the combined total, up from 13% a year earlier. In December 2009, 84% of the interconnected VoIP subscribers received service through a broadband bundle, while the remainder subscribed to a standalone service. Among subscribers with bundled service, 87% used cable modem broadband.

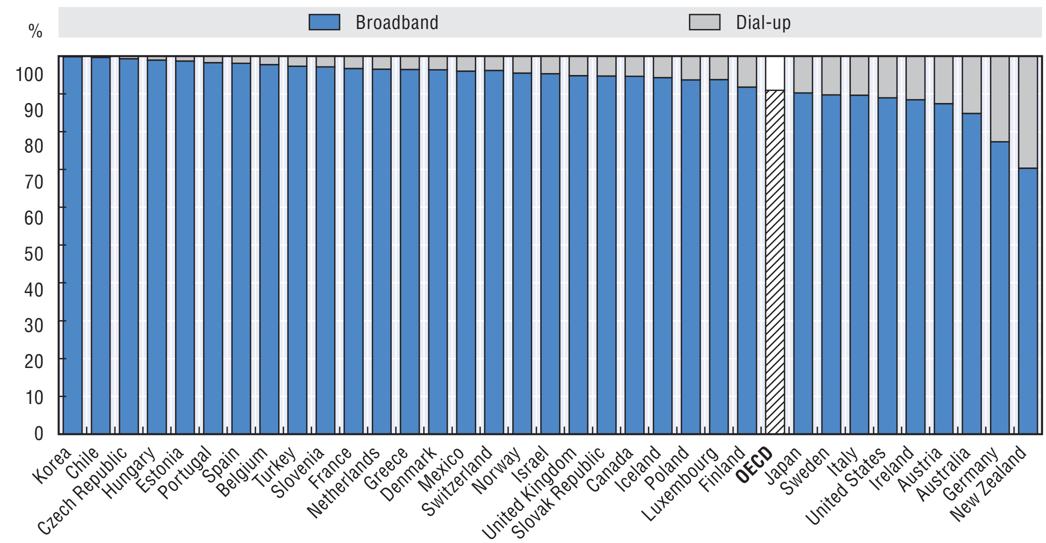
Broadband developments

The shift from dial-up to broadband

OECD countries have experienced an overwhelming shift from dial-up to broadband. In 2009, dial-up connections accounted for less than 10% of fixed Internet connections in the OECD area. Some countries no longer collect dial-up subscription data, and this can be expected to become the norm as dial-up subscription continues to decline (Figure 4.8).

The number of fixed broadband subscriptions in the OECD area reached 292 million in June 2010 (Table 4.12). Growth for broadband has increased every year since cable and DSL services were launched in the first countries in the mid-1990s. The number grew at a CAGR of 39.7% between 2000 and 2009. The largest CAGR in the number of broadband subscriptions over the last two years occurred in Mexico (46%), followed by Greece (33%), the Slovak Republic (23%) and Turkey (21%).

Figure 4.8. **Dial-up and broadband shares of total fixed Internet subscriptions, December 2009**



Note: Data for the United States are interim estimates.

StatLink http://dx.doi.org/10.1787/888932395003

In OECD countries, the average penetration of broadband was 23.1 subscriptions per 100 inhabitants in 2009, increased from 19.7 subscriptions per 100 inhabitants in 2007 (Table 4.13). Denmark had the highest broadband penetration rate with 37.4%, followed by the Netherlands (37.1%) and Switzerland (35.8%). Less expensive and faster Internet access has well and truly superseded dial-up connections. In the United States, dial-up's share of the overall household Internet market declined from 11% to 5% between 2007 and 2009.[2] These households are more likely to be located in rural areas and have a lower level of income. Broadband is the dominant fixed Internet connection in the OECD, while dial-up may be still the only Internet access path for those living in some rural areas, and is less expensive in a small number of cases. Many Internet Service Providers (ISPs) no longer advertise or offer dial-up services, although such services are still available over the PSTN in a number of countries.

There are a number of indicators available to assess the diffusion of broadband. Broadband network coverage is one example, representing the availability of broadband connections. In the OECD area, DSL network coverage continues to improve, as Belgium, Israel, Korea and the United Kingdom report 100% coverage (Table 4.14). Cable coverage is extensive in some countries such as Israel (95%), the United States (93%) and the Netherlands (90%) (Table 4.15).

Chapter 8 presents data on household penetration. Here, data are shown on the number of subscriptions across all firms operating in a country. Subscription data, including business users, is provided by ISPs on a regular basis, and as such is timely and accurate. It also includes useful data for stakeholders with respect to questions on market and technology share. These data are indispensable for regulators, as well as other users such as the investment community. Indicators gathered by household surveys or direct from operators are complementary and the penetration rankings of countries are generally consistent across both methodologies.

With respect to the number of broadband subscriptions in the OECD area in June 2010 (excluding all wireless broadband), DSL continues to lead with the largest share (58%), followed by cable (29%), fibre (12%) and others (1%) (Table 4.16). Greece, Italy and Turkey have a relatively high share of DSL with more than 95%, while cable is the dominant broadband access path in some countries, such as Canada (56%) and the United States (54%).

Significant developments have taken place in telecommunication access networks in the last few years, with the deployment of next generation access, such as fibre, to the home. Japan and Korea lead the way with fibre networks being developed at a rapid pace. In Japan, fibre subscriptions accounted for 55% of total fixed broadband in June 2010, while DSL accounted for 28%, a decrease as users upgrade to fibre-based connections. The situation is similar in Korea where fibre subscription has the largest share of total fixed broadband with 52%. The pace of developments and favoured locations for deployment rely on a number of factors. In Korea, for example, high population density and proclivity for residential apartment living are assisting faster development.

Upgrading broadband

Facilities-based competition has driven operators to upgrade or enhance infrastructure for faster speeds, better quality of service, and provide larger amounts of network capacity to their customers. A primary aspect of network upgrade strategies is the selection of technologies used for providing final access to customers. Fibre to the premises/home/building (FTTP/FTTH/FTTB) is said to be the most future-proof technology in that it can offer the highest and most sustainable rates per end-user. In the United States, for example, Verizon has deployed an FTTP network, which had passed 15.6 million premises as of the end of 2010.[3] Orange, with 35 000 fibre subscriptions at the end of 2009, aimed to pass all metropolitan areas in France by 2015. In 2010, ZON in Portugal and K-Opticom in Japan were the speed-leaders, providing fibre service advertised with a maximum download speed of 1 Gbit/s.

Some operators, such as Deutsche Telekom, KPN and Telefónica, have been rolling out VDSL technology, resulting in a speed upgrade for the existing copper network, while simultaneously implementing FTTH in new areas. In some areas, companies are also deploying FTTH or have invested in companies providing such networks. Telecom New Zealand, for example, had planned to make VDSL available to at least 60% of customers by the end of 2011, before extending fibre to the premises. In September 2009, however, the government announced it would invest in an open-access, dark-fibre network to accelerate the roll-out of ultra-fast broadband to 75% of New Zealanders over 10 years. The government's investment is expected to be matched by private sector funding, by way of a co-investment model, to provide fibre to the premises. Telecom New Zealand has announced its participation, exploring a potential split between its infrastructure and services divisions, so that it can bid to provide fibre over the final mile.

VDSL shares the capacity of one fibre line among multiple users by using existing copper-based wire lines for the last mile. It is widely regarded as being less expensive to deploy than fibre, but in comparison supports relatively short-distance data transmission for high-speed delivery of services. VDSL speeds depend on the distance between the aggregated exchange point and each home/office building and length of copper loop, with a significant reduction in speed as distance from the exchange point increases.

A number of cable operators in the OECD area have upgraded their network with DOCSIS 3.0. Some are offering broadband services at the speed of 100 Mbit/s and above, including UPC (Austria, the Netherlands, Poland), J:COM (Japan) and SK Broadband (Korea). In the United States, major cable operators such as Cablevision, Comcast, Cox and Time Warner Cable began offering faster broadband services using DOCSIS 3.0 in their markets, particularly in regions where the threat from incumbent telecommunications operators (*e.g.* AT&T and Verizon) existed. Faster broadband services enable cable companies to better compete with telecommunication network operators, as these in turn move to offer triple play services that include video. However, not all OECD countries have widespread or cable networks independently owned from the incumbent telecommunication operator, such as occurs in Canada, the Netherlands and the United States.

Next generation broadband access and market structure

A further consideration in respect to broadband development, since the previous *Communications Outlook*, has been direct government investment. In some countries, this has occurred in response to the global financial crisis (GFC). In others, this has taken place because of a desire to see development occur faster than is believed the market would otherwise deliver, or to reach places the market may not reach, such as rural areas. In these instances, governments have had to consider how this action would impact on existing market structure. Policy makers do not wish to reinforce market power, nor do they wish to fund duplicate infrastructure. Instead, they prefer to involve the private sector to avoid a return to the days of government ownership and management of infrastructure and services. Although regulation can make private participation open to new entrants, new infrastructure construction will be less expensive if it can leverage existing facilities, such as cable ducts or poles.

Over the longer term, many policy makers are concerned that market forces will tend towards a monopoly of one, or at best two, broadband access networks, that can be regarded as fully substitutable, in terms of delivering competitive choices for customers. Moreover, these may only be viable in denser urban areas. In addition, regulators are concerned that firms which control bottleneck infrastructure will seek to use this to their advantage relative to other firms. To overcome this problem, some countries have introduced functional separation (*e.g.* the United Kingdom), while others are introducing models that include vertical structural separation (*e.g.* Australia, New Zealand). An alternative approach may be based on Open Internet rules concerning transparency, no blocking, and no unreasonable discrimination, applied with the complementary principle of reasonable network management (*e.g.* the United States).

Unlike the decision to introduce competition, there is unlikely to be an easily determined balance for every country between end-to-end infrastructure competition or some degree of separation, whether functional or vertical separation of ownership between infrastructure and services. Some countries with high population densities and apartment residential living are witnessing vigorous infrastructure competition that may dampen concern over the need to consider separation. That being said, population density may be only one contributory factor as to why one government chooses vertical separation and another does not.

Hong Kong, China, has some of the fastest, most inexpensive broadband access in the world. By way of contrast, Singapore, which also has high population density, chose to develop a national broadband network with vertically separated infrastructure and services. OECD countries, such as Korea, have achieved excellent results for NGN (Next Generation Network) development from infrastructure competition in their urban areas.

Yet even in these countries, the challenges to provide NGN competition in rural areas are not insignificant. In addition, the role of other policies that have increased broadband access competition, for example, local loop unbundling in countries such as France or Japan, needs to be considered. In many countries, rolling out one broadband network to all areas of the country, let alone access competition, may prove challenging. For this reason, some countries have opted for functional separation, and others, such as Australia and New Zealand, have plans for national broadband networks with separate provision of wholesale and retail services.

All OECD governments support infrastructure competition and it should be noted that this debate is largely about next generation access networks. The issue is how to structure fixed-line broadband network connectivity to small business and households, especially those in suburban, rural and remote areas. In most OECD countries, competitive backbone infrastructure has been established, along with healthy levels of competition in central business districts. However, there may be far less competition in some areas for local access to end users and the "backhaul" from these competitive local access facilities to reach backbone networks. Alternative platforms, such as wireless networks, are a key component in the debate, to the extent that they can provide competitive services. All agree that wireless networks are complementary and can provide substitution for some traditional telecommunication services, as well as some new services. What is less clear is whether they can provide full substitution to fixed-line broadband access over fibre or VDSL.

While the speeds of wireless networks are steadily increasing, and will continue to do so, performance is related to a number of factors, such as the number of users concurrently utilising service and distance to the tower. The immense popularity of smartphones, including applications that automatically update data services, has placed strains on some wireless networks. Governments wanting to increase infrastructure competition with incumbents, through platforms such as fixed wireless, have long recognised that backhaul is one of the major challenges to small or localised new entrants. While many mobile wireless operators would not be considered small or localised, they also rely heavily on fixed networks to provide transmission to backbone networks. In other words, fixed networks, for a variety of reasons, are essential to attaining government goals for broadband wireless services.

Mobile broadband

Mobile broadband growth

The growth of 3G and, for the future, 4G, has been driven by an increasing demand for data communications. A number of mobile network operators in the OECD area have experienced rapid traffic growth. AT&T reported a 5 000% increase in their mobile traffic in the three years leading to 2009. TeliaSonera saw their mobile data traffic increase by around 200% in the Nordic and Baltic service area, during 2009. The situation was similar for T-Mobile USA, whose mobile data traffic increased by 45% between the second and third quarter of 2009. This is certainly related to the advent of devices more user friendly for wireless Internet access, such as smartphones and tablet computers, as well as an increasing range of game consoles. The launch of tariff plans better suited to customer requirements, as a result of increasing competition, has also stimulated the growth in data use. Finally, the success of "application stores" (*e.g.* Apple iTunes, Blackberry App World, Google Android Market, Nokia Ovi Store) has created a business model that has encourage a rapid increase in the availability of content and services.

A number of private sources track developments in application stores and report these data on a regular basis. While unofficial, these data closely concur with statistics reported by the firms responsible for the application stores. The methodology used by these sources is to create programs that "data mine" the stores, enabling their users to aggregate public information. These data show a spectacular increase in the availability of applications in stores that were either nascent or did not exist at the time of the previous *Communications Outlook*. Take, for example, Apple's "app store" which opened in July 2008 with just 500 applications. As of December 2009, there were over 100 000 applications available from the store, and the number of applications downloaded increased from 100 000 in 2008 to over 2 billion in 2009.[4]

Individuals and enterprises worldwide have developed applications aimed at global or local markets. In Apple's case, there were 57 000 publishers of applications as of October 2010. The success of application stores can be, in part, attributed to their pricing. At that time, about one-third of applications in Apple's store were free, another one-third cost less than USD 0.99, and an average price was around USD 2.60.[5]

A further example of the growth in application stores is Google's Android Market, which opened in October 2008. The FCC has cited estimates that the Android Market had 15 000 available applications and 40 million downloads at the close of 2009.[6] In October 2010, more than one-third of the applications were free, with others priced similarly to their larger rival. Some of the largest categories of applications in both stores include books, games, entertainment, education and lifestyle.[7]

The growth of the "application store model" and the use of apps on smartphones and a growing number of other devices (tablet and laptop computers) are creating profound changes to everything from the business models of the actors concerned to patterns of consumption by their users. One private source of data on the use of smartphones comes from "Flurry", a United States-based firm. Flurry's tools run on more than 30 000 applications across Android, Blackberry, iOS and J2ME. Each month, Flurry tracks over 3 billion end user application sessions. According to Flurry, the various portable devices sold by Apple, running social games, had a daily audience of 19 million people spending an average of 22 minutes per day.

The size and reach of popular applications are comparable to the audience of the most popular prime-time programmes on United States television.[8] This trend has not escaped the attention of actors in the mobile wireless value chain, who see a significant potential for advertising to create increases in wireless revenue, not least because applications reach users more frequently than traditional broadcasting. Apple has suggested that 100 million users of iPhones and iPads, averaging 30 minutes a day, watching an advertisement every three minutes, could mean they serve a billion advertisements a day.

Some analysts believe that the most effective advertising platforms have moved from traditional media to the fixed Internet, and are now shifting to mobile networks. This phenomenon is visible in the increasing amount of corporate activity with respect to the ownership of nascent firms specializing in mobile advertising. For example, in 2009 Google acquired AdMob, a mobile display advertising technology company; soon after, Apple acquired Quattro Wireless, a mobile advertising provider. The growth of the mobile advertising industry, supported by infrastructure developments, will provide new business opportunities for many stakeholders, such as mobile advertising platform providers and application developers. For instance, Apple plans to sell mobile advertising on behalf of the developers who create the applications. The company proposes to take 40% of the revenue from mobile advertising, with developers receiving 60%.

For policy makers, these changes, in combination with others being generated by fixed network developments, will likely have significant implications for some traditional approaches to media supported by advertising. For example, in 2010 the Australian government decided to rebate license fees on commercial broadcasters to underpin their support for Australian content requirements. The range of reasons for the decision included technological and commercial developments.

Development of mobile broadband

A recent trend in the use of mobile broadband networks has taken place in the field of "sponsored connectivity" business models. Firms that are not direct network providers use wireless network connectivity to provide services to their customers. There is no direct relationship between the customers and the network providers, as the firms pay directly for the network connection and the customers pay for the services via the price of devices and content they purchase. Further technological development will open more opportunities for this type of business model, which will likely proliferate in the presence of robust competition between infrastructure providers. Market growth should be beneficial for all firms that take advantage of this trend.

Under sponsored connectivity, there is no direct relationship between the customer and the network provider, such as via a monthly subscription or prepaid card. Examples of sponsored connectivity can be found in services such as e-book readers (*e.g.* Amazon Kindle) and GPS (*e.g.* Tomtom Live Services). In addition, devices such as the "International Kindle" provide international roaming by using foreign partner networks without additional contracts. A further example is Apple's iPad (3G), where in some countries Apple provides the interface with customers (*e.g.* billing) rather than the mobile operator.

An important consideration for stakeholders is how the use of sponsored connectivity affects the collection and reporting of network use. AT&T provides a leading example here. The company counts the number of connected device subscriptions separately from its conventional wireless customers. In October 2010, AT&T reported 7.8 million device subscribers, up from 3.3 million the previous year.[9] In addition to devices such as Kindles or iPads, the development of machine-to-machine (M2M) communication over wireless networks may also come to be a category reported separately by operators. For example, Verizon Wireless reported 7.9 million subscriptions of "other" connections, including M2M, e-book readers and telematics in September 2010,[10] up from 7.3 million in March 2010.[11] Although Sprint had not broken down the number of connected devices using its wireless networks, by mid-2010, the company states that these account for about half of the company's wholesale business.[12] An example of the type of firm using wholesale connectivity services, such as those found on these carriers, is Tomtom. The company, which provides car navigation services, reported about 1.5 million connected traffic devices in use in September 2010.[13] As the range of such devices and the applications for which they are used expands, operators will no doubt wish to keep stakeholders, such as capital markets, informed by reporting such developments.

ICT devices are increasingly being equipped for direct connection to mobile networks. There may, however, be a significant price difference between devices enabled for mobile network access as opposed to those that are only Wi-Fi-enabled. Tethering is the use of smartphones to connect other devices (*e.g.* netbooks, tablet computers etc.) to the Internet. It enables users to purchase less expensive equipment (*e.g.* Wi-Fi only) and take advantage of their existing mobile connectivity to extend the area in which they can access services. Some operators offer separate data plans for tethering devices, or allow users to access their networks under their existing tariff plan. In contrast, some operators do not permit tethering. Charging additional fees or prohibiting tethering is an important difference between mobile and fixed networks, where such practices are very rare. This is a salient consideration when assessing the competitiveness of wireless and fixed broadband services.

Operators have made significant investments to upgrade their wireless networks to handle increased data demands and to offer higher speed connectivity. This includes moving forward with the initial deployment of the next generation of wireless technologies, such as LTE (Long Term Evolution) and Mobile WiMAX. TeliaSonera, for example, is the first operator to launch commercial LTE service in Stockholm, Sweden and Oslo, Norway. By June 2010 in the United States, Clearwire and Sprint had together provided WiMAX-based "4G" services covering 55.7 million people.

Spectrum for new mobile broadband services

Spectrum is always the most important issue for the deployment of new wireless systems. How much, and in which band, radio spectrum is assigned is critical for the deployment of wireless broadband services. A number of OECD countries have recently taken initiatives to free-up spectrum for new generation mobile services (Table 4.1). In Europe, a band commonly released for this purpose was at 2.6 GHz to assist in the provision of services in nearby countries. Spectrum harmonisation can support enabling economies of scale, and facilitate international roaming and, in particular, interference-free operations across countries with close geographical proximity.

In most OECD countries, a significant amount of spectrum has become available due to the switch from analogue to digital broadcasting. Governments and regulators consider the so-called "digital dividend" as an opportunity to enhance or develop wireless communication services. This is because the current spectrum allocation plan in most countries is typically very tightly spaced, and it is difficult to find additional space without

Table 4.1. **Spectrum available for new generation mobile communication services in selected OECD countries, October 2010**

	Spectrum band (approaches)
Australia	700 MHz (Auction), 2.5 GHz (Auction)
Austria	800 MHz (Auction), 2.6 GHz (Auction)
Belgium	2.6 GHz (Auction)
Denmark	800 MHz (Auction), 2.6 GHz (Auction)
Finland	2.6 GHz (Auction)
Germany	800 MHz (Auction), 1.8 GHz (Auction), 2 GHz (Auction), 2.6 GHz (Auction)
Hungary	2.6 GHz (Auction)
Italy	2.6 GHz (Auction)
Japan	1.5 GHz (Comparative selection), 1.7 GHz (Comparative selection)
Korea	800/900 MHz (Comparative selection), 2.1 GHz (Comparative selection)
Netherlands	2.6 GHz (Auction)
New Zealand	700 MHz (Auction)
Norway	800 MHz (Auction), 2.6 GHz (Auction)
Sweden	800 MHz (Auction), 2.6 GHz (Auction)
Switzerland	800 MHz (Auction), 1.8 GHz (Auction), 2.1GHz (Auction), 2.6 GHz (Auction)
United Kingdom	800 MHz (Auction), 2.6 GHz (Auction)
United States	700 MHz (Auction), 1.7 GHz (Auction), 2.1 GHz (Auction), 2.5 GHz (Auction)

StatLink http://dx.doi.org/10.1787/888932395022

significant changes. Moreover, the newly available band has attractive propagation features for delivering communication services much valued by the wireless industry. Some countries have already released the digital dividend (700/800 MHz band, depending on the countries) for mobile telecommunication services, and others are planning to do so. In the United States, for example, the digital dividend already released so far includes 698-806 MHz.

Spectrum management is an important issue for governments and regulators. Recent spectrum assignments show that OECD countries continue to move away from comparative selection to market-based approaches. In Finland, for example, the right to use spectrum was initially not made available for competitive bids; however, in 2009 an auction was held for the 2.6 GHz band.

Broadband speeds

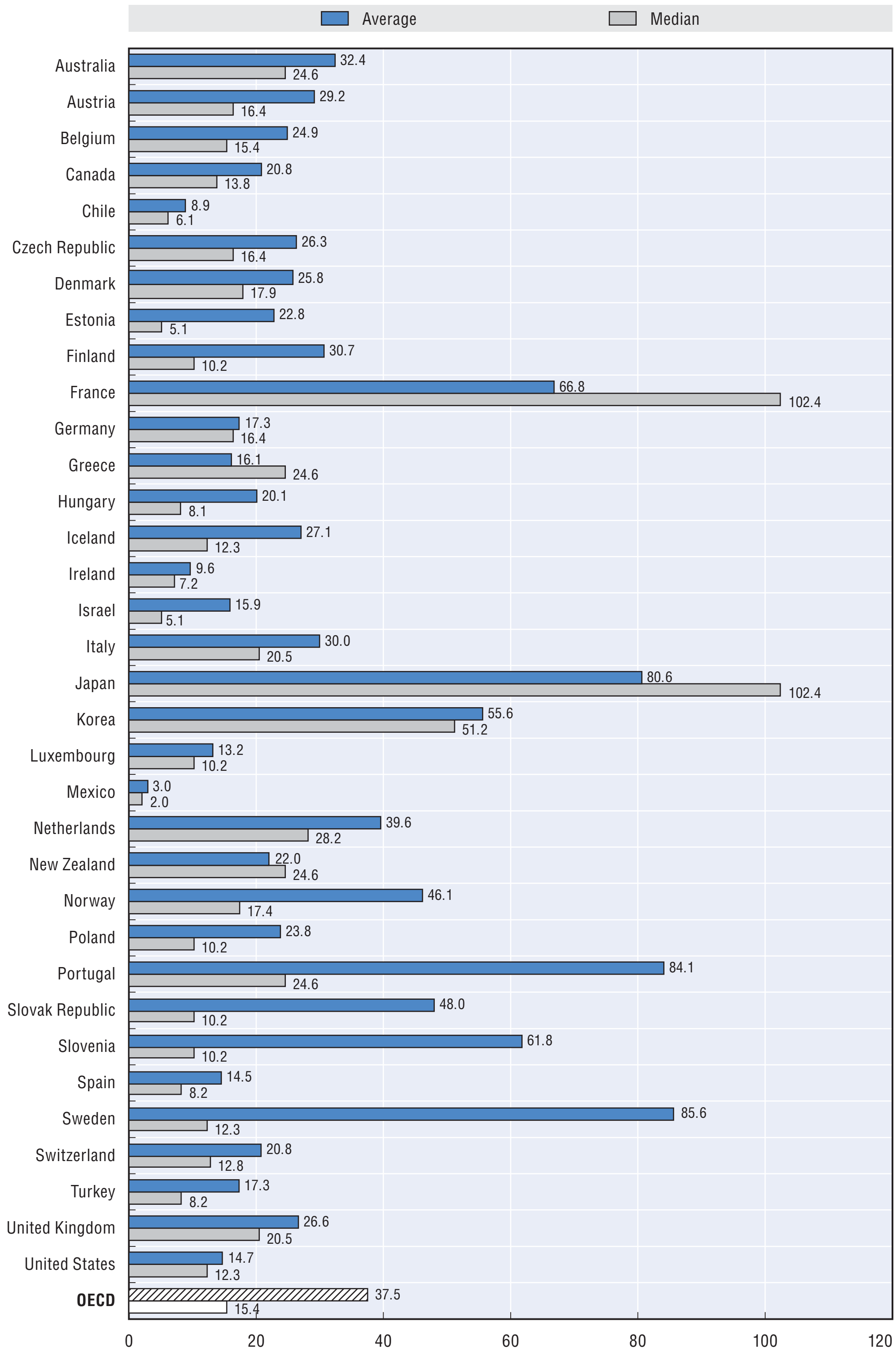
Advertised broadband speeds

Initiatives to upgrade broadband by many network operators have led to the increase of advertised bandwidth (*i.e.* speeds). An OECD data collection of 686 offers of fixed broadband services from 101 firms across all OECD countries revealed that the average advertised speed of all platforms increased by more than 20%, from up to 30.5 Mbit/s in October 2009 to up to 37.5 Mbit/s in September 2010. This reflects the increasing number of operators that have launched broadband services with faster download speeds during that time period. In September 2010, at least one operator offered broadband services with 100 Mbit/s and above, in more than 23 countries of the OECD area. As discussed in detail later, the advertised broadband speeds need to be interpreted carefully because actual speeds are often much lower than advertised speeds.

In September 2010, France and Japan had the fastest median advertised download speed of up to 100 Mbit/s, led by the fibre services of several operators, such as Orange, Free and Numericable in France, and NTT and J:COM in Japan. Korea follows the two countries with up to 50 Mbit/s of median download speed. Some countries presented a large gap between average speeds and median speeds. Sweden had the fastest average advertised download speed of up to 85.6 Mbit/s, led by the up to 1 Gbit/s download speed services of Telia, but the median was 12.3 Mbit/s, indicating that Telia's broadband speed was exceptional. Similar gaps were seen in Portugal, the Slovak Republic and Slovenia, where operators also provide up to 1 Gbit/s download speed services, much higher than other broadband services (Figure 4.9). Across all OECD countries, the median advertised download speed was 15.4 Mbit/s in September 2010, compared to the average advertised download speed of 37.5 Mbit/s.

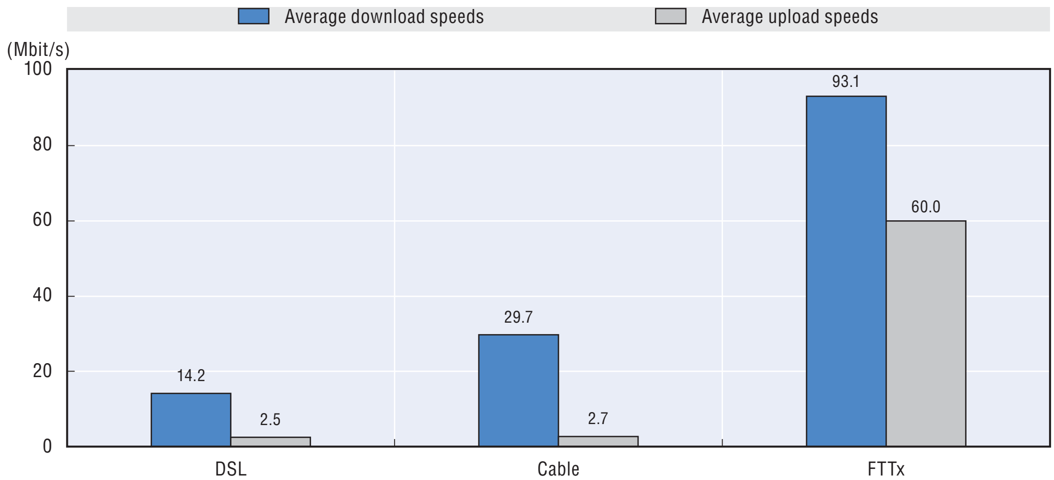
The average advertised DSL download speed did not change significantly, from up to 14.4 Mbit/s in October 2009 to up to 14.2 Mbit/s in September 2010, while the average advertised DSL upload speed decreased slightly, from up to 3.1 Mbit/s in October 2009 to up to 2.5 Mbit/s in September 2010 (Figure 4.10). Of the 686 offers in the OECD data collection, more than 300 were DSL-based broadband services. As such, DSL continues to be the dominant broadband platform in most OECD countries. Many network operators have invested in upgrading infrastructure to provide faster speed, such as ADSL2+, VDSL and VDSL2. DSL, however, has a speed limitation in that the download speeds deteriorate with distance, such that the speeds advertised for DSL connections are dependent on the distance between the switch and the customer.

Figure 4.9. **Average and median advertised download speeds, September 2010**



StatLink http://dx.doi.org/10.1787/888932395041

Figure 4.10. **Average advertised download and upload speeds, by technology, September 2010**



StatLink http://dx.doi.org/10.1787/888932395060

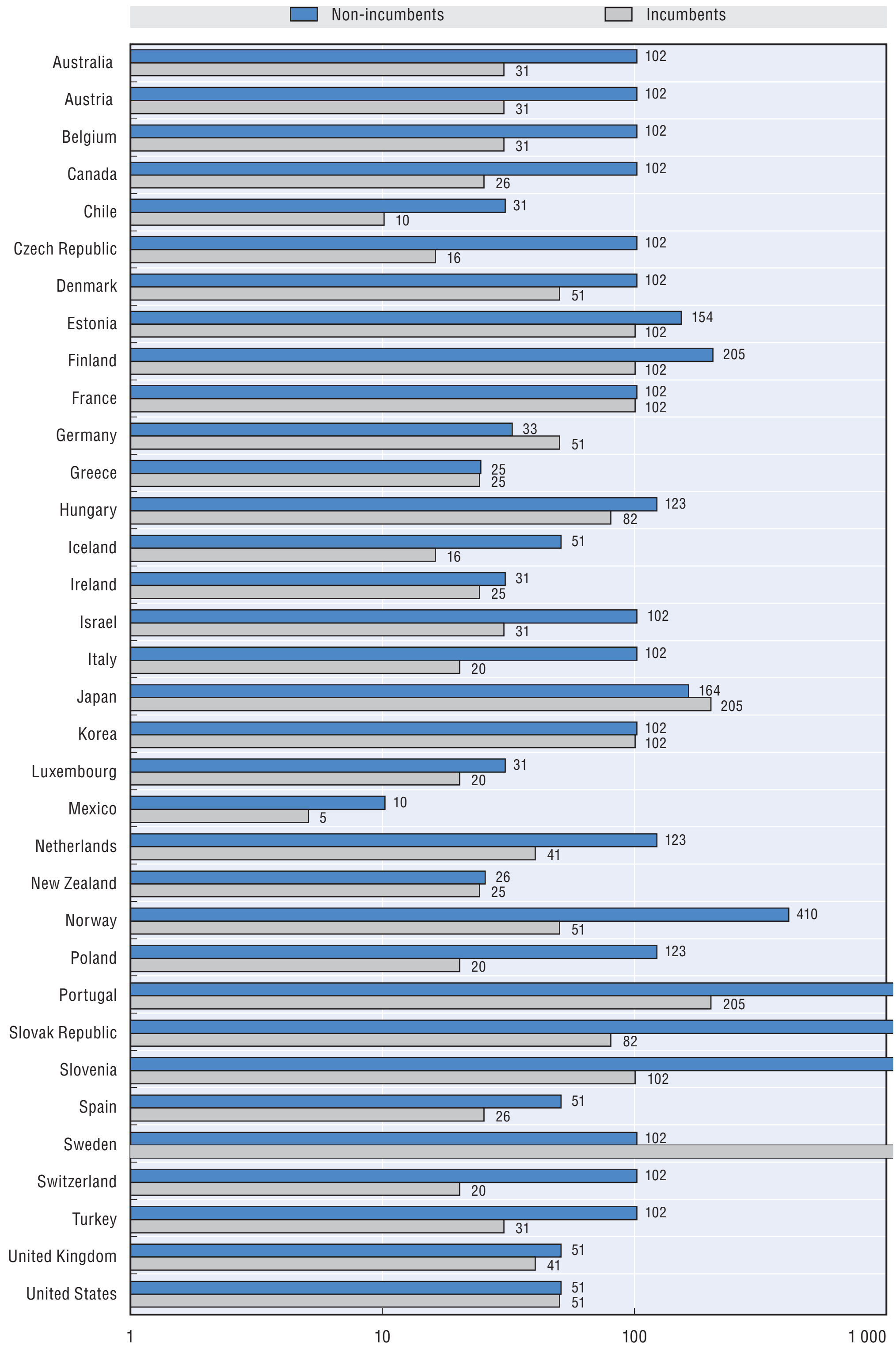
The average advertised cable download speed was up to 29.7 Mbit/s in September 2010, an increase from up to 25.5 Mbit/s in October 2009. The average cable upload speed was up to 2.7 Mbit/s, an increase from up to 2.3 Mbit/s in October 2009. In recent years, many cable networks in the OECD area have made major investments in hybrid fibre/cable networks (HFC) to be able to offer digital television and Internet services. Furthermore, an increasing number have adopted the new DOCSIS 3.0 standard, providing broadband services at 100 Mbit/s and above, reflected by the speed increase over one year. Of 207 cable offers in the data collection, the fastest advertised cable broadband speed in the OECD in September 2010 was 200 Mbit/s, provided by Welho in Finland.

Fibre continues to be the fastest platform of fixed broadband services, with an average advertised download speed of up to 93.1 Mbit/s in September 2010, an increase from up to 76.8 Mbit/s in October 2009; and an average advertised upload speed of up to 60.0 Mbit/s, an increase from up to 51.7 Mbit/s in October 2009. The total number of observed fibre offers was 162 of all 686 surveyed cases in September 2010. Japan boasted the most fibre services with 21 available offers, reflecting a system whereby operators provide services depending on building type, such as standalone house or apartment.

A comparison between broadband services offered by incumbents and non-incumbents provides a perspective on the competition landscape in OECD countries, in particular, with respect to fastest broadband download speed advertised (Figure 4.11). In 27 countries, non-incumbents provide faster maximum download speeds than the incumbents, while the incumbents offer faster speed only in three countries. The gaps are very large in Portugal, the Slovak Republic and Slovenia where non-incumbents provide up to 1 Gbit/s download speeds, and in Sweden where up to 1 Gbit/s download speed service is provided by the incumbent.

The range of advertised offers varies in each OECD country among the firms surveyed in September 2010. Entry-level offers were 1 Mbit/s and above in two-thirds of the OECD countries (Figure 4.12). Sweden had the widest range of speed offers, from 256 kbit/s to 1 Gbit/s. In contrast, New Zealand had the narrowest range of speed offers, from 15 Mbit/s to 25 Mbit/s. Based on the survey, the number of broadband services available also differs

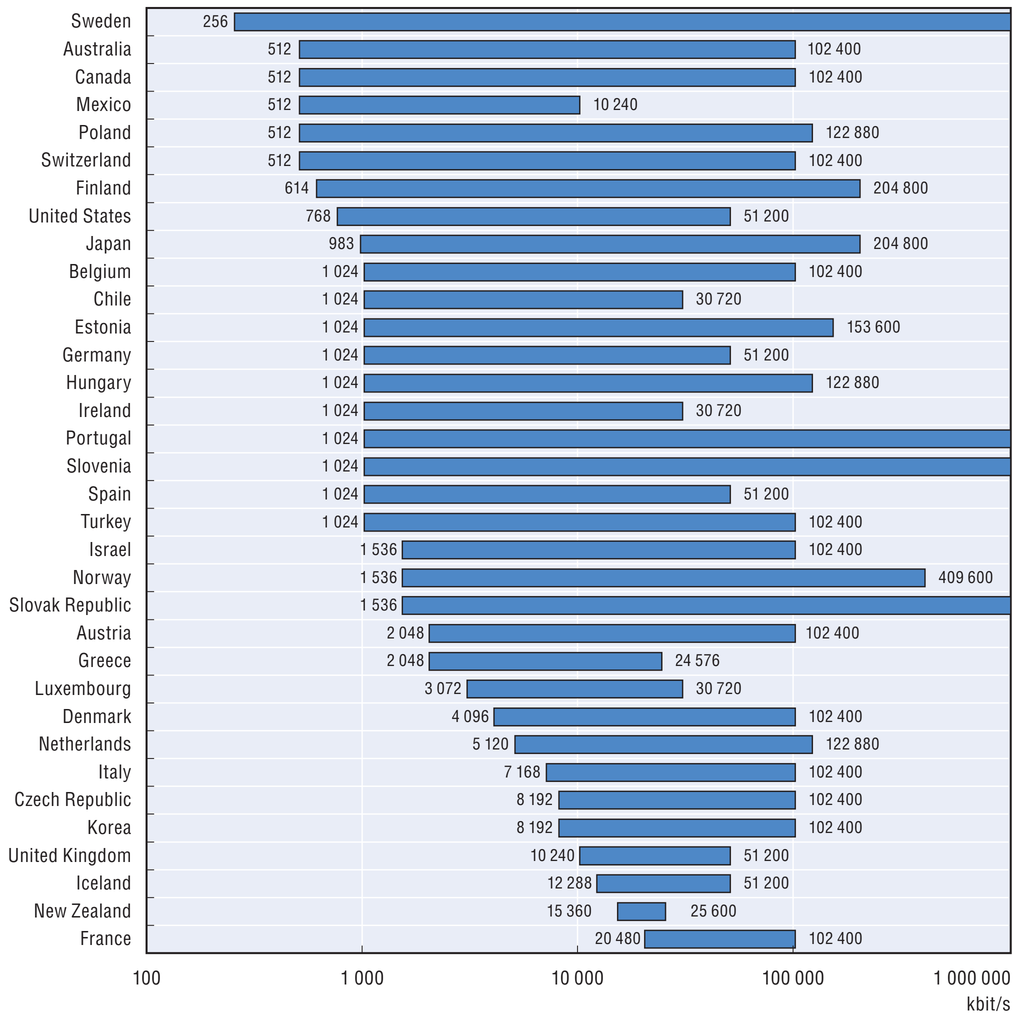
Figure 4.11. **Fastest advertised connection offered by the incumbent and non-incumbent operator, logarithmic scale, September 2010**



Note: For Portugal, Slovenia, the Slovak Republic and Sweden: speed up to 1 024 Mbit/s (1 Gbit/s).

StatLink http://dx.doi.org/10.1787/888932395079

Figure 4.12. **Broadband advertised speed ranges, all technologies, logarithmic scale, September 2010**



Note: For Portugal, Slovenia, the Slovak Republic and Sweden: speed up to 1 024 Mbit/s (1 Gbit/s).

StatLink http://dx.doi.org/10.1787/888932395098

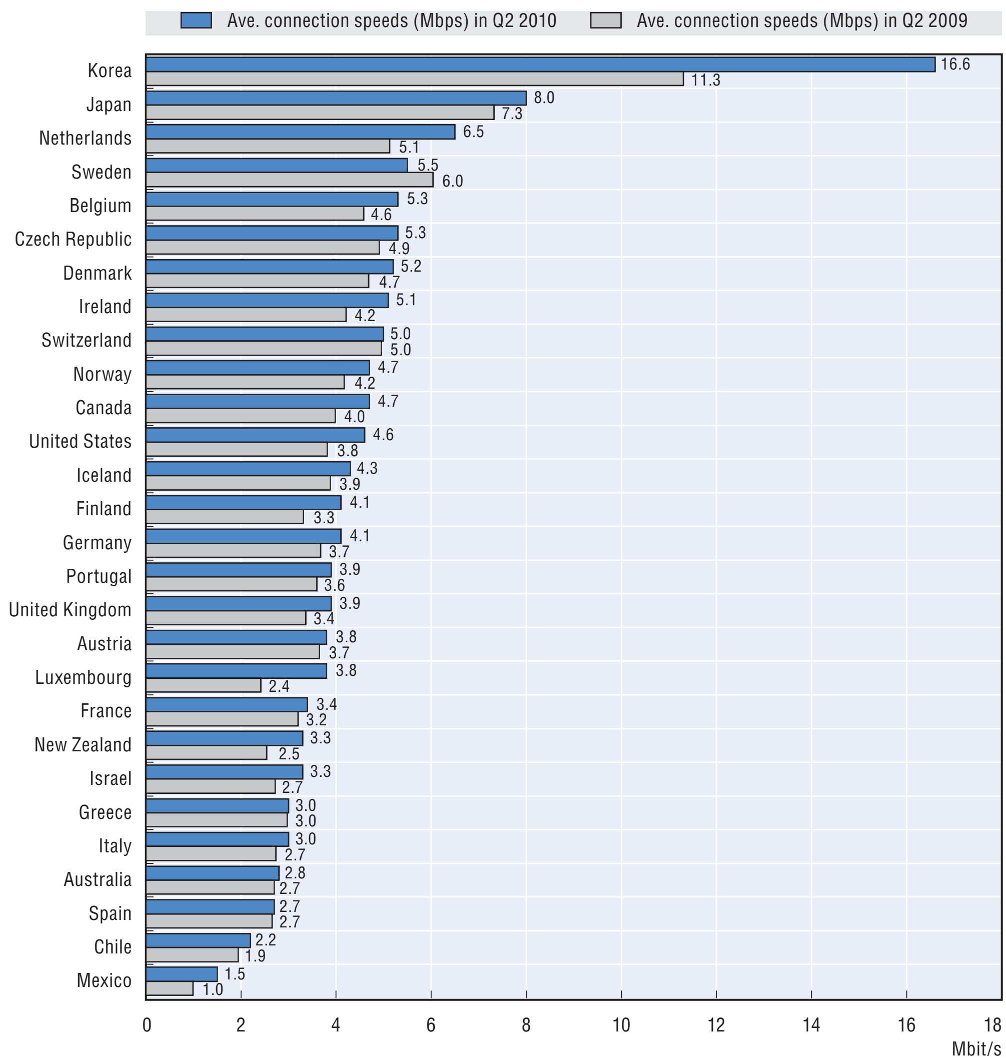
in each country. Slovenia had the most services available with 48 offers, followed by Australia with 46 offers, while Greece and Luxembourg had the least services available, with seven offers and eight offers respectively.

Actual broadband speeds

As the advertised speeds increase, the gap between the "headlines" and the actual speeds that consumers may experience has sometimes grown. For example, Ofcom reported that advertised speeds increased by nearly 50% between April 2009 and May 2010, while actual speeds delivered increased by just 27%, and averaged just 46% of the advertised speeds. In the United States, the FCC is undertaking to measure the actual speeds experienced at homes within a structured random sample of homes, and will compare those speeds with the advertised service speeds. An earlier analysis, based on a commercial sample of home computers during the first half of 2009, suggested that median and average advertised download speeds for purchased services were about 7 Mbit/s and 8 Mbit/s respectively, while the median and average experienced speeds were about 3 Mbit/s and 4 Mbit/s.

One private source of data comes from Akamai, using its global content distribution network.[14] The firm gathers data on speeds, over a quarter, through its server network. These are then published in its report "State of the Internet". In October 2010, the company reported that the global average connection speed, in the second quarter of 2010, had increased by 6.1% from the same quarter a year previous. The countries with the fastest average speeds, of 28 OECD member economies covered in their survey, were Korea with 16.6 Mbit/s, followed by Japan with 8.0 Mbit/s and the Netherlands with 6.5 Mbit/s (Figure 4.13). Although the methodology changed slightly, the average speeds had increased between 2009 and 2010 in almost all surveyed OECD countries. The countries with the largest increase in average speeds over one year were Luxembourg (57.0%), Korea (46.8%) and, although starting from a lower base, Mexico (51.4%).

Figure 4.13. **Observed average connection speeds, selected OECD countries, Q2 2009 and Q2 2010**



Source: Akamai "The State of the Internet", *www.akamai.com*.

StatLink http://dx.doi.org/10.1787/888932395117

It is worth noting that global levels of narrowband adoption dropped in many countries around the world during the second quarter of 2010. Of the OECD countries, Korea had the lowest narrowband (below 256 kbit/s) usage rate of 0.2% (Table 4.17). It is, however, still significant in some OECD countries where broadband coverage, for fixed or terrestrial wireless networks, may not be available because of geographic factors. In these countries, dial-up and broadband network access with performance resulting in low speeds (*i.e.* offers with results below 256 kbit/s), or the slower speeds available through satellite services, is still used for up to 6.3% of all Internet access, as is the case with New Zealand.

Mobile broadband speeds and data consumption

An increasing number of mobile broadband services, over 3G, offer faster download speeds. In Australia, by way of example, Telstra's HSPA+ services provide, in theory, 42 Mbit/s at maximum speed. The migration to next generation technologies is resulting in further headline speeds. For example, TeliaSonera, the first operator to launch commercial LTE service in Sweden and Norway, offers a mobile broadband connection to laptops with USB dongles, with up to 50 Mbit/s download speed.

The actual speeds that consumers can get could be much lower than the theoretical maximum speeds due to a number of factors. Wireless broadband performance is affected by more variable conditions than fixed broadband, including device distance from mobile towers, device design (*e.g.* internal/external antennas) and wireless data standards used. The ground speed of the devices (*e.g.* use on the move or stationary use) has, in particular, a large impact on signal stability, which directly affects connection speeds. Furthermore, mobile broadband has spectrum limitations. When users access the network simultaneously, the bandwidth has to be shared. In commercial situations the available bandwidth, for an end-user, will be less than the maximum theoretical limit. Although other aspects, such as coverage, latency and reliability, may be important to end users, speed is also a useful indicator to measure overall network quality. In some cases, users may be relying on their mobile connections to "do the heavy lifting" for services that may be better suited to fixed networks. This also leads to slow speeds. Although there are challenges to analysing actual mobile broadband speeds, one study in the United States, cited by the FCC, found that actual speeds can be a quarter of the speeds advertised.[15] In the United Kingdom, Ofcom conducted extensive reviews of these issues in its own market over the course of several years. These revealed that, in April 2009, average actual download speeds were 4.1 Mbit/s, 58% of average advertised "up to" speeds (7.1 Mbit/s), and in May 2010, average download speeds were 5.2 Mbit/s, 45% of average advertised "up to" speeds (11.5 Mbit/s).[16]

Mobile operators often provide information about the gap between theoretical speeds and actual speeds. Three, in the United Kingdom, states that the theoretical maximum speed of its mobile broadband service is 7.2 Mbit/s, while its actual speeds will be up to 5.6 Mbit/s.[17] Optus, in Australia, says that when its theoretical download speed is 7.2 Mbit/s, the typical download experience would be between 512 kbit/s and 3.0 Mbit/s. It further states that when the theoretical upload speed is 2.0 Mbit/s, the typical upload experience would be between 512 kbit/s and 1.2 Mbit/s.[18]

Akamai's data provides one of the most widespread global overviews of mobile broadband connection speeds and data consumption. The company's results for the fourth quarter of 2009 and the second quarter of 2010 covered 47 providers across the OECD area (Table 4.18). The average connection speeds varied widely in both surveys. In the 2010 survey, the fastest speeds (3.7 Mbit/s) were experienced with a Polish operator and the slowest speeds (115 kbit/s) were recorded for a Slovakian operator.

The mobile broadband speeds improved over the two quarters, as 35 of the 47 mobile providers had higher average speeds. The number of providers with average connection speeds with 2 Mbit/s and above in the second quarter of 2010 was 12, up from five in the fourth quarter of 2009. Over the same period, while 18 providers had average connection speeds with less than 1 Mbit/s, this had decreased from 22 providers. The largest improvement was seen in an operator in the Czech Republic with 135% over the two quarters. A German operator also increased the average speeds by 94% between the fourth quarter of 2009 and the second quarter of 2010.

Akamai records the average consumption of data downloaded from its servers, per unique IP address, from mobile providers. During the second quarter of 2010, the survey recorded four providers whose users downloaded, on average, more than 1 GB per month in Austria, Canada, Germany and the Slovak Republic. Of these, the users of a Canadian provider consumed more than 7 GB per month, which was exceptionally large. Akamai excludes operators from these data when it determines that they are acting as a single gateway for their customers – although as the data reported (Table 4.18) represents the first two surveys, the company says it is learning more as this proceeds. There were 13 operators whose users downloaded less than 100 MB per month during the second quarter of 2010, and the least data downloaded was 19 MB per month, for one of the Netherlands' operators. The differences in data consumption may depend on devices. For example, basic multimedia phones have limited Internet data usage of 1-25 MB per month, while Clearwire in the United States reports that average usage for its 4G wireless card service is roughly 7 GB per month.[19]

Data caps for fixed networks

One aspect of pricing structure which can be followed is the use of data caps. While relatively common for wireless networks, where spectrum constraints are ever present, data caps have become less frequent for fixed broadband networks. In the pricing survey for fixed broadband in September 2010 (described in Chapter 7), 27.0% of the 686 offers surveyed had an explicit monthly limit on the amount of traffic which subscribers can download (or upload), which fell from 35.7% in 2008. The percentage of DSL offers with caps decreased to 32.0% in 2010 from 40.5% in 2008, while that of cable broadband offers also decreased to 19.8% from 31.1% during the same period. On the other hand, the percentage of fibre offers with caps increased from 8.1% to 26.5%, but the threshold varied from 1 GB per month, offered by T-Home in Hungary, to 500 GB per month, offered by Superonline in Turkey. The most common structure for fibre pricing is for uncapped service (*i.e.* unmetered).

Shaw in Canada increased the maximum monthly data caps of its cable broadband offers to 500 GB in 2010, from 150 GB in 2008. Internode, in Australia, almost doubled the maximum monthly data caps of its DSL broadband offers to 240 GB, from 100 GB over the previous two years. In 2008, the cable broadband operator's service had data caps, but by 2010, it provided unmetered offers – although some of the highest caps are sometimes at premium prices. Nevertheless, it can be noted that some caps are at levels that few users may reach even at lower ranges. This suggests that, for many users, they represent the equivalent of unmetered service. Of all offers with data caps in 2010, 24.3% of offers were caps with over 10 GB per month. The total average data caps were 73.2 GB per month, and by technology, those of DSL, cable and fibre were 48.1 GB, 115.8 GB and 91.6 GB respectively.

Once data caps are reached, operators generally offer two options: either the user pays more per megabyte or the speeds are decreased. Some operators, if they have data caps, make both options available. Between 2008 and 2010, an increasing number of operators have offered the option of decreased speeds. This practice is often referred to as speed shaping. The most common shaped speeds were up to 128 kbit/s. Shaped speeds are higher for some fibre offers, although few exist with caps. For example, the Slovakian operator T-Com shaped speeds of 1 Mbit/s after a user reached the cap. In Australia, Telstra (Bigpond) has introduced shaping in recent years, alongside the option for customers to pay more once they reach their data allowance. In 2010, however, they simplified the line-up of services by offering only speed reductions to 64 kbit/s. This reflects increased competition in Australia ahead of implementation of the country's national broadband network. The raising of caps by companies such as Internode reflects the same factor.

For those operators charging more if a user exceeds their cap, there are a number of different approaches. Some operators charge fixed fees per extra megabytes regardless of the size of monthly caps. Others charge less expensive amounts for offers with large caps and charge more on offers with small caps. For example, Bell Canada charges additional USD 0.0024 per megabyte for DSL offers with 25 GB monthly caps, but USD 0.001 per megabyte for DSL offers with a 75 GB monthly cap.

Superonline in Turkey provides offers with a tiered charge system; once users reach the caps, they pay per additional megabyte until they reach a maximum of 15 GB per month. In excess of this, speeds are shaped to 512 kbit/s. Belgacom in Belgium offers top-up options for unlimited data use to certain DSL offers for USD 14 per month. Clix in Portugal had some offers without data caps for the first 24 months, but introduced certain data caps after that period expired.

Data caps for mobile networks

Mobile broadband services are less likely to allow users to access unlimited data, because the available spectrum needs to be shared with other users, and intensive use is likely to cause performance deterioration. This could include slow download speeds and unsteady services. As such, operators mostly sell mobile broadband services on a per megabyte charging basis. This is not exactly the same as monthly data caps, but can facilitate managing traffic volume on networks. In 2010, Vodafone in Germany had offers with 300 MB monthly data caps and charged an additional amount per megabyte after the caps were reached. Movistar in Spain sold mobile data plans which charged USD 1.18 per day with 10 MB daily caps and billed USD 1.18 per additional 10 MB after reaching the caps.

In 2010, some operators sold mobile data plans without caps, in particular, for popular smartphones and tablet computers. Softbank Mobile in Japan provided unmetered data plans for iPhone users. However, it is sometimes the case that offers advertised as "unlimited" entail caps, and users must pay for excess data or tolerate lower data speeds. Movistar, for example, sold iPhone "unlimited" data plans, while in actuality speeds in excess of 1 GB were shaped.

Some operators have either scaled back their use of unmetered or unlimited offers, or discontinued them in response to the popularity of smartphones. In 2010, AT&T, an exclusive iPhone carrier in the United States, commenced offering the device with unmetered data access. In June, however, the company decided to stop selling unmetered data plans, and instead launched plans with monthly usage limits and an additional charge for extra use. In the United Kingdom, several major mobile operators including Orange and O2 decided to step back from advertising services as unlimited for smartphones. That being said, offers in the United Kingdom were capped prior to the change. At the same time, a number of firms in the United States stepped up their unmetered offers to see if they could attract customers from AT&T to other devices or, in early 2011, with the launch of the iPhone by a second carrier (*i.e.* Verizon). This is a reminder that the use of tools such as caps or shaping is not just about data management on networks, but also the degree of competition in the market.

Contention ratios

A few network operators publish the contention ratio on their lines as an indication of the number of customers who share the capacity available in a broadband network. This is one of the factors underlying the difference between advertised speeds and those experienced by users. A 50:1 contention ratio, for example, means that the maximum number of other users that one user may share the connection with is 49. To date, it is unlikely that all 50 users would access the Internet at the same time. If they did, the actual download speeds of each user would decrease. The more lines connected to a backhaul trunk line, the more congested the backhaul becomes and the slower the speed users can enjoy.

This may have recently been the case in wireless networks, as some smartphone applications regularly check for updates. For fixed and mobile networks, it may be truer in the future as more M2M applications share network use. In addition, convergence between telecommunication and broadcasting services, including audio and video, means that broadband connections are often in use for extended periods compared to initial Internet use in the first decade of its commercialisation.

In 2010, GTS Novera in the Czech Republic was one of a few operators who made its contention ratio available to the public. The company differentiates its fixed broadband services for business customers by two contention ratios of either 50:1 or 20:1, and their prices are set in proportion to the ratios. Irish broadband in Ireland offered residential DSL services with contention ratios of 1 Mbit/s and 3 Mbit/s with 48:1, 7.6 Mbit/s with 12:1, and fixed-wireless services of 4 Mbit/s with 24:1. Digiweb in Ireland also published the contention ratio of its fixed broadband services, as up to 36:1 for residential customers, and up to 18:1 for business users.

Very few contention ratios for fixed wireless broadband services are made available in the OECD area. For mobile, the ratios would depend on the number of users active in any cell at a particular time. In 2010, "3 Ireland" provided mobile broadband services with the maximum contention ratio of 22:1.[20] The company is required, as the designated provider under the National Broadband Scheme of Ireland, to extend its network to provide mobile wireless broadband services into certain rural areas with certain guaranteed qualitative levels including the contention ratio.

Initiatives for consumer empowerment in relation to broadband

As the take-up of broadband has grown, consumers have become increasingly aware of the complexity of some products and services. This includes the difference between advertised and actual speeds and the different factors which may be at play. In the United States, the FCC has cited data which suggests that 80% of users are not aware of the speed of their broadband connection.[21] Research in other countries shows that the majority of consumers find it difficult to compare offers and ascertain whether the service they receive meets their expectations when making their choice of provider. This highlights the need for clear and transparent information on products and services for consumers.

Some governments and regulators in the OECD area specifically require operators not to mislead consumers through advertising related to Internet access, and encourage operators to provide better information for such purchases. In Italy, operators are required to publish data on their broadband service quality on their website, and AGCOM provides links to that information.[22] In the United Kingdom, ISPs have signed up to a code of practice for broadband speeds. This requires them to provide consumers with information about estimated access line speeds and access to a tool which enables a user to check their actual speed. From July 2011, consumers will have the right to exit their broadband contract without penalty if actual speeds are significantly lower than the estimate provided at time of purchase. In Hungary, operators are required to realise the minimum guaranteed speeds, which they set, in 80% of the time.

In a number of countries, governments and regulators have launched web-based measurement tools to enable consumers to measure the actual quality of their broadband connection and help them better understand broadband services and products. Government-endorsed websites for broadband speed tests are available in several countries, including Estonia, Germany and Norway.

The Korean National Information Society Agency provides consumers with an Internet quality test system. Users can test their upload and download speeds, packet delay, packet loss and packet jitter, in addition to the results of thousands of speed test data, updated three times a day.[23] Operators must compensate customers for failure to meet the minimum guaranteed connection speeds, set by the operators, if the tests results fall short of the guaranteed speeds for more than 60% of the test time.

In the United States, the FCC has launched the Consumer Broadband Test (Beta) to give consumers additional information about the quality of their broadband connections, and to create awareness about the importance of broadband quality in accessing content and services over the Internet. Additionally, the FCC may use data collected from the service, along with submitted street addresses, to analyse broadband quality and availability on a geographic basis across the United States.

Notes

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14. The data was collected during the second quarter of 2009 and 2010 respectively, through Akamai's server network. See *www.akamai.com/stateoftheinternet/*.
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Table 4.2. **Access trends in the OECD area**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 2000-09	CAGR 2007-09
Lines/subscribers															
Standard analogue access lines	471 199 101	472 829 120	519 992 586	519 208 708	518 643 097	514 497 742	506 686 293	500 232 150	493 253 494	477 329 327	457 110 578	441 971 523	423 751 920	-2.23	-3.72
ISDN lines	10 071 488	13 645 430	20 913 089	27 967 863	30 962 652	32 688 133	33 201 796	31 800 474	31 405 652	31 504 633	30 451 995	29 284 006	27 889 211	-0.03	-4.30
ISDN channels	32 154 248	42 392 920	61 385 180	79 471 106	83 509 738	86 602 518	88 106 752	86 720 407	95 853 691	100 424 404	99 027 865	93 811 311	91 925 919	1.63	-3.65
Mobile subscriptions	170 909 682	246 751 242	364 988 936	518 317 143	620 799 295	688 549 104	759 684 404	856 712 920	947 032 598	1 045 138 264	1 148 054 496	1 215 746 592	1 256 812 864	10.34	4.63
Including wireless broadband subscriptions													*308 000 000*		
DSL lines		27 531	583 019	5 896 051	17 080 170	30 515 181	48 975 846	73 152 237	99 143 853	125 204 351	146 351 600	159 453 904	167 666 101	45.06	7.03
Cable modem subscriptions	96 000	679 921	2 761 073	7 619 618	15 054 014	22 891 690	31 664 278	40 058 009	48 849 969	60 710 443	69 063 374	77 523 782	82 797 149	30.35	9.49
Fibre to the home/building subscriptions			312 204	523 402	1 106 904	2 035 699	2 376 574	4 392 972	7 917 301	14 267 681	20 152 407	25 936 064	31 660 966	57.75	25.34
Telephone access															
Fixed telephone access paths (analogue + ISDN lines)	481 270 589	486 474 550	540 905 675	547 176 571	549 605 749	547 185 876	539 888 089	532 032 624	531 921 657	518 131 462	493 634 239	484 921 671	457 541 869	-1.97	-3.73
Total telephone access paths (analogue + ISDN lines + mobile)	652 180 271	733 225 792	905 894 611	1 065 493 713	1 170 405 044	1 235 734 980	1 299 572 493	1 388 745 544	1 471 691 745	1 553 972 224	1 635 617 069	1 687 002 121	1 708 453 994	5.39	2.20
Communication access															
Fixed communication access paths (analogue lines + ISDN lines + DSL + cable modem + other + fibre)	481 270 589	487 282 652	544 450 356	550 149 251	571 647 910	590 593 718	613 405 374	641 095 707	686 120 010	712 921 172	727 894 613	739 575 620	736 048 377	3.29	0.56
Total communication access paths (analogue lines + ISDN lines + DSL + cable modem + fibre + other + mobile)	652 180 271	734 033 894	909 439 292	1 068 466 394	1 192 447 205	1 279 142 822	1 373 089 778	1 497 808 627	1 633 152 608	1 758 059 436	1 875 949 109	1 955 322 211	1 992 861 242	7.17	3.07
Broadband															
DSL lines as percentage of fixed communication access paths			0.1	1.1	3.0	5.2	8.0	11.4	14.4	17.6	20.1	21.6	22.8	40.44	6.44
Cable subscribers as percentage of fixed communication access paths	0.02	0.1	0.5	1.4	2.6	3.9	5.2	6.2	7.1	8.5	9.5	10.5	11.2	26.20	8.88
Fibre subscribers as percentage of fixed communication access paths			0.1	0.1	0.2	0.3	0.4	0.7	1.2	2.0	2.8	3.5	4.3	62.81	51.46

StatLink http://dx.doi.org/10.1787/888932397872

Table 4.3. **Total communication access paths in the OECD area**

In thousands

	1993	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 2007-09	CAGR 2000-09	CAGR 1996-2009
Australia	9 590	13 430	14 288	15 343	16 579	18 514	21 726	23 434	25 459	28 394	31 325	33 516	35 850	36 816	38 347	3.42	8.43	8.41
Austria	3 924	4 297	4 732	5 755	7 806	9 629	10 141	10 375	10 857	11 927	12 556	13 515	14 196	15 055	15 941	5.97	5.76	10.61
Belgium	4 701	5 258	6 012	6 490	7 819	10 250	12 453	13 276	14 045	14 899	15 652	16 280	17 469	18 602	19 405	5.40	7.35	10.57
Canada	18 902	21 471	22 917	24 914	26 681	29 661	33 209	35 054	37 216	39 722	42 836	45 896	48 510	50 762	52 500	4.03	6.55	7.12
Chile	..	2 470	3 103	4 011	5 369	6 704	8 630	9 878	10 842	13 030	14 689	16 843	18 713	19 746	21 667	7.61	13.92	18.18
Czech Republic	2 409	3 018	3 795	4 700	5 752	8 254	10 628	12 016	13 036	14 007	15 306	16 091	17 223	17 955	17 733	1.47	8.87	14.59
Denmark	3 563	4 571	4 608	5 134	5 815	6 640	7 370	7 996	8 472	9 105	9 597	10 171	10 613	10 947	11 149	2.49	5.93	7.10
Estonia	..	499	609	745	900	1 093	1 250	1 362	1 554	1 795	2 006	2 254	2 632	3 189	3 394	13.54	13.41	15.89
Finland	3 270	4 346	5 011	5 801	6 288	6 815	7 326	7 743	7 977	8 339	8 835	9 125	9 538	10 180	10 557	5.21	4.98	7.07
France	33 170	34 431	37 883	42 273	50 922	59 468	66 866	69 265	74 032	79 576	85 523	90 857	94 691	97 492	102 048	3.81	6.18	8.72
Germany	41 199	46 746	48 863	54 350	63 561	88 073	97 756	102 032	108 791	120 302	128 902	138 883	153 509	164 577	165 947	3.97	7.29	10.24
Greece	5 191	5 861	6 370	7 595	9 534	11 693	13 776	15 085	15 996	16 723	18 125	19 782	22 780	25 678	27 465	9.80	9.95	12.62
Hungary	2 282	3 154	3 859	4 530	5 240	6 670	8 449	10 253	11 401	12 285	12 960	14 350	15 724	17 063	16 646	2.89	10.70	13.65
Iceland	166	201	221	265	333	378	404	443	473	494	533	558	572	594	591	1.71	5.10	8.67
Ireland	1 370	1 680	2 011	2 531	3 261	3 658	4 431	4 834	5 158	5 598	6 214	6 949	7 480	7 630	7 303	-1.19	7.99	11.97
Israel	..	..	..	..	5 848	7 295	8 497	9 261	9 496	10 086	10 233	12 438	13 021	13 805	14 591	5.86	8.01	..
Italy	26 065	31 436	37 023	45 434	55 065	66 899	76 264	78 875	85 113	92 655	102 743	111 475	121 120	120 735	117 957	-1.31	6.50	10.71
Japan	63 453	89 539	101 103	109 934	119 128	129 376	138 981	149 509	160 781	170 196	177 723	183 301	187 321	189 479	187 152	-0.04	4.19	5.84
Korea	19 397	23 131	27 762	34 787	45 832	53 308	60 514	66 233	68 987	72 439	75 073	77 329	81 338	83 214	84 382	1.85	5.24	10.47
Luxembourg	234	295	327	358	426	551	684	731	801	935	1 031	1 059	1 068	1 111	1 142	3.44	8.43	10.98
Mexico	9 187	9 848	10 995	13 276	18 659	26 418	35 643	41 150	46 856	57 562	68 942	78 235	90 889	103 324	112 350	11.18	17.45	20.59
Netherlands	8 237	9 168	10 818	11 114	15 152	19 434	20 097	20 788	22 690	26 433	26 346	27 900	30 237	31 022	30 538	0.50	5.15	9.70
New Zealand	1 846	2 195	2 463	3 018	3 301	3 946	4 215	4 404	4 550	5 062	5 751	6 144	6 856	7 367	7 551	4.95	7.48	9.97
Norway	2 801	3 746	4 152	4 547	5 114	5 649	5 998	6 276	6 642	7 332	7 721	7 797	7 993	8 200	8 252	1.61	4.30	6.26
Poland	5 744	6 749	8 322	10 413	13 437	6 879	10 946	14 339	18 194	24 466	41 828	50 876	54 986	57 376	57 982	2.69	26.73	17.99
Portugal	3 687	4 407	5 374	6 969	8 564	10 456	11 810	13 145	14 121	14 969	16 030	17 023	18 166	19 728	21 028	7.59	8.07	12.77
Slovak Republic	1 122	1 275	1 592	2 005	2 319	2 992	3 704	4 327	4 992	5 577	5 871	6 335	7 632	7 237	7 139	-3.29	10.15	14.17
Slovenia	..	..	..	..	..	..	..	2 410	2 510	2 709	2 698	2 817	2 924	3 055	3 055	2.21	..	..
Spain	15 353	18 507	20 415	23 519	32 055	41 745	47 557	52 382	57 186	59 999	67 149	72 219	76 649	79 492	81 340	3.01	7.69	12.06
Sweden	6 863	8 557	9 244	10 198	11 230	12 518	13 493	14 389	15 539	15 724	16 391	17 141	17 775	18 384	18 757	2.73	4.60	6.22
Switzerland	4 677	4 834	5 328	5 923	7 210	8 808	9 519	10 228	10 987	11 532	12 454	13 260	14 345	15 055	15 599	4.28	6.56	9.43
Turkey	14 268	15 092	17 354	20 466	25 856	33 470	37 344	42 277	47 016	54 353	64 131	74 283	84 588	89 080	85 777	0.70	11.02	14.30
United Kingdom	30 745	36 646	38 291	44 443	55 589	71 889	77 175	82 131	87 010	96 870	105 907	112 826	118 980	123 393	126 898	3.27	6.52	10.03
United States	171 687	171 991	187 340	203 193	268 792	299 334	325 590	343 246	364 309	392 714	420 073	450 532	470 563	487 981	500 677	3.15	5.88	8.57
OECD	515 102	588 850	652 180	734 034	909 439	1 068 466	1 192 447	1 279 143	1 373 090	1 497 809	1 633 153	1 758 059	1 875 949	1 955 322	1 992 861	3.07	7.17	9.83

Notes: Total communication access paths = (analogue lines + ISDN lines + DSL + cable modem + fibre + other broadband + mobile subscribers). Data for Israel (2008) and the United States (2009) are estimates.

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Table 4.4. **Total communication access paths per 100 inhabitants in the OECD area**

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Rank
Australia	47.1	51.0	72.9	76.8	81.6	87.1	96.1	111.2	118.5	127.2	140.2	152.5	160.6	168.8	170.1	173.5	19
Austria	41.8	47.2	54.0	59.4	72.2	97.7	120.2	126.1	128.4	133.7	146.0	152.7	163.5	171.0	180.6	190.6	13
Belgium	39.3	46.5	51.8	59.1	63.6	76.5	100.0	121.1	128.5	135.4	143.0	149.4	154.4	164.5	173.7	179.8	16
Canada	55.2	60.0	72.5	76.6	82.6	87.8	96.7	107.1	111.8	117.6	124.4	132.8	140.9	147.3	152.3	155.6	27
Chile	..	..	16.9	21.0	26.7	35.3	43.5	55.4	62.7	68.1	81.0	90.3	102.5	112.7	117.8	128.0	32
Czech Republic	15.7	23.2	29.3	36.8	45.7	55.9	80.3	104.0	117.8	127.8	137.2	149.6	156.7	166.8	172.2	168.8	22
Denmark	56.6	62.0	86.9	87.2	96.8	109.3	124.4	137.6	148.7	157.2	168.5	177.1	187.1	194.4	199.3	201.9	6
Estonia	..	..	35.0	43.3	53.5	65.2	79.7	91.4	100.1	114.6	132.9	148.9	167.6	196.1	237.8	253.2	1
Finland	53.5	55.5	84.8	97.5	112.6	121.7	131.7	141.2	148.9	153.0	159.5	168.4	173.3	180.3	191.6	197.7	10
France	49.6	57.3	57.7	63.3	70.4	84.4	97.9	109.3	112.4	119.3	127.3	135.8	143.3	148.5	152.0	158.2	26
Germany	50.7	51.4	57.1	59.6	66.3	77.4	107.2	118.7	123.7	131.8	145.8	156.3	168.6	186.6	200.4	202.7	5
Greece	39.1	48.5	54.7	59.1	70.1	87.6	107.1	125.8	137.3	145.1	151.2	163.2	177.4	203.5	228.5	243.9	2
Hungary	9.6	21.5	30.6	37.5	44.1	51.2	65.3	82.9	100.9	112.6	121.5	128.5	142.5	156.4	170.0	166.1	23
Iceland	51.4	55.6	74.6	81.6	96.8	120.3	134.4	141.8	154.2	163.6	168.7	180.0	183.2	183.6	185.9	185.2	14
Ireland	28.1	36.5	46.3	54.9	68.1	86.9	96.1	114.7	122.9	129.0	137.6	149.4	163.1	171.3	171.7	163.4	24
Israel	..	..	..	..	..	95.5	116.0	132.0	141.0	141.9	148.1	147.7	176.3	181.3	188.9	196.1	11
Italy	39.4	43.7	55.3	65.1	79.8	96.7	117.5	133.8	138.0	147.8	159.3	175.3	189.1	204.0	201.8	195.7	12
Japan	44.2	49.7	71.1	80.1	86.9	94.0	101.9	109.2	117.3	125.9	133.2	139.1	143.5	146.6	148.6	147.0	30
Korea	35.7	42.0	50.8	60.4	75.2	98.3	113.4	127.8	139.1	144.1	150.8	156.0	160.1	167.9	171.2	173.1	20
Luxembourg	47.8	56.4	70.9	77.8	83.9	98.5	125.7	155.0	163.7	177.3	204.1	221.7	224.0	222.4	227.5	229.6	3
Mexico	6.6	9.8	10.6	11.7	13.9	19.3	26.9	35.8	40.8	46.0	56.0	66.4	74.7	86.0	97.0	104.6	34
Netherlands	46.4	52.5	59.0	69.3	70.8	95.8	122.1	125.3	128.7	139.9	162.4	161.5	170.7	184.6	188.7	184.8	15
New Zealand	43.8	44.8	59.5	65.7	79.6	86.4	102.7	109.0	112.9	114.6	125.1	140.2	148.1	163.3	173.7	176.4	18
Norway	50.3	56.8	85.5	94.3	102.6	114.6	125.8	132.9	138.3	145.5	159.7	167.0	167.3	169.8	172.0	170.9	21
Poland	8.6	14.8	17.6	21.7	27.2	35.1	18.0	28.6	37.5	47.6	64.1	109.6	133.4	144.3	150.5	152.0	28
Portugal	24.1	36.1	43.8	53.3	68.8	84.2	102.3	114.7	126.8	135.2	142.5	152.0	160.8	171.2	185.7	197.8	9
Slovak Republic	..	20.9	23.7	29.6	37.2	43.0	55.4	68.9	80.4	92.8	103.6	109.0	117.5	141.4	133.9	131.8	31
Slovenia	..	..	..	..	..	..	..	..	120.8	125.7	135.6	134.9	140.3	144.8	151.1	149.6	29
Spain	32.4	38.6	46.9	51.6	59.2	80.3	103.7	116.8	126.8	136.1	140.5	154.7	163.9	170.8	174.3	177.1	17
Sweden	68.3	68.6	96.8	104.5	115.2	126.8	141.1	151.7	161.2	173.5	174.8	181.5	188.8	194.3	198.6	200.8	7
Switzerland	58.7	65.6	68.0	74.9	83.0	100.6	122.2	130.7	139.3	148.4	154.7	166.0	175.4	188.3	195.2	200.0	8
Turkey	12.3	23.0	24.9	28.2	32.8	40.8	52.1	57.3	64.0	70.3	80.2	93.5	107.0	120.4	125.3	119.3	33
United Kingdom	44.1	50.3	63.0	65.7	76.0	94.7	122.1	130.6	138.4	146.1	161.9	175.8	186.2	195.1	201.0	205.4	4
United States	53.9	64.4	63.8	68.7	73.6	96.3	106.1	112.4	121.2	124.6	134.1	144.9	154.8	160.5	160.1	162.8	25
OECD	39.7	45.4	53.4	58.7	65.6	80.2	93.9	103.9	111.4	117.7	127.9	137.4	147.3	156.7	160.6	162.7	..

Notes: Total communication access paths = analogue lines + ISDN lines + DSL + cable modem + fibre + mobile subscribers. Data for Israel (2008) and the United States (2008 and 2009) are estimates.

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Table 4.5. **Fixed telephone access paths in the OECD area**

In thousands

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Per 100 inhabitants (2009)	CAGR 2007-2009	CAGR 1996-2009
Australia	9 440	9 710	9 900	10 120	10 511	10 511	10 790	10 911	10 370	10 120	9 940	9 760	9 360	9 020	40.8	-3.87	-0.35
Austria	3 698	3 567	3 455	3 455	3 374	3 307	3 187	3 144	3 069	3 005	2 877	2 742	2 680	2 662	31.8	-1.47	-2.50
Belgium	4 780	5 037	4 734	4 609	4 475	4 315	4 279	4 226	4 148	4 144	4 077	4 015	3 818	3 782	35.0	-2.95	-1.79
Canada	18 051	18 722	19 384	19 187	19 527	19 810	19 252	19 161	19 069	19 124	19 218	19 257	19 264	18 708	55.4	-1.44	0.28
Chile	2 151	2 693	3 047	3 109	3 303	3 467	3 467	3 252	3 318	3 436	3 384	3 460	3 526	3 575	21.1	1.66	3.99
Czech Republic	2 817	3 273	3 735	3 806	3 898	3 669	3 389	3 279	3 059	2 869	2 548	2 493	2 380	2 120	20.2	-7.79	-2.16
Denmark	3 255	3 164	3 203	3 175	3 202	3 172	3 074	2 998	2 914	2 797	2 615	2 354	2 061	1 679	30.4	-15.55	-4.96
Estonia	439	469	499	511	514	492	440	423	404	387	376	398	383	372	27.8	-3.29	-1.25
Finland	2 869	2 919	2 955	3 007	3 057	3 082	2 943	2 736	2 560	2 276	2 026	1 841	1 733	1 430	26.8	-11.86	-5.22
France	31 991	32 128	31 050	30 253	29 597	29 248	28 980	28 673	28 502	27 969	26 477	23 804	21 773	21 000	32.6	-6.07	-3.19
Germany	40 964	40 687	40 437	40 110	39 666	39 696	39 650	39 380	39 081	38 995	38 248	36 827	34 800	32 756	40.0	-5.69	-1.71
Greece	5 330	5 432	5 539	5 640	5 760	5 813	5 769	5 656	5 612	5 520	5 398	5 469	5 254	5 248	46.6	-2.04	-0.12
Hungary	2 681	3 153	3 494	3 639	3 592	3 454	3 301	3 255	3 197	3 001	3 419	3 299	3 142	3 069	30.6	-3.55	1.04
Iceland	154	155	159	161	161	158	158	152	150	151	147	148	153	147	46.0	-0.25	-0.38
Ireland	1 390	1 500	1 585	1 661	1 637	1 660	1 701	1 703	1 679	1 727	1 739	1 741	1 686	1 597	35.7	-4.24	1.07
Israel	..	..	..	2 808	2 921	2 996	2 961	2 877	2 865	2 476	4 722	2 459	2 872	3 285	44.1	15.58	..
Italy	25 022	25 263	25 134	24 996	24 494	24 753	24 799	26 011	24 800	24 008	22 666	21 188	19 111	17 680	29.3	-8.65	-2.64
Japan	62 633	62 849	62 626	62 129	61 957	61 324	60 772	60 218	59 608	58 053	55 165	51 232	47 321	43 339	34.0	-8.03	-2.79
Korea	19 950	20 866	20 795	22 118	22 426	22 725	23 490	22 877	22 871	22 920	23 119	23 130	22 132	20 090	41.2	-6.80	0.05
Luxembourg	250	260	228	217	248	251	251	246	245	244	245	254	261	264	53.0	1.85	0.43
Mexico	8 826	9 254	9 927	10 927	12 332	13 774	14 975	16 330	18 073	19 512	19 861	19 872	20 491	19 333	18.0	-1.37	6.22
Netherlands	8 152	9 129	7 767	8 211	8 174	7 985	7 852	7 677	7 434	5 942	5 777	4 994	5 422	4 804	29.1	-1.92	-3.99
New Zealand	1 719	1 753	1 763	1 759	1 749	1 765	1 801	1 847	1 843	1 847	1 851	1 854	1 875	1 865	43.6	0.30	0.63
Norway	2 484	2 475	2 475	2 446	2 386	2 317	2 295	2 208	2 110	1 921	1 677	1 519	1 381	1 259	26.1	-8.97	-5.09
Poland	6 532	7 510	8 485	9 533	10 946	11 400	11 860	11 818	11 726	10 910	10 487	9 428	8 692	7 673	20.1	-9.78	1.25
Portugal	3 744	3 867	3 894	3 892	3 766	3 733	3 682	3 616	3 569	3 496	3 364	3 175	3 082	3 197	30.1	0.34	-1.21
Slovak Republic	1 246	1 392	1 539	1 655	1 698	1 556	1 403	1 295	1 250	1 197	1 167	1 151	1 098	1 013	18.7	-6.16	-1.58
Slovenia	..	..	..	..	..	..	701	683	747	744	721	663	573	494	24.2	-13.67	..
Spain	15 510	16 085	16 467	17 134	17 748	17 427	17 641	17 759	17 934	19 461	19 865	20 328	20 711	20 469	44.6	0.35	2.16
Sweden	6 065	6 075	6 089	6 093	6 053	5 951	5 846	5 739	5 601	5 412	5 137	4 878	4 588	4 174	44.7	-7.50	-2.83
Switzerland	4 171	4 284	4 224	4 153	4 108	4 101	4 077	4 016	3 941	3 831	3 760	3 698	3 635	3 496	49.3	-2.78	-1.35
Turkey	14 286	15 744	16 960	18 060	18 402	18 913	18 928	18 933	19 139	18 993	18 846	18 216	17 519	16 551	23.0	-4.68	1.14
United Kingdom	29 829	29 828	31 442	31 646	31 823	32 070	31 213	30 940	30 645	30 275	29 753	29 567	29 381	28 429	48.6	-1.94	-0.37
United States	127 948	132 027	133 484	180 683	183 671	184 709	182 261	175 848	170 502	175 161	167 460	158 418	162 763	152 963	49.7	-1.74	1.38
OECD	468 378	481 271	486 475	540 906	547 177	549 606	547 186	539 888	532 033	531 922	518 131	493 634	484 922	457 542	37.4	-3.73	-0.18

Notes: Fixed telephone access paths: analogue + ISDN lines. Data for Israel (2008) and for the United States (2008 and 2009) are estimates.

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Table 4.6. **Standard analogue telecommunication access lines in the OECD area**

In thousands

	1993	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	AGR 2007-2009	CAGR 2000-2009	CAGR 1996-2009	Per 100 inhabitants 2009
Australia	8 900	9 170	9 350	9 540	9 760	10 050	10 060	10 400	10 460	10 370	10 120	9 940	9 760	9 360	9 020	-3.87	-1.19	-0.13	40.81
Austria	3 701	3 656	3 482	3 299	3 202	3 034	2 900	2 754	2 687	2 609	2 562	2 468	2 351	2 317	2 319	-0.69	-2.94	-3.44	27.72
Belgium	4 632	4 725	4 939	4 549	4 353	4 042	3 884	3 854	3 805	3 733	3 737	3 678	3 624	3 440	3 425	-2.79	-1.82	-2.45	31.74
Canada	17 567	18 051	18 660	19 294	19 082	19 409	19 689	19 153	19 062	18 973	19 035	19 134	19 176	19 184	18 633	-1.43	-0.45	0.24	55.22
Chile	..	2 151	2 693	3 047	3 109	3 303	3 467	3 467	3 252	3 318	3 436	3 384	3 460	3 526	3 575	1.66	0.89	3.99	21.12
Czech Republic	2 398	2 817	3 273	3 732	3 795	3 872	3 585	3 243	3 094	2 867	2 695	2 388	2 333	2 222	1 976	-7.98	-7.20	-2.69	18.80
Denmark	3 203	3 225	3 104	3 086	2 928	2 827	2 767	2 680	2 621	2 557	2 476	2 332	2 105	1 847	1 504	-15.47	-6.77	-5.70	27.24
Estonia	..	439	469	499	511	512	491	436	419	400	383	372	394	380	369	-3.20	-3.57	-1.32	27.55
Finland	2 810	2 842	2 861	2 855	2 850	2 849	2 806	2 726	2 500	2 390	2 140	1 920	1 740	1 650	1 430	-9.34	-7.37	-5.15	26.78
France	32 600	31 600	31 572	31 050	30 253	29 597	29 248	28 980	28 673	28 502	27 969	26 477	23 804	21 773	21 000	-6.07	-3.74	-3.09	32.56
Germany	39 200	39 000	37 800	36 200	34 500	32 200	30 500	29 100	27 837	26 986	26 340	25 440	23 850	21 650	19 760	-8.98	-5.28	-5.10	24.13
Greece	5 163	5 329	5 431	5 536	5 611	5 659	5 608	5 413	5 200	5 079	4 933	4 794	4 883	4 699	4 725	-1.63	-1.98	-0.92	41.96
Hungary	2 219	2 675	3 133	3 457	3 614	3 492	3 294	3 092	3 038	2 980	2 792	3 216	3 102	2 952	2 896	-3.39	-2.06	0.61	28.89
Iceland	149	154	152	151	148	144	140	140	135	134	134	132	135	141	136	0.50	-0.64	-0.93	42.59
Ireland	1 313	1 390	1 500	1 536	1 585	1 590	1 590	1 600	1 610	1 590	1 605	1 631	1 634	1 582	1 502	-4.13	-0.63	0.60	33.61
Israel	..	..	..	..	2 808	2 921	2 996	2 961	2 877	2 865	2 476	2 595	2 429	2 836	3 243	15.56	1.17	..	43.59
Italy	24 854	24 918	24 801	24 251	23 453	22 569	22 244	21 943	23 000	22 400	21 725	20 540	19 221	17 372	16 116	-8.43	-3.67	-3.30	26.74
Japan	61 106	61 526	60 451	58 559	55 446	52 258	50 997	51 162	51 592	51 626	50 563	48 169	44 779	41 392	37 918	-7.98	-3.50	-3.65	29.78
Korea	18 925	19 942	20 845	20 756	21 944	22 326	22 667	23 385	22 773	22 806	22 785	23 092	23 103	22 132	20 090	-6.75	-1.17	0.06	41.21
Luxembourg	229	248	255	219	189	206	191	191	171	166	165	166	171	172	174	0.93	-1.86	-2.68	35.01
Mexico	8 801	8 826	9 254	9 927	10 927	12 317	13 747	14 956	16 315	18 059	19 500	19 850	19 860	20 480	19 322	-1.36	5.13	6.21	17.98
Netherlands	8 020	8 110	8 850	7 767	7 330	6 915	6 569	6 316	6 120	5 922	4 518	4 459	4 994	4 376	3 855	-12.14	-6.29	-5.56	23.33
New Zealand	1 660	1 719	1 753	1 763	1 759	1 749	1 765	1 801	1 847	1 843	1 847	1 851	1 854	1 875	1 865	0.30	0.72	0.63	43.56
Norway	2 431	2 440	2 325	2 166	1 914	1 683	1 548	1 484	1 417	1 376	1 299	1 163	1 074	993	921	-7.40	-6.48	-7.22	19.07
Poland	5 728	6 532	7 510	8 479	9 483	10 814	11 225	11 534	11 323	11 174	10 364	9 951	8 942	8 267	7 237	-10.04	-4.36	0.79	18.97
Portugal	3 586	3 724	3 819	3 803	3 752	3 571	3 482	3 404	3 334	3 291	3 222	3 098	2 918	2 835	2 978	1.02	-2.00	-1.71	28.01
Slovak Republic	1 118	1 246	1 392	1 539	1 651	1 686	1 525	1 348	1 219	1 155	1 106	1 082	1 071	1 026	947	-5.97	-6.21	-2.09	17.48
Slovenia	..	..	..	..	..	..	..	601	562	598	575	561	524	462	405	-12.08	..	..	19.86
Spain	15 095	15 413	15 854	16 285	16 770	17 102	17 427	17 641	17 759	17 934	19 461	18 736	19 198	19 582	19 340	0.37	1.38	1.76	42.11
Sweden	6 013	6 032	6 010	5 965	5 890	5 783	5 665	5 581	5 494	5 397	5 233	4 982	4 737	4 455	4 059	-7.44	-3.86	-3.00	43.45
Switzerland	4 410	4 045	4 076	3 883	3 622	3 382	3 240	3 163	3 089	3 012	2 924	2 897	2 876	2 851	2 754	-2.13	-2.25	-2.91	35.32
Turkey	14 184	14 286	15 744	16 960	18 060	18 395	18 904	18 915	18 917	19 125	18 978	18 832	18 201	17 502	16 534	-4.69	-1.18	1.13	23.00
United Kingdom	28 479	29 668	29 569	31 051	31 045	30 940	31 060	30 135	29 874	29 672	29 380	28 907	28 753	28 641	27 724	-1.81	-1.21	-0.52	44.88
United States	156 973	126 379	130 273	131 628	178 650	182 013	183 360	180 941	174 609	169 325	166 779	159 094	150 055	..	..	..	..	..	..
OECD	485 469	462 279	471 199	472 829	519 993	519 209	518 643	514 498	506 686	500 232	493 253	477 329	457 111	441 972	423 752	-3.72	-2.23	-0.67	34.60

Note: Data for Israel (2008) are estimates. The OECD total (2008 and 2009) includes estimates for the United States.

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Table 4.7. **ISDN subscriber lines in the OECD area**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 2007-2009	Per 100 inhabitants 2009
Australia	269 525	360 350	360 350	360 350	461 000	451 000	390 000	451 000	..	..	..	..	..	..	..	..
Austria	42 018	85 683	156 300	253 200	339 900	407 000	433 100	457 628	460 371	443 267	409 005	391 332	362 837	343 575	-6.30	4.11
Belgium	54 652	98 548	184 700	256 432	432 618	431 276	425 332	420 783	415 767	407 157	399 055	390 897	378 005	356 745	-4.47	3.31
Canada	..	61 854	90 538	105 452	117 581	120 510	99 000	99 000	96 000	89 000	84 000	80 797	79 753	74 925	-3.70	0.22
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	..	196	2 753	11 394	26 194	84 385	145 611	184 987	191 628	174 238	160 565	159 617	158 757	144 184	-4.96	1.37
Denmark	29 863	60 000	117 000	246 746	375 388	404 728	394 393	377 047	356 929	321 466	282 532	249 227	214 000	175 000	-16.20	3.17
Estonia	..	..	..	500	1 510	1 850	3 730	3 980	3 990	3 950	4 300	4 161	3 765	3 191	-12.43	0.24
Finland	27 200	57 855	99 694	156 897	207 645	276 355	216 978	235 870	169 657	136 316	106 000	100 900	83 100	..	..	1.56
France	391 200	556 400	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Germany	1 963 900	2 887 200	4 236 720	5 610 300	7 465 700	9 196 100	10 550 000	11 543 000	12 095 000	12 655 000	12 808 000	12 977 000	13 150 000	12 996 000	0.07	15.87
Greece	981	926	3 706	29 020	100 918	204 856	355 796	455 308	532 861	586 067	604 447	586 601	554 359	523 046	-5.57	4.65
Hungary	6 450	19 300	37 050	24 579	99 461	160 050	209 260	216 969	217 250	208 620	202 875	196 478	189 926	173 052	-6.15	1.73
Iceland	782	3 620	7 724	12 686	16 869	17 928	17 928	16 745	16 853	16 427	15 239	13 041	12 271	10 945	-8.39	3.43
Ireland	..	..	48 850	76 223	47 414	70 180	100 770	93 170	88 995	121 634	108 488	107 534	103 832	95 150	-5.93	2.13
Israel	..	..	..	..	..	..	..	..	..	..	18 564	30 348	35 997	41 645	17.14	0.56
Italy	104 578	461 500	883 465	1 543 430	1 925 200	2 508 933	2 855 800	3 010 802	2 400 359	2 283 100	2 126 486	1 967 304	1 738 658	1 563 316	-10.86	2.59
Japan	1 106 506	2 398 151	4 067 663	6 682 858	9 699 476	10 327 297	9 610 275	8 626 857	7 981 305	7 490 705	6 995 601	6 453 198	5 929 405	5 420 676	-8.35	4.26
Korea	8 405	21 110	38 586	174 446	100 174	57 758	105 126	104 232	64 683	134 886	26 689	27 143	..	..	..	..
Luxembourg	1 844	4 920	8 610	28 375	41 812	59 282	59 282	74 900	78 800	79 900	79 300	83 400	88 600	89 700	3.71	18.03
Mexico	..	..	..	..	14 879	26 879	19 527	15 338	13 915	12 368	11 069	11 938	11 284	11 050	-3.79	0.01
Netherlands	42 000	279 000	..	881 000	1 259 389	1 416 000	1 536 000	1 557 000	1 512 000	1 424 000	1 317 720	1 171 720	1 046 000	949 000	-10.00	5.74
New Zealand	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Norway	43 988	149 954	309 960	532 077	703 843	768 945	810 913	791 080	733 410	621 536	514 026	445 006	388 674	337 952	-12.85	7.00
Poland	238	400	6 439	50 324	132 165	174 755	326 360	495 316	551 458	545 613	535 530	486 052	425 203	435 971	-5.29	1.14
Portugal	19 729	47 845	90 635	139 976	195 065	250 886	278 191	281 808	278 385	274 127	265 712	257 503	246 908	218 937	-7.79	2.06
Slovak Republic	..	..	771	4 353	11 911	31 076	54 971	75 559	95 442	91 363	85 128	79 974	71 921	66 534	-8.79	1.23
Slovenia	..	..	..	..	..	..	99 605	120 426	148 728	169 762	160 231	138 321	110 975	88 527	-20.00	4.34
Spain	96 941	230 500	182 222	364 421	646 110	..	..	..	..	..	1 129 494	1 129 494	1 129 494	1 129 494	0.00	2.46
Sweden	32 630	65 370	123 830	203 000	270 000	286 000	265 000	244 600	204 100	178 600	154 900	141 000	132 670	115 129	-9.64	1.23
Switzerland	125 810	208 000	341 155	530 889	726 613	860 806	913 480	927 135	928 888	907 453	863 138	822 352	783 519	741 286	-5.06	9.50
Turkey	..	..	..	..	7 191	8 692	13 551	15 989	14 005	14 298	14 535	15 265	17 096	16 570	4.19	0.02
United Kingdom	161 000	258 600	391 300	601 300	883 202	1 010 098	1 078 070	1 066 764	973 275	895 186	845 584	814 778	740 140	705 350	-6.96	1.14
United States	1 568 687	1 754 206	1 855 409	2 032 861	1 658 635	1 349 027	1 320 085	1 238 503	1 176 420	1 119 614	1 176 420	1 119 614	..	..	..	..
OECD	5 957 927	10 071 488	13 645 430	20 913 089	27 967 863	30 962 652	32 688 133	33 201 796	31 800 474	31 405 652	31 504 633	30 451 995	29 284 006	27 889 211	-4.30	2.28

Note: Data for Israel (2008) are estimates. The OECD total (2008 and 2009) includes estimates for the United States.

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Table 4.8. **Cellular mobile subscriptions in the OECD area**

	1993	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 2007-09	CAGR 2000-09	CAGR 1996-2009
Australia	682 000	3 990 000	4 578 000	5 342 000	6 340 000	8 010 000	11 100 000	12 670 000	14 300 000	16 476 000	18 420 000	19 760 000	21 260 000	22 120 000	24 220 000	6.73	13.08	14.88
Austria	221 450	598 804	1 164 270	2 300 000	4 300 000	6 117 243	6 541 386	6 736 368	7 094 502	7 991 170	8 369 251	9 254 265	9 855 352	10 605 967	11 434 330	7.71	7.20	25.47
Belgium	67 771	478 172	974 494	1 756 287	3 186 602	5 629 000	7 690 000	8 101 778	8 605 834	9 131 705	9 604 695	9 847 375	10 738 121	11 822 190	12 508 781	7.93	9.28	28.54
Canada	1 332 982	3 420 318	4 194 761	5 346 026	6 911 038	8 726 636	10 648 824	11 997 000	13 291 000	15 020 000	17 016 600	18 749 100	20 277 400	22 092 500	23 811 900	8.37	11.80	16.10
Chile	..	319 474	409 740	964 212	2 260 687	3 401 525	5 100 783	6 244 310	7 268 281	9 261 385	10 569 572	12 450 801	13 955 202	14 796 593	16 450 223	8.57	19.14	35.42
Czech Republic	11 151	200 315	521 469	965 476	1 944 553	4 346 009	6 947 151	8 610 177	9 708 683	10 782 567	11 775 878	12 406 199	13 228 631	13 805 466	14 258 404	3.82	14.11	38.83
Denmark	357 589	1 316 592	1 444 000	1 931 101	2 628 585	3 370 020	3 960 165	4 477 845	4 767 100	5 166 912	5 449 206	5 828 157	6 313 320	6 865 000	7 424 000	8.44	9.17	14.23
Estonia	..	60 000	140 000	246 000	387 000	574 650	737 100	880 550	1 051 940	1 255 730	1 445 300	1 658 700	1 981 849	2 524 465	2 720 536	17.16	18.86	34.10
Finland	459 074	1 476 976	2 091 791	2 845 985	3 273 433	3 728 625	4 175 587	4 516 772	4 747 000	4 999 060	5 384 572	5 670 000	6 080 000	6 830 000	7 700 000	12.54	8.39	13.54
France	467 000	2 440 139	5 754 539	11 210 100	20 619 000	29 681 300	36 997 400	38 593 000	41 702 000	44 544 000	48 088 000	51 662 000	55 337 000	57 994 000	61 466 000	5.39	8.42	28.17
Germany	1 768 000	5 782 200	8 175 500	13 913 000	23 446 000	48 202 000	56 126 000	59 128 000	64 800 000	74 316 000	79 200 000	85 652 000	97 151 000	107 245 000	108 255 000	5.56	9.41	25.28
Greece	28 000	531 488	938 038	2 056 084	3 894 312	5 932 403	7 963 742	9 314 260	10 330 323	11 059 920	12 448 473	13 874 674	16 226 675	18 918 092	20 298 102	11.84	14.65	32.34
Hungary	63 000	473 000	706 000	1 036 000	1 601 000	3 076 000	4 967 430	6 886 111	7 944 586	8 727 188	9 320 169	9 965 720	11 029 930	12 224 163	11 792 475	3.40	16.10	28.07
Iceland	17 409	46 302	65 746	106 000	172 600	215 000	235 400	260 900	279 670	290 068	304 001	322 840	326 098	336 922	339 715	2.07	5.21	16.57
Ireland	57 065	290 000	510 747	946 000	1 600 000	2 020 000	2 770 000	3 122 148	3 421 261	3 785 052	4 213 436	4 690 135	4 970 719	5 048 127	4 835 376	-1.37	10.18	24.17
Israel	..	..	..	..	3 039 500	4 373 610	5 500 621	6 300 008	6 618 367	7 221 955	7 757 000	8 403 765	8 982 731	9 266 448	9 550 164	3.11	9.07	..
Italy	1 206 975	6 413 412	11 760 000	20 300 000	30 068 000	42 290 000	51 096 000	53 100 000	56 700 000	63 153 000	71 838 000	80 416 000	89 800 000	90 341 160	88 024 370	-0.99	8.49	22.32
Japan	2 131 367	26 906 511	38 253 893	47 307 592	56 845 594	66 784 374	74 819 158	81 118 324	86 654 962	91 473 960	96 483 732	101 698 165	107 338 974	112 050 077	112 182 922	2.23	5.93	11.61
Korea	471 784	3 180 989	6 895 477	13 982 919	23 442 724	26 816 398	29 045 596	32 342 493	33 591 758	36 586 052	38 342 323	40 197 115	43 497 541	45 606 984	47 944 222	4.99	6.67	23.21
Luxembourg	5 082	45 000	67 208	130 000	208 364	303 274	432 400	473 000	539 000	646 000	719 500	714 000	684 000	707 000	720 000	2.60	10.08	23.77
Mexico	386 100	1 021 900	1 740 814	3 349 475	7 731 635	14 077 880	21 757 559	25 928 266	30 097 700	38 451 135	47 128 746	55 395 461	66 559 462	75 303 469	83 527 872	12.02	21.88	40.32
Netherlands	216 000	1 016 000	1 688 550	3 347 000	6 790 000	11 000 000	11 500 000	11 800 000	13 100 000	15 913 000	16 289 000	17 058 000	18 453 000	19 745 000	19 604 000	3.07	6.63	25.57
New Zealand	186 000	476 200	710 000	1 254 900	1 542 000	2 187 000	2 422 000	2 539 000	2 599 000	3 027 000	3 530 000	3 803 000	4 245 000	4 577 000	4 697 000	5.19	8.86	19.25
Norway	369 271	1 261 445	1 676 763	2 071 672	2 663 552	3 244 646	3 593 251	3 790 086	4 060 829	4 524 750	4 754 453	4 868 916	5 037 650	5 211 207	5 359 640	3.15	5.73	11.77
Poland	15 699	216 900	812 000	1 928 000	3 904 000	6 747 000	10 750 000	13 898 471	17 401 222	23 096 065	29 166 391	36 745 454	41 388 774	43 926 365	44 806 632	4.05	23.41	50.69
Portugal	101 231	663 651	1 506 958	3 074 633	4 671 458	6 664 951	7 977 537	9 202 232	10 002 705	10 571 100	11 368 494	12 236 104	13 477 414	14 953 207	15 929 418	8.72	10.17	27.69
Slovak Republic	3 125	28 658	200 141	465 364	664 072	1 293 736	2 147 331	2 923 383	3 678 774	4 275 164	4 540 374	4 893 232	6 068 063	5 520 043	5 497 719	-4.82	17.44	49.83
Slovenia	..	..	..	..	..	..	..	1 708 742	1 761 901	1 848 637	1 759 232	1 819 572	1 928 412	2 054 889	2 100 435	4.36	..	..
Spain	257 261	2 997 212	4 330 282	7 051 441	14 884 207	23 938 970	29 655 729	33 530 997	37 219 839	38 622 582	42 693 832	45 695 061	48 422 470	49 623 339	51 083 880	2.71	8.79	24.38
Sweden	850 000	2 492 000	3 169 000	4 108 793	5 126 100	6 372 367	7 177 813	7 948 518	8 801 266	8 784 536	9 103 505	9 606 661	10 116 852	10 891 660	11 641 638	7.27	6.92	12.59
Switzerland	259 200	662 700	1 044 400	1 698 565	3 057 509	4 638 519	5 275 791	5 736 303	6 188 793	6 274 763	6 834 233	7 436 157	8 208 884	8 896 706	9 310 111	6.50	8.05	22.54
Turkey	84 187	806 339	1 609 808	3 506 100	7 796 000	15 062 744	18 420 000	23 323 118	27 887 535	34 707 549	43 608 965	52 662 709	61 975 807	65 824 110	62 779 554	0.65	17.19	39.79
United Kingdom	2 216 000	6 817 000	8 463 000	13 001 196	23 942 411	40 013 263	44 767 541	49 546 944	52 868 573	60 028 915	65 805 665	70 077 926	73 806 165	76 735 443	80 255 445	4.28	8.04	20.89
United States	14 712 000	44 043 000	55 312 293	69 209 321	86 047 000	109 478 000	128 500 000	141 800 000	160 600 000	184 700 000	203 700 000	229 619 000	249 332 000	261 284 000	274 283 000	4.88	10.74	15.11
OECD	29 003 773	120 472 697	170 909 682	246 751 242	364 988 936	518 317 143	620 799 295	688 549 104	759 684 404	856 712 920	947 032 598	1 045 138 264	1 148 054 496	1 215 746 592	1 256 812 864	4.63	10.34	19.77
World	34 171 809	145 085 841	215 020 435	318 235 884	491 176 119	738 419 296	961 261 030	1 157 159 511	1 416 479 253	1 762 563 835	2 217 133 160	2 754 865 021	3 357 449 872	4 037 342 879	4 672 818 519	23.9	38.7	30.62
OECD % share of world total	85	83	79	78	74	70	65	60	54	49	42	38	34	30	27	23.9	38.7	-8.31

Source: OECD and ITU (for world mobile subscriptions)

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Table 4.9. **Cellular mobile penetration, subscriptions per 100 inhabitants**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 2007-09	CAGR 1996-2009
Australia	21.7	24.6	28.4	33.3	41.6	56.8	64.1	71.5	81.4	89.7	94.7	100.1	102.2	109.6	4.63	13.28
Austria	7.5	14.6	28.8	53.8	76.4	81.3	83.3	87.4	97.8	101.8	111.9	118.7	127.2	136.7	7.31	24.99
Belgium	4.7	9.6	17.2	31.2	54.9	74.8	78.4	83.0	87.7	91.7	93.4	101.1	110.4	115.9	7.09	27.95
Canada	11.6	14.0	17.7	22.7	28.4	34.3	38.3	42.0	47.0	52.8	57.6	61.6	66.3	70.6	7.06	14.94
Chile	2.2	2.8	6.4	14.9	22.1	32.8	39.7	45.7	57.5	65.0	75.8	84.1	88.3	97.2	7.51	33.88
Czech Republic	1.9	5.1	9.4	18.9	42.3	67.9	84.4	95.2	105.6	115.1	120.8	128.1	132.4	135.7	2.91	38.64
Denmark	25.0	27.3	36.4	49.4	63.1	73.9	83.3	88.4	95.6	100.6	107.2	115.6	125.0	134.4	7.83	13.81
Estonia	4.2	10.0	17.7	28.1	41.9	53.9	64.7	77.6	92.9	107.3	123.4	147.6	188.3	203.0	17.25	34.73
Finland	28.8	40.7	55.2	63.4	72.0	80.5	86.8	91.1	95.6	102.7	107.7	115.0	128.5	144.2	12.01	13.19
France	4.1	9.6	18.7	34.2	48.9	60.5	62.6	67.2	71.3	76.4	81.5	86.8	90.4	95.3	4.81	27.40
Germany	7.1	10.0	17.0	28.6	58.6	68.2	71.7	78.5	90.1	96.0	104.0	118.1	130.6	132.2	5.81	25.28
Greece	5.0	8.7	19.0	35.8	54.3	72.7	84.8	93.7	100.0	112.1	124.5	145.0	168.4	180.3	11.51	31.83
Hungary	4.6	6.9	10.1	15.6	30.1	48.8	67.8	78.4	86.3	92.4	99.0	109.7	121.8	117.7	3.57	28.35
Iceland	17.2	24.3	38.7	62.3	76.5	82.6	90.7	96.7	99.1	102.8	106.1	104.7	105.5	106.4	0.80	15.04
Ireland	8.0	14.0	25.5	42.6	53.1	71.7	79.4	85.6	93.1	101.3	110.1	113.9	113.6	108.2	-2.51	22.19
Israel	..	..	..	49.6	69.5	85.4	95.9	98.9	106.1	111.9	119.1	125.1	126.8	128.4	1.29	..
Italy	11.3	20.7	35.7	52.8	74.3	89.7	92.9	98.4	108.6	122.6	136.4	151.2	151.0	146.1	-1.73	21.78
Japan	21.4	30.3	37.4	44.9	52.6	58.8	63.6	67.9	71.6	75.5	79.6	84.0	87.9	88.1	2.41	11.51
Korea	7.0	15.0	30.2	50.3	57.0	61.3	67.9	70.2	76.2	79.7	83.2	89.8	93.8	98.4	4.67	22.56
Luxembourg	10.8	16.0	30.5	48.2	69.2	97.9	106.0	119.4	141.0	154.7	151.1	142.5	144.7	144.7	0.77	22.07
Mexico	1.1	1.9	3.5	8.0	14.3	21.9	25.7	29.5	37.4	45.4	52.9	63.0	70.7	77.7	11.10	38.72
Netherlands	6.5	10.8	21.3	43.0	69.1	71.7	73.1	80.7	97.8	99.8	104.4	112.7	120.1	118.6	2.61	24.97
New Zealand	12.9	18.9	33.1	40.3	56.9	62.6	65.1	65.5	74.8	86.1	91.7	101.1	107.9	109.7	4.16	17.90
Norway	28.8	38.1	46.7	59.7	72.2	79.6	83.5	89.0	98.6	102.9	104.5	107.0	109.3	111.0	1.82	10.94
Poland	0.6	2.1	5.0	10.2	17.6	28.1	36.4	45.6	60.5	76.4	96.4	108.6	115.2	117.4	4.00	50.73
Portugal	6.6	14.9	30.4	45.9	65.2	77.5	88.8	95.8	100.7	107.8	115.6	127.0	140.8	149.8	8.59	27.15
Slovak Republic	0.5	3.7	8.6	12.3	24.0	39.9	54.4	68.4	79.4	84.3	90.8	112.4	102.1	101.5	-5.00	49.74
Slovenia	..	..	..	..	..	..	85.7	88.3	92.6	87.9	90.6	95.5	101.6	102.9	3.78	..
Spain	7.6	10.9	17.8	37.3	59.5	72.8	81.2	88.6	90.5	98.4	103.7	107.9	108.8	111.2	1.52	22.94
Sweden	28.2	35.8	46.4	57.9	71.8	80.7	89.1	98.3	97.7	100.8	105.8	110.6	117.7	124.6	6.16	12.11
Switzerland	9.3	14.7	23.8	42.7	64.3	72.4	78.1	83.6	84.2	91.1	98.4	107.7	115.4	119.4	5.26	21.67
Turkey	1.3	2.6	5.6	12.3	23.4	28.3	35.3	41.7	51.2	63.6	75.9	88.2	92.6	87.3	-0.51	37.98
United Kingdom	11.7	14.5	22.2	40.8	68.0	75.7	83.5	88.8	100.3	109.2	115.7	121.0	125.0	129.9	3.61	20.33
United States	16.3	20.3	25.1	30.8	38.8	43.2	51.3	54.6	62.9	71.9	80.8	87.1	85.7	89.2	1.22	13.95
OECD	10.9	15.4	22.1	32.1	44.7	53.1	59.2	64.2	72.0	79.9	87.8	96.1	99.9	102.6	3.35	18.79

Note: Data for Israel (2008) and for the United States (2008) are estimates.

StatLink http://dx.doi.org/10.1787/888932398005

Table 4.10. **3G cellular mobile subscriptions in the OECD area**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	AGR 2007-09
Australia	..	..	20 000	238 070	532 000	1 560 000	4 560 000	8 550 000	12 280 000	64.1
Austria	..	..	..	180 240	901 812	1 671 000	2 464 715	3 560 744	4 489 620	35.0
Belgium	..	..	..	..	..	..	..	..	..	..
Canada	..	..	..	..	..	..	..	..	..	..
Chile	..	..	..	..	..	..	..	..	..	..
Czech Republic	..	..	..	..	65 000	119 405	182 495	276 485	354 166	39.3
Denmark	..	..	3 425	124 674	..	326 927	666 178	1 234 000	1 996 000	73.1
Estonia	..	..	..	..	3 000	15 000	44 600	99 895	136 600	75.0
Finland	..	..	..	13 000	45 000	..	1 040 000	..	..	..
France	..	..	..	..	..	..	..	..	..	..
Germany	..	..	..	..	..	..	12 400 000	17 900 000	26 000 000	44.8
Greece	..	..	..	18 800	229 537	419 553	1 126 039	7 331 678	7 823 857	163.6
Hungary	..	..	..	..	..	..	..	365 393	614 421	..
Iceland	..	..	..	..	..	..	..	..	..	..
Ireland	..	..	..	..	..	..	994 144	1 262 032	2 220 510	49.5
Israel	..	..	..	..	..	640 606	1 801 235	2 797 542	3 793 848	45.1
Italy	..	..	400 000	2 813 000	10 477 700	17 091 000	24 548 000	28 992 000	32 923 000	15.8
Japan	89 400	7 161 100	16 692 000	30 352 700	48 329 400	69 909 200	88 097 400	99 631 300	109 056 900	11.3
Korea	..	16 537 747	24 826 749	32 538 532	36 089 425	*40 220 115*	42 488 783	44 777 814	47 351 418	5.6
Luxembourg	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	..
Netherlands	..	..	..	..	..	..	1 311 000	3 755 000	4 612 000	87.6
New Zealand	..		88 000	470 000	993 000	*993 000*	..	..	..	..
Norway	..	..	..	..	..	..	..	..	..	..
Poland	..	..	..	..	5 534	5 534	..	..	..	..
Portugal	..	..	..	..	..	..	3 074 319	4 319 850	5 984 053	39.5
Slovak Republic	..	..	..	..	..	174 999	473 110	827 603	1 100 003	52.5
Slovenia	..		1 276 226	1 451 905	1 367 090	1 376 044	1 868 789	1 935 216	2 100 435	6.0
Spain	..	..	..	..	..	3 421 849	3 074 319	..	..	..
Sweden	..	..	18 000	322 000	..	1 214 000	..	..	..	..
Switzerland	..	..	..	..	114 806	360 690	1 447 095	2 133 901	3 111 640	46.6
Turkey	..	..	..	..	..	..	2 258 000	..	7 064 842	76.9
United Kingdom	..	..	230 000	2 567 000	4 611 000	7 820 072	12 514 000	18 444 216	25 503 490	42.8
United States	..	13 900	30 700	49 200	257 431	484 277	586 141	688 005	789 869	16.1
OECD	89 400	23 712 747	43 585 100	71 139 121	104 021 735	147 823 271	207 020 362	248 882 673	299 306 672	20.2

Note: Data for Israel (2008) and for the United States (2008 and 2009) are estimates.

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Table 4.11. **Mobile pre-paid subscriptions**

In thousands

	1996	% of total	1997	% of total	1998	% of total	1999	% of total	2000	% of total	2001	% of total	2002	% of total	2003	% of total	2004	% of total	2005	% of total	2006	% of total	2007	% of total	2008	% of total	2009	% of total
Australia	..	..	..	..	..	..	409	6	1 350	17	3 300	30	4 120	33	5 400	38	7 080	52	8 504	46	9 700	49	10 150	48	9 990	45	10 580	44
Austria	..	..	..	..	..	..	2 044	48	3 185	52	3 331	51	3 259	48	3 338	47	3 529	47	3 774	45	3 880	42	3 695	37	3 552	33	3 642	32
Belgium	..	..	..	..	..	..	1 275	40	3 377	60	4 901	64	5 331	66	5 716	66	6 036	66	6 042	63	5 942	60	6 147	57	6 654	56	6 974	56
Canada	..	..	..	..	341	6	1 132	16	1 879	22	2 736	26	2 937	24	3 146	24	3 330	25	3 820	22	4 203	22	4 463	22	4 817	22	5 028	21
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5 795	80	7 645	93	8 638	82	9 807	79	10 432	75	10 763	73	11 933	73
Czech Republic	..	..	..	..	..	..	..	..	..	..	3 016	43	6 732	78	7 268	75	7 733	73	7 834	67	7 452	60	7 381	56	7 294	53	7 207	51
Denmark	..	..	..	..	..	..	980	37	1 238	37	1 474	37	1 354	30	1 118	23	1 013	19	998	18	1 023	18	990	16	1 078	16	1 148	15
Estonia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	364	35	481	45	562	39	719	43	968	49	1 474	58	1 673	61
Finland	..	..	..	..	..	..	30	1	75	2	84	2	90	2	94	2	350	7	369	7	454	8	550	9	710	10	770	10
France	..	..	..	..	..	..	7 279	35	13 806	47	18 022	49	17 108	44	16 462	39	16 409	37	16 698	35	17 193	33	17 673	32	16 958	29	16 880	27
Germany	..	..	..	..	2 087	15	5 533	24	26 318	55	31 374	56	31 338	53	33 307	51	31 374	54	40 200	51	39 947	47	53 433	55	60 680	57	60 483	56
Greece	..	..	..	..	716	35	..	..	3 469	58	5 029	63	6 066	65	6 750	65	7 286	75	8 339	67	9 599	69	11 471	71	13 811	73	15 715	77
Hungary	..	..	..	..	..	..	474	30	1 749	57	3 585	72	5 378	78	6 158	78	6 383	73	6 338	68	6 442	65	6 887	62	7 484	61	6 681	57
Iceland	..	..	..	..	6	5	40	23	63	29	88	37	88	34	113	40	125	46	133	44	144	45	135	41	141	42	145	43
Ireland	..	..	..	..	..	..	640	40	1 266	63	1 967	71	2 210	71	2 510	73	2 845	85	3 202	76	3 540	75	3 708	75	3 747	74	3 377	70
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2 274	25	2 445	26	2 616	27
Italy	577	9	5 527	47	15 022	74	25 257	84	37 290	88	45 792	90	47 732	90	51 706	91	57 659	104	65 732	92	72 696	90	79 742	89	79 173	88	75 196	85
Japan	..	..	..	..	..	..	1 907	3	1 414	2	..	..	2 084	3	2 610	3	2 858	3	2 726	3	2 494	2	2 109	2	1 541	1	1 099	1
Korea	..	..	..	..	..	..	..	..	..	..	..	..	607	2	591	2	527	2	662	2	538	1	872	2	909	2	727	2
Luxembourg	..	..	..	..	..	..	47	22	120	39	179	41	179	38	318	59	381	65	419	58	372	52	310	45	279	39	260	36
Mexico	423	41	982	56	2 282	68	6 327	82	12 450	88	19 974	92	23 922	92	28 070	93	35 943	114	43 861	93	51 092	92	61 361	92	69 152	92	73 098	88
Netherlands	..	..	..	..	1 573	47	3 938	58	7 370	67	7 500	65	7 400	63	8 100	62	10 064	76	12 028	74	9 382	55	8 171	44	8 393	43	7 628	39
New Zealand	..	..	..	..	577	46	879	57	1 487	68	1 661	69	1 737	68	1 798	69	2 115	81	2 461	70	2 595	68	2 878	68	3 096	68	3 104	66
Norway	..	..	..	..	474	23	1 113	42	1 385	43	1 514	42	1 654	44	1 666	41	1 754	38	1 736	37	1 615	33	1 425	28	1 422	27	1 432	27
Poland	..	..	..	..	463	24	942	24	2 606	39	5 120	48	7 375	53	9 467	54	13 498	81	18 813	65	24 319	66	26 684	64	24 466	56	23 419	52
Portugal	..	..	..	..	2 429	79	3 706	79	5 305	80	6 329	79	7 293	79	7 929	79	8 424	87	9 212	81	9 761	80	10 341	77	11 080	74	11 589	73
Slovak Republic	..	..	..	..	..	..	127	19	483	37	1 536	72	1 961	67	2 284	62	2 445	56	2 393	53	2 382	49	3 097	51	2 307	42	1 979	36
Slovenia	..	..	..	..	..	..	..	..	..	..	..	..	902	53	867	49	878	42	773	44	735	40	748	39	729	35	669	32
Spain	..	..	..	..	2 609	37	9 240	62	15 737	66	19 271	65	22 087	66	21 627	58	20 067	54	20 714	49	20 881	46	20 765	43	20 313	41	20 880	41
Sweden	..	..	235	7	1 016	25	1 983	39	2 773	45	3 536	50	4 309	54	5 003	57	4 629	53	4 638	51	4 693	49	4 496	44	4 407	40	4 423	38
Switzerland	36	5	209	20	590	35	1 053	34	1 707	37	2 155	41	2 315	40	2 601	42	2 485	40	2 808	41	3 103	42	3 559	43	3 896	44	4 045	43
Turkey	..	..	..	..	..	..	780	10	6 628	44	11 500	62	17 125	73	20 851	75	26 355	76	30 601	70	42 695	81	50 237	81	52 640	80	46 910	75
United Kingdom	..	..	..	..	2 910	22	12 059	50	27 400	77	31 037	70	33 976	69	35 582	67	39 794	67	43 197	66	45 778	65	47 036	64	46 830	61	47 285	59
United States	..	..	..	..	..	..	4 302	5	6 570	6	11 565	9	11 565	8	11 565	7	15 000	8	23 430	12	36 270	16	44 710	18	53 150	20	61 590	22
OECD	1 037	1	6 953	4	33 095	13	93 497	26	188 499	37	247 575	41	279 332	41	303 147	40	337 489	40	391 757	41	445 309	43	502 369	44	535 380	44	540 185	43

Note: Data for Israel (2008) and for the United States (2008 and 2009) are estimates.

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Table 4.12. **Total broadband subscriptions in the OECD area**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Fixed broadband* June 2010	Wireless broadband* June 2010	CAGR 2007-09	CAGR 2000-09
Australia	1 000	5 000	27 800	74 000	165 000	363 500	698 700	1 548 300	2 785 000	3 816 172	4 830 200	5 336 000	5 236 000	5 128 000	10 369 000	4.1	60.5
Austria	..	..	50 900	137 400	292 600	451 500	618 500	867 318	1 181 692	1 383 798	1 597 991	1 768 941	1 877 815	1 921 445	1 473 769	8.4	33.7
Belgium	..	..	22 841	145 823	448 349	895 671	1 213 304	1 618 944	1 902 739	2 355 603	2 715 793	2 962 450	3 133 881	3 237 052	749 775	7.4	40.6
Canada	21 000	161 000	559 000	1 407 790	2 750 308	3 805 519	4 764 238	5 632 608	6 695 546	7 929 081	8 975 902	9 405 318	10 290 000	10 138 741	6 005 142	7.1	24.7
Chile	..	..	..	..	62 020	166 384	322 071	450 249	683 346	1 008 322	1 298 085	1 422 591	1 658 165	1 703 928	1 086 549	13.0	..
Czech Republic		..	1 500	10 000	12 100	16 900	48 498	255 200	661 000	1 136 758	1 501 420	1 769 684	2 034 986	1 446 900	1 067 900	16.4	80.5
Denmark	..	..	11 800	67 399	237 673	443 297	706 281	1 024 160	1 350 415	1 728 337	1 945 842	2 021 404	2 067 000	2 059 729	3 046 097	3.1	46.3
Estonia	..	400	1 520	4 900	20 300	42 100	81 900	138 915	179 200	228 140	265 651	316 149	338 296	298 540	82 175	12.8	60.1
Finland	..		7 500	30 000	68 000	283 500	494 300	779 929	1 174 200	1 429 200	1 617 100	1 616 900	1 459 000	1 525 000	3 672 300	-5.0	54.0
France		13 464	50 217	189 443	620 322	1 691 992	3 656 654	6 529 997	9 465 600	12 718 313	15 550 000	17 725 000	19 582 000	20 256 000	19 356 000	12.2	67.4
Germany	..	..	5 000	205 000	1 934 000	3 254 000	4 611 286	6 904 983	10 706 600	14 982 600	19 531 000	22 532 000	24 977 400	25 599 360	19 342 660	13.1	70.5
Greece	..	..		72	72	1 932	10 476	51 463	156 560	509 081	1 084 115	1 506 614	1 918 630	2 102 852	1 282 095	33.0	210.3
Hungary	..	..	486	2 304	26 079	65 704	202 002	360 741	639 505	965 384	1 395 612	1 696 714	1 880 226	1 870 149	752 688	16.1	110.6
Iceland	..	..	..	2 035	10 478	24 285	41 406	53 264	78 017	87 738	97 937	103 697	107 072	106 258	109 459	4.6	55.3
Ireland	..	..	..	300	400	10 600	33 050	134 848	274 100	519 029	767 736	896 346	961 748	907 859	1 799 666	11.9	145.2
Israel	..	..	..	..	..	..	..	..	..	1 420 357	1 579 165	1 666 583	1 756 300	1 784 000	..	5.5	..
Italy	..	..	615	114 900	415 000	976 019	2 401 939	4 701 252	6 896 696	8 393 000	10 131 542	11 283 000	12 281 429	12 849 074	20 883 448	10.1	68.0
Japan	..	..	154 019	634 732	2 865 748	8 111 304	14 783 646	21 994 108	27 972 788	26 438 351	28 749 525	30 107 327	31 630 781	33 321 068	96 113 795	4.9	54.4
Korea	..	..	270 987	4 065 648	9 330 387	11 581 449	12 518 443	12 982 743	13 810 713	14 012 921	14 709 998	15 474 931	16 347 716	16 789 170	44 741 093	5.4	16.7
Luxembourg	..	..	..	..	1 230	6 861	15 571	44 145	67 357	99 280	129 260	143 766	158 548	163 539	209 178	10.8	..
Mexico	..	..	..	8 622	111 070	247 016	428 378	1 037 455	2 301 054	2 978 359	4 457 247	7 528 969	9 488 780	10 676 301	456 865	45.9	117.7
Netherlands	..	..	151 000	260 000	612 200	1 136 200	1 913 200	3 085 561	4 114 573	5 065 000	5 617 902	5 855 000	6 130 000	6 254 000	5 010 000	4.5	42.1
New Zealand	..	..	..	10 334	28 079	64 100	103 776	191 695	374 000	490 067	757 132	914 961	988 993	1 048 518	1 503 354	14.3	66.0
Norway	..	..	4 700	17 829	84 192	190 544	373 261	697 875	1 045 589	1 250 899	1 436 255	1 607 750	1 633 592	1 655 232	3 529 391	6.6	65.2
Poland	..	..	..	..	21 696	114 000	297 291	818 575	920 752	2 736 923	3 297 700	3 995 458	4 682 835	4 524 213	18 401 344	19.2	..
Portugal	..	..	297	25 154	99 316	260 583	502 023	828 623	1 165 440	1 423 687	1 513 314	1 692 306	1 902 273	2 013 530	5 662 338	12.1	61.7
Slovak Republic	..	..	..	..	420	420	18 677	51 669	133 900	274 108	413 244	618 871	627 722	651 268	1 480 904	23.2	..
Slovenia	..	..	..	..	..	..	65 658	113 982	194 823	275 785	332 635	426 647	460 167	475 090	591 423	17.6	..
Spain	..	..	36 848	58 415	474 282	1 209 969	2 207 008	3 441 630	4 994 274	6 658 907	7 898 436	9 156 969	9 786 578	10 261 933	16 290 524	11.3	76.7
Sweden	..	..	10 800	191 300	562 100	871 400	1 186 000	1 590 561	2 182 000	2 398 000	2 780 000	2 905 000	2 941 648	2 960 000	7 058 000	2.9	35.5
Switzerland	..	..	70	60 891	141 688	414 742	781 579	1 316 910	1 788 829	2 064 118	2 438 128	2 523 649	2 793 723	2 889 120	3 373 000	7.0	53.0
Turkey	..	..	..	4 459	10 715	25 531	195 726	506 452	1 530 000	2 773 685	4 395 800	5 736 619	6 446 374	6 780 479	841 945	21.1	124.5
United Kingdom	..	..	..	57 693	350 000	1 371 319	3 200 900	6 196 000	9 826 300	12 995 140	15 606 100	17 275 660	18 213 290	18 820 868	18 550 000	8.0	89.5
United States	74 000	500 000	2 104 066	6 248 006	12 472 857	19 293 679	27 860 742	37 512 173	48 474 844	60 642 869	70 056 146	77 600 095	79 331 337	80 054 000	138 290 000	6.4	32.6
OECD	96 000	679 464	3 471 966	14 034 449	34 228 681	57 392 020	86 356 484	123 462 328	165 727 452	203 189 012	239 473 913	267 593 369	285 124 305	292 273 216	453 181 877	9.1	39.7

Note: (*)The broadband data from 1997 to 2009 are calculated according to the 'old' OECD methodology including DSL, cable, fibre, other, satellite and fixed wireless connections. For June 2010 data, the current or 'new' methodology separates all fixed and wireless connections.

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Table 4.13. **Total broadband subscriptions per 100 inhabitants in the OECD area**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Rank 2007	Rank 2009
Australia	0.01	0.03	0.15	0.38	0.84	1.84	3.49	7.65	13.56	18.28	22.75	24.66	23.69	16	17
Austria	0.00	0.00	0.64	1.72	3.64	5.59	7.62	10.62	14.37	16.74	19.25	21.22	22.45	19	20
Belgium	0.00	0.00	0.22	1.42	4.36	8.67	11.70	15.54	18.17	22.34	25.57	27.67	29.04	12	13
Canada	0.07	0.53	1.84	4.59	8.87	12.14	15.06	17.63	20.76	24.34	27.26	28.22	30.50	9	10
Chile	..	..	..	..	0.40	1.06	2.02	2.80	4.20	6.14	7.82	8.49	12.02	31	31
Czech Republic	0.00	0.00	0.01	0.10	0.12	0.17	0.48	2.50	6.46	11.07	14.54	16.97	19.37	25	25
Denmark	0.00	0.00	0.22	1.26	4.44	8.25	13.10	18.96	24.92	31.79	35.64	36.81	37.43	1	1
Estonia	..	0.03	0.11	0.36	1.49	3.09	6.04	10.28	13.30	16.97	19.79	23.58	25.24	20	21
Finland	0.00	0.00	0.15	0.58	1.31	5.45	9.48	14.92	22.39	27.14	30.58	30.43	27.33	5	14
France	0.00	0.02	0.08	0.31	1.01	2.75	5.89	10.45	15.03	20.06	24.38	27.63	30.36	13	11
Germany	0.00	0.00	0.01	0.25	2.35	3.95	5.59	8.37	12.98	18.19	23.74	27.44	30.51	14	9
Greece	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.47	1.41	4.57	9.69	13.41	17.04	29	28
Hungary	0.00	0.00	0.00	0.02	0.26	0.65	1.99	3.57	6.34	9.59	13.88	16.90	18.76	27	26
Iceland	0.00	0.00	0.00	0.72	3.68	8.45	14.31	18.20	26.37	28.83	31.45	32.47	33.54	4	5
Ireland	0.00	0.00	0.00	0.01	0.01	0.27	0.83	3.32	6.59	12.18	17.59	20.17	21.53	23	22
Israel	..	..	..	..	..	..	..	..	..	20.14	21.99	22.80	23.61	18	18
Italy	0.00	0.00	0.00	0.20	0.73	1.71	4.17	8.08	11.77	14.24	17.06	18.86	20.38	24	24
Japan	0.00	0.00	0.12	0.50	2.25	6.36	11.58	17.21	21.89	20.69	22.50	23.61	24.84	17	16
Korea	0.00	0.00	0.58	8.65	19.70	24.32	26.16	27.03	28.69	29.01	30.36	31.84	33.54	8	6
Luxembourg	0.00	0.00	0.00	0.00	0.28	1.54	3.45	9.64	14.48	21.01	26.93	29.42	31.86	10	7
Mexico	0.00	0.00	0.00	0.01	0.11	0.25	0.42	1.01	2.22	2.84	4.22	7.06	8.83	34	34
Netherlands	0.00	0.00	0.96	1.63	3.82	7.04	11.79	18.96	25.22	31.00	34.30	35.61	37.09	2	2
New Zealand	0.00	0.00	0.00	0.27	0.72	1.64	2.61	4.74	9.12	11.81	18.04	21.57	23.10	21	19
Norway	0.00	0.00	0.11	0.40	1.87	4.20	8.18	15.20	22.62	26.84	30.52	33.72	33.83	6	4
Poland	0.00	0.00	0.00	0.00	0.06	0.30	0.78	2.14	2.41	7.18	8.65	10.48	12.27	30	30
Portugal	0.00	0.00	0.00	0.25	0.96	2.51	4.81	7.89	11.05	13.45	14.27	15.93	17.89	26	27
Slovak Republic	0.00	0.00	0.00	0.00	0.01	0.01	0.35	0.96	2.49	5.08	7.66	11.45	11.59	32	32
Slovenia	..	..	..	..	..	..	3.29	5.71	9.74	13.74	16.48	21.10	22.54	28	29
Spain	0.00	0.00	0.09	0.15	1.16	2.93	5.25	8.06	11.51	15.11	17.60	20.08	21.31	22	23
Sweden	0.00	0.00	0.12	2.16	6.32	9.76	13.24	17.68	24.16	26.41	30.39	31.39	31.49	7	8
Switzerland	0.00	0.00	0.00	0.85	1.97	5.65	10.55	17.67	23.85	27.31	32.00	32.73	35.82	3	3
Turkey	0.00	0.00	0.00	0.01	0.02	0.04	0.29	0.75	2.23	4.00	6.26	8.07	8.97	33	33
United Kingdom	0.00	0.00	0.00	0.10	0.59	2.31	5.37	10.35	16.31	21.45	25.59	28.14	29.49	11	12
United States	0.03	0.18	0.75	2.21	4.37	6.70	9.58	12.78	16.36	20.28	23.20	25.46	25.80	15	15
OECD	0.01	0.06	0.30	1.21	2.93	4.87	7.28	10.34	13.78	16.79	19.65	21.81	23.10	..	..

Note: Data for June 2010 will be available in the final version of this chapter.

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Table 4.14. **Availability of digital subscriber lines (DSL) in the OECD area**

	Commercial service launch	Actual coverage by year end (%)										Indicator used to express coverage
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Australia	August 2000	50.0	72.0	75.0	75.0	81.0	81.0	88.0	91.0	91.0	92.0	Population
Austria	November 1999	72.0	77.0	80.0	80.0	87.0	90.0	95.0	95.0	99.0	99.0	Lines
Belgium	October 1999	75.0	93.0	98.0	98.0	100.0	100.0	100.0	100.0	100.0	100.0	Lines
Canada	1996	69.0	70.0	75.0	75.4	75.4	75.4	89.0	89.0	84.0	84.0	Population
Chile		..	..	..	..	..	..	..	..	..	..	..
Czech Republic	March 2003	..	..	..	44.0	84.0	90.0	90.0	90.0	90.0	90.0	Lines
Denmark	July 1999	65.0	90.0	95.0	95.0	96.0	98.0	98.0	99.0	99.0	99.0	Lines
Estonia		5.0	20.0	30.0	45.0	65.0	70.0	75.0	86.4	93.4	94.0	Lines
Finland	May 2000	50.0	60.0	75.0	81.5	94.1	95.6	96.0	96.0	..	..	Lines
France	November 1999	32.0	66.0	71.0	79.0	90.0	97.0	..	..	..	..	Population
Germany	August 1999	60.0	70.0	80.0	85.0	90.0	90.0	96.0	98.0	97.0	97.0	Households
Greece	June 2003	..	..	..	..	6.0	9.0	..	94.3	95.0	..	..
Hungary	September 2000	..	..	..	58.0	70.0	85.0	87.0	89.0	96.9	97.5	Population
Iceland	April 2000	33.0	51.0	78.0	90.0	92.0	92.0	..	..	..	..	Population
Ireland	May 2002	..	..	25.0	50.0	74.0	90.0	..		90.0	90.0	Lines
Israel		..	..	..	..	..	..	99.0	99.0	99.5	100.0	..
Italy	December 1999	45.0	67.5	70.0	80.0	85.0	90.0	89.0	94.0	95.0	96.0	Lines
Japan	September 2000	..	73.5	80.0	90.0	93.0	94.0	95.2	98.0	..	..	Households
Korea	April 1999	..	70.0	89.0	93.0	100.0	100.0	..	..	100.0	100.0	Lines
Luxembourg	2001	..	65.0	90.0	90.0	100.0	100.0	96.0	98.0	99.0	99.0	Population
Mexico	September 2001	..	..	..	58.9	75.5	92.0	..	..	..	..	Lines
Netherlands	June 2000	40.0	67.0	85.0	85.0	100.0	100.0	100.0	100.0	99.0	99.0	Lines
New Zealand	June 1999	60.0	69.0	83.0	84.8	92.0	93.0	92.0	93.0	93.0	93.0	Population (customers)
Norway	December 2000	20.0	50.0	58.0	67.0	77.0	91.0	..	..	94.3	94.4	Lines
Poland	2001	..	..	..	..	..	..	..	64.0	..	..	Population
Portugal	December 2000	..	..	..	..	..	98.8	..	..	95.0	..	Lines
Slovak Republic	2003	..	..	..	14.5	50.0	60.0	..	76.0		78.0	Population
Slovenia		..	..	..	..	..	..	..	..	..	84.0	Population
Spain	1999	62.2	81.3	89.3	92.0	92.0	92.0	..	..	..	99.0	Lines
Sweden	October 2000	..	70.0	75.0	78.0	90.0	96.0	..	97.8	97.9	98.0	Lines
Switzerland	October 2000	..	85.0	95.0	98.0	98.0	98.0	98.0	98.0	..	..	Lines
Turkey	February 2001	..	..	2.5	5.0	10.0	10.0	..	..	..	38.0	Lines
United Kingdom	July 2000	50.0	60.0	64.0	98.0	98.0	99.9	100.0	100.0	100.0	100.0	Lines
United States	1997	36.0	50.0	68.0	75.0	77.0	78.0	79.0	82.0	84.0	85.0	Lines

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Table 4.15. **Availability of cable modem service in the OECD area**

	Actual coverage by year end (%)										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	..	..	..	..	..	..	..	..	..	..	..
Austria	..	..	..	..	..	..	..	..	..	..	..
Belgium	..	..	..	..	..	..	..	..	..	..	..
Canada	..	..	..	..	..	..	..	..	..	80	80
Chile	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	..	..	..	..	..	..	4	6	8	10	12
Denmark	..	..	14	47	50	56	56	56	57	..	56
Estonia	..	..	..	..	..	..	..	..	..	..	..
Finland	..	..	..	..	..	..	..	..	..	..	..
France	..	..	..	..	..	..	..	..	..	..	..
Germany	..	..	2	3	3	8	15	38	53	57	60
Greece	..	..	..	..	..	..	..	..	..	..	..
Hungary	..	..	..	..	..	..	49	..	..	80	82
Iceland	..	..	..	..	..	..	..	..	..	..	0
Ireland	..	..	..	..	..	..	..	..	27	33	37
Israel	..	..	..	..	..	..	..	95	95	95	95
Italy	..	..	..	..	..	..	..	..	..	..	..
Japan	..	..	..	..	..	..	..	..	..	..	..
Korea	..	..	..	..	..	..	..	..	..	..	..
Luxembourg	..	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	..	..
Netherlands	..	..	..	..	..	85	..	..	..	..	90
New Zealand	..	..	..	..	..	..	14	14	14	14	14
Norway	..	..	..	..	..	..	7	9	11	15	19
Poland	..	..	..	..	..	..	..	..	..	..	..
Portugal	..	..	..	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	..	..	..	..	..	..	..
Slovenia	..	..	..	..	4	6	10	12	12	14	15
Spain	..	..	..	..	..	..	..	..	..	60	..
Sweden	..	..	..	..	..	..	..	..	37	37	38
Switzerland	..	..	47	62	73	75	..	..	..	..	..
Turkey	..	..	..	..	..	..	..	17	17	17	17
United Kingdom	..	..	..	..	..	..	..	..	..	..	..
United States	..	..	..	..	..	..	..	..	..	..	93

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Table 4.16. **Total broadband subscriptions by access technology**

	2006				2007				2008				2009				June 2010*			
	DSL	Cable	Fibre	Other	DSL	Cable	Fibre	Other	DSL	Cable	Fibre	Other	DSL	Cable	Fibre	Other	DSL	Cable	Fibre	Other
Australia	2 995 000	624 300	..	196 872	3 815 000	861 000	..	154 200	4 176 000	916 000	..	244 000	4 178 000	914 000	15 000	..	4 212 000	903 000	13 000	..
Austria	832 107	521 626	3 662	26 403	985 163	559 225	4 042	49 561	1 150 275	569 758	4 806	44 102	1 263 038	569 903	6 917	5 033	1 329 917	577 688	8 975	4 865
Belgium	1 469 668	878 360	14	7 561	1 620 577	1 071 107	56	24 053	1 734 866	1 200 231	722	26 631	1 775 409	1 331 526	1 407	6 353	1 799 757	1 428 914	1 437	6 944
Canada	3 714 335	4 180 751	1 072	32 923	4 096 932	4 747 898	1 072	130 000	4 300 694	4 973 552	1 072	130 000	4 440 000	5 540 000	..	365 617	4 433 438	5 705 303	..	..
Chile	584 098	424 224	..	..	760 482	537 603	..	..	816 702	605 889	..	..	882 864	758 943	..	..	899 344	796 563	..	8 021
Czech Republic	493 402	230 306	35 000	378 050	613 220	309 000	55 000	524 200	697 172	382 512	70 000	620 000	778 286	441 700	135 000	..	807 900	479 000	160 000	..
Denmark	1 062 040	506 734	138 588	20 975	1 206 282	541 708	151 700	46 152	1 226 290	538 846	194 382	61 886	1 238 000	557 000	232 000	19 000	1 229 452	553 654	237 769	38 854
Estonia	101 363	59 183	40 883	17 459	115 226	68 592	51 521	16 830	125 074	74 573	66 117	15 383	135 170	76 756	67 846	20 771	141 213	74 479	68 058	14 790
Finland	1 234 000	181 100	..	14 100	1 348 000	209 600	..	59 500	1 366 200	214 800	..	35 900	1 185 900	222 700	12 600	6 000	1 162 600	229 600	14 500	118 300
France	12 019 313	690 000	..	9 000	14 804 715	718 017	27 268	..	16 825 000	860 000	40 000	..	18 493 000	1 020 000	69 000	..	19 147 000	1 020 000	89 000	..
Germany	14 400 000	490 000	..	92 600	18 500 000	985 000	..	46 000	20 900 000	1 600 000	..	32 000	22 424 800	2 300 000	133 700	77 000	22 812 000	2 590 000	143 360	54 000
Greece	484 321	0	760	24 000	1 083 521	0	594	..	1 506 614	0	..	..	1 916 630	0	2 000	..	2 096 715	0	2 625	3 512
Hungary	614 894	335 490	..	15 000	751 860	574 707	1 327	67 718	794 986	763 567	51 816	86 345	823 275	840 589	120 291	1 071	817 168	870 612	182 369	..
Iceland	85 280	..	668	1 790	94 630	..	1 218	2 089	98 762	..	2 615	2 320	97 862	..	6 908	..	97 389	..	8 869	..
Ireland	379 124	55 925	1 780	82 200	549 594	82 477	4 165	131 500	660 025	104 133	5 612	126 576	714 016	150 910	5 636	..	729 892	173 146	4 821	..
Israel	879 509	540 848	..	..	963 000	616 165	..	..	999 000	667 583	..	..	1 035 000	719 000	2 300	2 300	1 051 000	733 000	..	..
Italy	8 156 000	0	229 000	8 000	9 754 680	0	277 000	99 862	10 903 000	0	308 000	72 000	11 995 019	0	254 174	3 936	12 566 000	0	279 238	3 836
Japan	14 013 248	3 609 625	8 803 898	11 580	12 710 678	3 873 547	12 152 715	12 585	11 594 082	4 083 072	14 417 207	12 966	10 134 491	4 300 594	17 195 696	..	9 361 054	5 391 342	18 568 672	..
Korea	5 458 861	5 152 986	3 399 659	1 415	4 603 425	5 091 066	5 015 126	381	3 718 135	5 085 348	6 670 596	852	3 222 419	5 147 994	7 977 303	..	2 883 139	5 169 811	8 736 220	..
Luxembourg	90 100	8 710	250	220	116 900	11 500	300	560	124 246	18 972	320	228	131 879	25 896	353	420	139 395	22 878	773	493
Mexico	1 960 557	987 802	..	30 000	3 148 349	1 236 238	..	164 251	5 436 668	1 980 319	..	111 982	7 308 791	2 097 872	..	82 117	8 378 187	2 166 165	..	131 949
Netherlands	3 028 000	1 972 000	65 000	..	3 300 000	2 210 000	70 000	37 902	3 563 000	2 192 000	100 000	..	3 645 000	2 351 000	134 000	..	3 645 000	2 452 000	157 000	..
New Zealand	435 000	27 000	..	28 067	674 000	48 087	..	35 045	815 488	55 858	380	43 235	927 427	60 058	1 508	..	983 528	62 390	2 600	..
Norway	975 150	177 800	70 303	27 646	1 085 000	236 675	94 580	20 000	1 109 000	321 750	145 000	32 000	1 007 587	415 214	207 589	3 202	974 816	444 875	232 296	3 245
Poland	1 882 045	813 683	1 195	40 000	2 352 100	904 142	1 458	40 000	2 744 000	1 200 000	1 458	50 000	2 877 286	1 389 943	67 694	..	2 906 273	1 539 142	77 514	1 284
Portugal	881 512	537 552	..	4 623	892 859	605 799	..	14 656	996 561	669 087	2 281	24 377	1 108 680	760 637	30 745	2 211	1 119 296	813 617	78 293	2 324
Slovak Republic	182 391	36 701	46 338	8 678	277 838	52 666	66 649	16 091	354 423	63 806	114 858	85 784	367 723	80 251	177 574	2 174	380 829	84 858	183 945	1 636
Slovenia	194 339	81 446	..	..	247 404	85 231	..	..	285 853	95 076	44 564	1 154	286 960	104 939	67 452	..	288 427	113 690	71 797	1 176
Spain	5 262 617	1 350 101	..	46 189	6 230 952	1 633 489	23 057	10 938	7 282 928	1 775 842	26 201	71 998	7 885 940	1 866 101	32 322	2 215	8 307 901	1 904 652	35 841	13 539
Sweden	1 531 000	454 000	390 000	5 700	1 716 000	536 000	509 000	5 014	1 737 000	563 000	590 000	15 000	1 666 134	579 141	687 403	8 970	1 633 000	590 000	728 000	9 000
Switzerland	1 391 521	598 663	3 934	70 000	1 684 266	710 000	21 462	22 400	1 756 000	730 000	17 006	20 643	1 943 487	795 500	26 281	28 455	2 022 000	813 000	24 190	29 930
Turkey	2 723 547	27 804	..	22 334	4 346 054	35 651	..	14 095	5 660 000	67 408	..	9 211	6 216 028	146 622	41 000	42 724	6 464 418	191 331	100 601	24 129
United Kingdom	9 928 140	3 058 500	..	8 500	12 157 200	3 413 900	..	35 000	13 556 860	3 682 800	..	36 000	14 370 000	3 840 000	3 290	..	14 878 224	3 942 644	..	..
United States	25 761 869	32 097 223	1 035 677	1 748 100	29 745 693	36 497 284	1 623 097	2 190 072	30 439 000	41 468 000	3 061 051	2 632 044	31 190 000	43 392 360	3 945 977	803 000	30 930 000	43 924 000	4 436 000	764 000
OECD	125 204 351	60 710 443	14 267 681	2 979 985	146 351 600	69 063 374	20 152 407	3 970 655	159 453 904	77 523 782	25 936 064	4 644 617	167 666 101	82 797 149	31 660 966	1 482 569	170 628 272	85 761 354	34 647 763	1 235 827

Note: (*)The broadband data from 1997 to 2009 are calculated according to the 'old' OECD methodology including DSL, cable, fibre, other, satellite and fixed wireless connections. For June 2010 data, the current or 'new' methodology separates all fixed and wireless connections.

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Table 4.17. **Observed average connection speeds, selected OECD countries, Q2 2009 and Q2 2010**

	Average connection speeds (Mbps) in Q2 2009	Average connection speeds (Mbps) in Q2 2010	% change of average connection speeds between 2009 and 2010	% Above 2Mbps in Q2 2009	% Below 256 kbps in Q2 2009	% Above 2Mbps in Q2 2010	% Below 256 kbps in Q2 2010
Australia	2.7	2.8	3.8	46	7.4	50	4.9
Austria	3.7	3.8	4.1	65	2.1	65	1.0
Belgium	4.6	5.3	15.7	89	0.6	91	0.3
Canada	4.0	4.7	18.0	75	2.9	84	1.9
Chile	1.9	2.2	13.4	39	6.8	44	1.4
Czech Republic	4.9	5.3	8.0	76	2.2	88	0.3
Denmark	4.7	5.2	10.9	83	1.1	87	0.7
Finland	3.3	4.1	23.8	45	1.6	56	1.3
France	3.2	3.4	6.2	70	0.7	73	0.8
Germany	3.7	4.1	11.5	78	1.6	85	0.8
Greece	3.0	3.0	0.9	60	3.0	71	1.5
Iceland	3.9	4.3	10.9	74	..	81	..
Ireland	4.2	5.1	21.1	48	3.7	65	3.1
Israel	2.7	3.3	21.3	51	0.6	76	0.3
Italy	2.7	3.0	9.8	68	2.6	76	3.1
Japan	7.3	8.0	9.3	89	1.7	86	1.4
Korea	11.3	16.6	46.8	93	0.2	93	0.2
Luxembourg	2.4	3.8	57.0	49	2.4	82	1.2
Mexico	1.0	1.5	51.4	5	3.5	16	1.8
Netherlands	5.1	6.5	26.8	76	1.9	88	0.6
New zealand	2.5	3.3	29.8	54	7.8	71	6.3
Norway	4.2	4.7	12.7	70	2.1	80	0.8
Portugal	3.6	3.9	8.4	77	1.1	78	0.3
Spain	2.7	2.7	1.7	60	1.7	63	1.0
Sweden	6.0	5.5	-8.9	77	2.2	73	1.6
Switzerland	5.0	5.0	0.9	91	0.9	91	0.6
United Kingdom	3.4	3.9	16.0	72	1.4	83	1.0
United States	3.8	4.6	20.6	57	4.9	72	2.8

Source: Akamai (2009, 2010), "The State of the Internet", www.akamai.com.

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Table 4.18. **Observed average mobile connection speeds and data consumption, selected OECD countries, Q4 2009 and Q2 2010**

Country	Provider ID	Ave speeds (kbit/s) in Q4 2009	Ave speeds (kbit/s) in Q2 2010	Ave MB/ month in Q2 2010	% change of speeds
Austria	AT1	3 242	2 745	133	-15.3
Austria	AT2	1 421	2 208	1 119	55.4
Australia	AU1	659	974	819	47.8
Australia	AU2	972	1 457	137	49.9
Belgium	BE1	2 528	2 435	303	-3.7
Canada	CA1	2 128	2 788	7 363	31.0
Canada	CA2	672	826	499	22.9
Chile	CL1	506	612	382	20.9
Cezch Republic	CZ1	903	1 066	78	18.1
Cezch Republic	CZ2	462	462	118	0.0
Cezch Republic	CZ3	1 108	2 604	140	135.0
Germany	DE1	251	486	61	93.6
Germany	DE2	1 976	2 447	1 246	23.8
France	FR1	417	489	140	17.3
France	FR2	1 321	1 742	609	31.9
Greece	GR1	868	1 207	512	39.1
Greece	GR2	561	575	119	2.5
Hungary	HU1	1 431	1 423	145	-0.6
Hungary	HU2	1 990	1 862	106	-6.4
Ireland	IE1	1 511	2 104	357	39.2
Ireland	IE2	1 189	1 302	357	9.5
Ireland	IE3	1 200	1 129	514	-5.9
Italy	IT1	1 237	1 131	358	-8.6
Italy	IT2	1 446	2 007	286	38.8
Italy	IT3	3 206	2 739	423	-14.6
Korea	KR1	1 332	1 482	34	11.3
Mexico	MX1	871	767	474	-11.9
Mexico	MX2	456	459	354	0.7
Netherlands	NL1	879	917	20	4.3
Netherlands	NL2	1 505	1 698	19	12.8
Norway	NO1	797	977	56	22.6
Norway	NO2	1 191	1 287	65	8.1
New Zealand	NZ1	1 200	1 098	303	-8.5
Poland	PL1	3 120	3 675	111	17.8
Poland	PL2	862	1 005	40	16.6
Poland	PL3	748	682	121	-8.8
Portugal	PT1	341	376	32	10.3
Slovakia	SK1	106	115	33	8.5
Slovakia	SK2	1 944	2 166	1 703	11.4
Slovenia	SL1	1 080	1 274	48	18.0
Spain	ES1	1 338	1 358	274	1.5
Spain	ES2	996	891	168	-10.5
United Kindom	UK1	1 275	1 285	386	0.8
United Kindom	UK2	1 830	2 115	526	15.6
United States	US1	617	967	28	56.7
United States	US2	805	980	27	21.7
United States	US3	684	910	351	33.0

Source: Akamai (2009, 2010), "The State of the Internet", www.akamai.com.

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Chapter 5

Internet Infrastructure

This chapter examines developments in the core structure of the Internet. Measurement of the Internet is challenging mainly due to the fact that, unlike most communication technologies, it relies on different actors and participants, and thus lacks a central control point. Nevertheless, data are available for some indicators from surveys and databases, which provide country-level information on Internet infrastructure issues such as Internet hosts, domain name registrations, address space, security and network traffic, among others.

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.

Introduction

The Internet has become a critical infrastructure, supporting businesses, consumers/users and the public sector, and continues to experience remarkable growth. According to the Internet System Consortium's (ISC) Domain Survey, the Internet has grown from 72 million hosts in 2000 to over 730 million in 2010. The introduction of internationalised domain names (IDN) could further stimulate growth by facilitating Internet use among those whose native languages do not use simple Latin-based scripts. In terms of data transmission, traffic levels have increased exponentially and are expected to continue to do so. New network applications and the expected migration of mobile users to more advanced 3G networks place larger demands on existing infrastructures by generating more traffic flow.

The Internet's original design as a research network did not anticipate its widespread commercialisation and expansion. As a result, the currently used version of the Internet Protocol, IPv4, is insufficient to meet today's needs. Mobile devices, always-on broadband connections and virtualised hosts on a single computer have increased the demand for IP addresses. IPv4 addresses held by the IANA ran out in February 2011 and the Regional Internet Registries (RIRs) are expected to run out of IPv4 addresses within relatively short periods of time. IPv6, which was designed to succeed IPv4, implements features that provide significantly greater address space and improve network performance and security.

Despite strong growth since 2007, IPv6 represented only a small proportion of the Internet at the start of 2011, mainly because of the costs associated with its deployment and its lack of backwards compatibility with IPv4. However, many OECD countries have established policy initiatives to raise awareness of IPv6 and co-ordinate deployment of the new protocol within government networks. There has also been ongoing interest in IPv6 research. In part, as a result of these efforts, 8.3% of routed networks on the Internet (3 041 networks) were able handle IPv6 traffic by early 2011. Routed IPv6 networks increased by 35% between 2009 and 2010 in OECD countries, and nearly all OECD-related country code Top-Level Domains (ccTLDs) had IPv6 support.

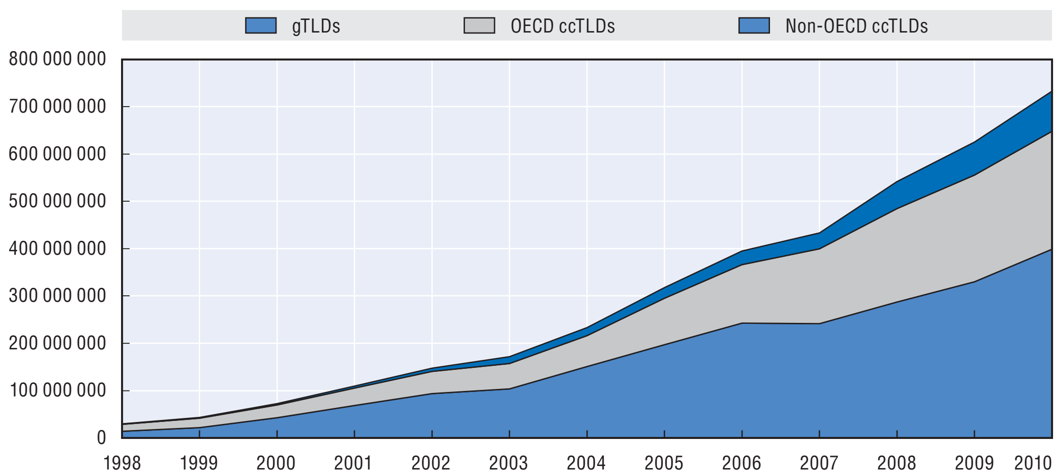
Internet hosts

Internet host surveys, such as the one undertaken by the ISC, are a leading measure of Internet growth. An Internet host is a machine or application connected to the Internet and identified with a unique IP address. Internet hosts can be servers that provide services to other machines across the Internet (*e.g.* web, e-mail and FTP servers) and/or clients that access these services remotely. The ISC survey attempts to discover every visible host on the Internet by querying the domain system for the name assigned to every possible IP address. It should be noted that for the purposes of the survey, domain names assigned can be at any level (*i.e.* they need not be limited to registered domain names).

Data on Internet hosts can help provide information on network growth and accessibility, as well as the density with which hosts populate address space. Host data do not indicate the total number of users accessing the Internet, but can rather be regarded as an estimate of the minimum size of the Internet. Many hosts and domains are undetectable by these surveys as they exist behind firewalls and private address space behind network-address translators. In addition, a host is not necessarily a single user. It is possible for a single computer to use several IP addresses, especially when it is providing simultaneous services such as an e-mail server and a web server. Finally, a host is not necessarily located in the same country as its registered country code domain name (for example, a business located in Luxembourg could operate under a ".fr" domain name).

As of January 2010, the number of Internet hosts worldwide exceeded 730 million (Table 5.2), up from fewer than 72 million in the year 2000. During the same period, the host count grew by 26% compound annual growth rate (CAGR). Over half of all hosts (398 million) had a generic top-level domain (gTLD) with the majority under the .net or .com domains (Figure 5.1). Neither domain entails registration restrictions, and their use was originally intended respectively for network and commercial operations.

Figure 5.1. **Internet hosts by type of domain, 1998-2010**



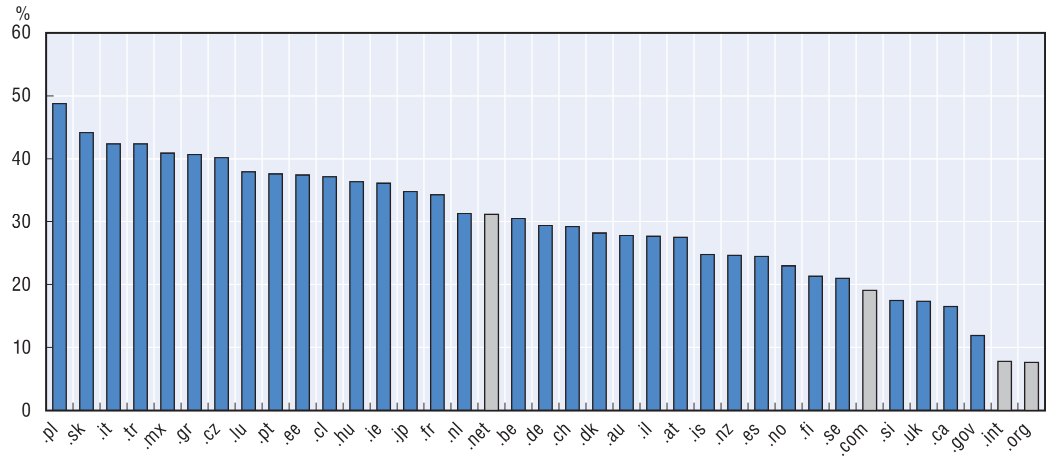
Source: OECD, based on Internet Software Consortium surveys (*www.isc.org*).

StatLink http://dx.doi.org/10.1787/888932395136

In January 2010, 34% of all hosts (249 million) were connected under OECD-related country code top-level domains (ccTLD). The largest OECD ccTLD in terms of hosts was .jp (Japan) with over 52 million hosts. By comparison, there were only 2.1 million hosts registered under the .us (United States) domain. However, at least an additional 17 million were found under various other United States domains (.edu, .gov, .mil). For historical reasons, most hosts in the United States use gTLDs such as .com and .net. Other large ccTLDs are: .de (Germany) with 22 million hosts; .it (Italy) with 22 million; .fr (France) with 14 million, and .au (Australia), .mx (Mexico) and .nl (the Netherlands) with 12 million hosts each.

As of January 2010, Denmark, Iceland, Finland, the Netherlands and Norway had the largest number of Internet hosts per capita. The countries with the highest host growth rate between 2008 and 2010 were Canada, the Czech Republic, Greece and Luxembourg. The overall worldwide growth rate increased slightly between 2007 and 2009. However, this rate only reached 15% between 2009 and 2010, a decrease from the 20% observed between 2007 and 2008 (Figure 5.2).

Figure 5.2. **Average annual growth in Internet hosts by domain, 2000-10**



Source: OECD, based on Internet Software Consortium surveys (*www.isc.org*).

StatLink http://dx.doi.org/10.1787/888932395155

Web servers

A web server is a computer that delivers content (*e.g.* web servers host websites). The number of web servers provides an indicator of the infrastructure supporting the World Wide Web (*i.e.* the volume of interlinked hypertext documents accessed via the Internet). E-soft (*www.securityspace.com*) conducts a monthly survey of web servers by running a general crawler that visits web pages on a subset of the Internet. It should be noted that this technique excludes about 90% of all websites, in particular, those not linked to well-known sites (*e.g.* domain squatters, personal blogs, etc.). In addition, site owners can easily deny web crawlers access to individual pages or to an entire site for privacy or performance reasons. As a result, the survey may underestimate the number of web servers.

The number of web servers worldwide grew from 33 million in mid-2008 to nearly 46 million in mid-2010. Nevertheless, the growth rate almost halved, from 67% (2006-08) to 38% (2008-10). Slower growth was likely related to the economic crisis and to the growth of cloud computing, whereby companies can share server capacity as needed. Of the 46 million web servers reported by E-soft's survey, nearly 60% (27 million) were found under gTLDs, while the remaining 40% (18.8 million) were found under ccTLDs. The top-level domain .com accounted for 45% of the world's total. Even though the use of .com was originally intended for commercial entities, there are currently no registration restrictions, thus allowing anyone to register a .com domain. Among OECD countries, the largest ccTLDs were .de (Germany) with 2.8 million web servers (6.2% of the total), .nl (Netherlands) with 1.5 million web servers (3.5%) and .pl (Poland) with 1.3 million (3%) (Table 5.3).

Between mid-2000 and mid-2010, the total number of web servers increased at a rate of 35.4% per annum. During this period, the fastest growing OECD country-related ccTLD was .hu (Hungary) at 53% per annum, followed by .pl (Poland) at 50.7% and .be (Belgium) at 43.8%. The gTLD .net increased by nearly 40% per annum, while .com growth accounted for 35.4% and .org for 32.8%.

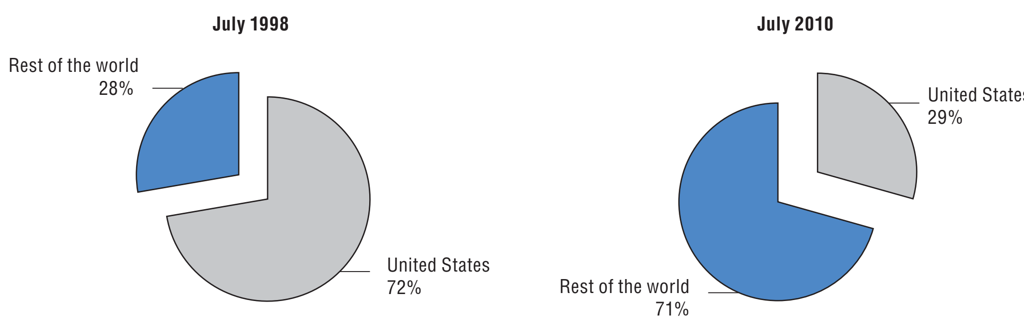
Secure servers

Secure Sockets Layer (SSL) is a form of protocol used by e-commerce sites, online banking and financial services, and other online service providers to secure communications by encrypting the data transmitted between two points over the Internet. A certificate authority issues a digital certificate containing a public key and information about its owner, and confirms that a given public key belongs to a specific site. When the user enters a site with an SSL certificate, the key is received by the browser and used to encrypt the submitted information. The data can only be decrypted with the key issued to the certificated site, assuring it will be readable only by the intended recipient.

Commercial certificate authorities sell certificates with different prices and features, offering different levels of assurance (*e.g.* low assurance certificates, high assurance certificates, extended validation certificates, etc.). Most also offer a warranty for the users of an SSL certificated site, which will compensate the end user if the site turns out to be fraudulent. Most third-party certificates are obtained from Symantec (42.9%), which recently acquired VeriSign, Inc., GoDaddy (27.9%) and Comodo (14.6%).

Netcraft performs a monthly survey that counts each distinct, valid SSL certificate from public secure websites (excluding secure mail servers, intranet and non-public extranet sites). Netcraft's survey of SSL sites found more than 960 000 secure servers in the OECD area by end-2010, representing 63.3% of the world's total. The United States was still the OECD country with the highest number of secure server sites (29.4% of the world's total), albeit less than in previous years (Figure 5.3). This suggests that online trading, banking and financial services were growing strongly in many OECD countries, but remained most active in the United States. Germany, Japan and the United Kingdom followed the United States in terms of absolute number of secure servers.

Figure 5.3. **Secure servers in the United States and in the rest of the world, 1998 and 2010**



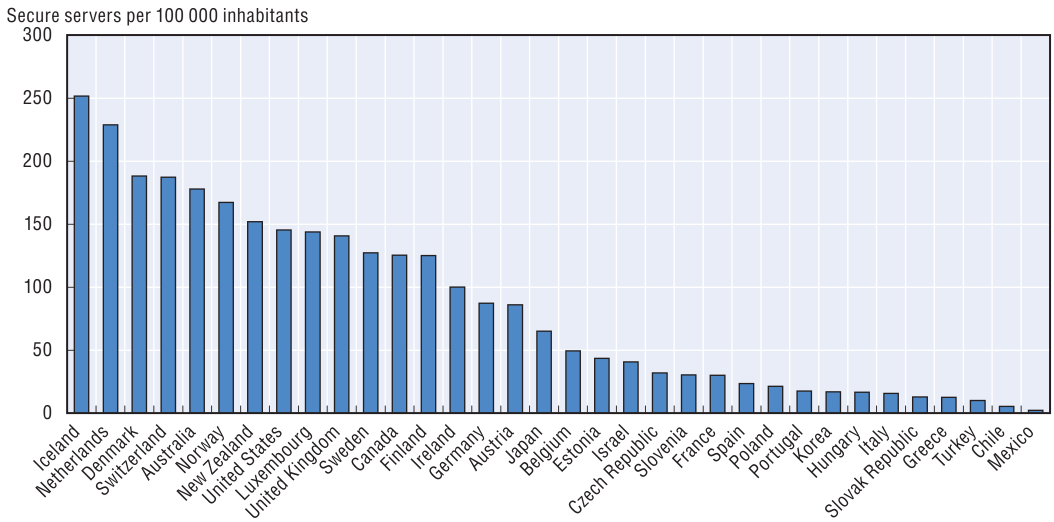
Source: Netcraft (*www.netcraft.com*).

StatLink http://dx.doi.org/10.1787/888932395174

Iceland leads in the use of secure servers on a per capita basis, followed by the Netherlands, Denmark, Switzerland and Australia, reflecting these countries' leading positions in online trading, banking and financial services. All OECD countries saw an increase in their number of secure servers per capita from 2009 to 2010. Switzerland had the highest growth over the same period of time (64.5%), followed by the Czech Republic (62%) and Poland (61%).

The number of secure servers in OECD countries increased by an average of 26% per year between 2000 and 2010. The Netherlands experienced a growth rate of over 50% during the 10-year period, followed by Turkey (51%) and Poland (46%) (Table 5.4). Adoption levels vary widely among OECD countries: the top five had more than 170 secure servers per 100 000 inhabitants, whereas the bottom seven had fewer than 15 (Figure 5.4).

Figure 5.4. **Secure servers per 100 000 inhabitants, July 2010**



Source: Netcraft (*www.netcraft.com*). StatLink http://dx.doi.org/10.1787/888932395193

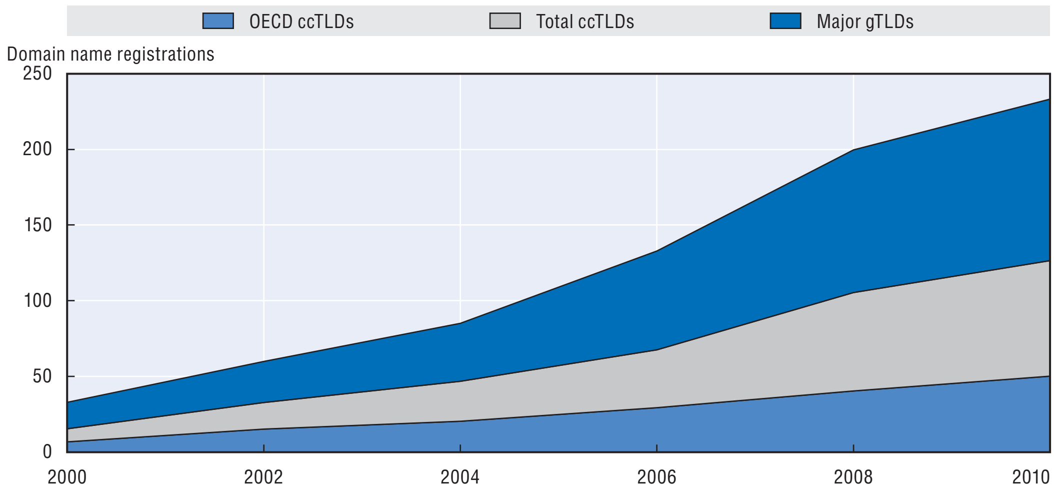
The domain name system

The domain name system (DNS) translates user-friendly domain names (*e.g. www.oecd.org*) into IP addresses (*e.g.* 203.160.185.48). The DNS servers distribute this task among servers allocated to each domain and handle billions of requests daily. As such, they are essential for the smooth functioning of the Internet. Top-Level Domains (TLDs) are divided into two classes: generic Top-Level Domains (gTLDs), which include for example ".com" or ".org", and country code Top-Level Domains (ccTLDs), which consist of two-letter codes generally reserved for a country or a dependent territory (*e.g.* ".au" for Australia or ".fr" for France). Management of ccTLDs is allocated to sponsoring associations, which establish different registration requirements and fees.

Domain name registrations are an indicator of interest in adopting a web presence. There were almost 200 million domain name registrations in mid-2010, up from 168 million in mid-2008. Despite the growth in absolute numbers, the growth rate decreased from 37.5% in 2006-08 to 14.4% in 2008-10, which may signal the beginning of market saturation. Registrations under OECD-related ccTLDs grew by 22.1% yearly between 2000 and 2010. Over the same time period, registrations under all ccTLDs worldwide grew by 24.3% yearly, and registrations under major gTLDs grew by 19.8% yearly (Figure 5.5).

The Internet Corporation for Assigned Names and Numbers (ICANN) is a non-profit corporation responsible for the management of the Internet domain name system, among other Internet functions. In 2010, ICANN continued to make progress in the implementation of a new gTLD programme that should eventually enable the introduction of new gTLDs, allowing new entities to apply to create and operate a registry business. This programme seeks to open new opportunities by creating more choice within the Internet's addressing system. Creating a new TLD (such as .ibm or .oecd) could be attractive for brand holders and organisations potentially interested in managing their own name as a top-level domain for branding purposes. Indeed, this decision by the ICANN community was partly a reaction to the limited availability of remaining .com domain names. Applications for new gTLDs are expected to open in 2011, following the release of the applicant guidebook at the 39th ICANN International public meeting in December 2010.

Figure 5.5. **Domain name registrations per type of top-level domain, 2000-10**



Source: OECD, based on Zooknic.

StatLink http://dx.doi.org/10.1787/888932395212

The programme also raises a number of issues, some of which were reflected in a ICANN Board resolution towards the close of 2010. There has been discussion on whether the vertical integration between registrars (which register domain names for individuals or organisations/ corporations) and registries (which maintain the central registry database that serves as a back-end to registrars) could undermine healthy competition in the domain name marketplace. There has also been discussion on the rights-protection mechanisms for trademark owners, in particular, regarding the need for "defensive" registrations under the new TLDs to prevent cybersquatters from registering trademarked names. Finally, issues have been raised by government on TLDs related to some areas of public policy (*e.g.* applications for TLDs with geographical, national, religious, cultural or linguistic aspects).

Another significant development in the area of top-level domains was the launch of internationalised domain names (IDN), which contain local language characters (*e.g.* Arabic, Korean, Japanese). In October 2009, ICANN approved the registration of top-level IDNs. Efforts to support access to the Internet through IDN and to co-ordinate work across different countries, regions and language groups were ongoing at the start of 2011. The demand for IDNs is based on the desire to increase access to the Internet for people who do not use or recognise Latin characters, and on the related wish for Internet identifiers to reflect cultural variety. By end-2010, IDN ccTLDs for China (中国 and 中國), Egypt (مصر), Jordan (الاردن), the Palestinian Territories (فلسطين), Russia (рф), Sri-Lanka (இலங்கை), Chinese Taipei (台湾 and 台灣), Thailand (ไทย), Tunisia (تونس), the United Arab Emirates (امارات) and Saudi Arabia (السعودية) were in operation. Several others were in the process of being approved.

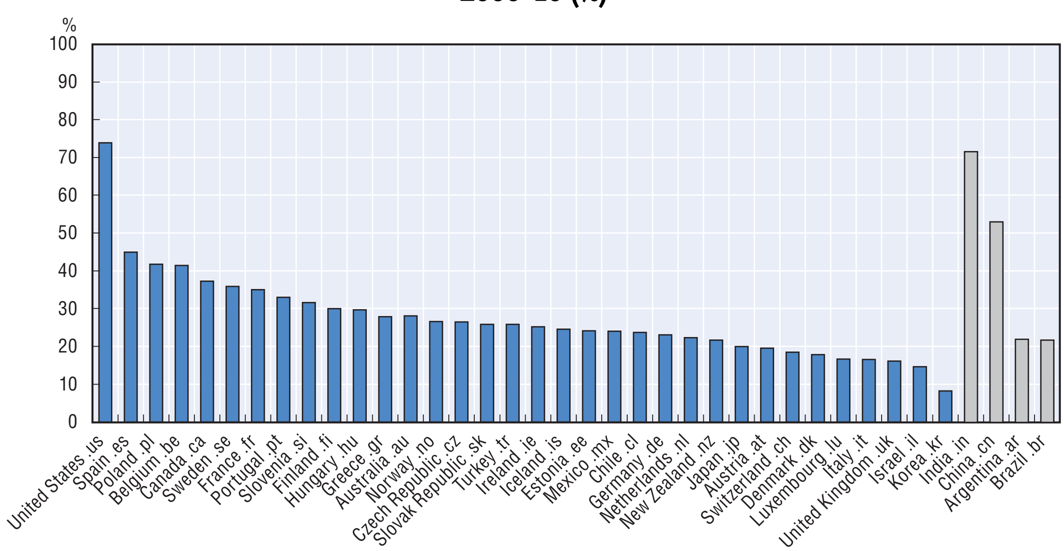
Registrations by domain

From 2008 to 2010, the number of registered domains increased by 16.8% a decrease of .cn (China) registrations, growth of ccTLD registrations continued to be stronger than of gTLD registrations over the same period. In mid-2010 the gTLDs .com and .net accounted for more than 90% of all gTLDs registrations and over half of the world's total domain name registrations. Registrations under OECD ccTLDs grew by an average of 11.4% per annum from mid-2008 to mid-2010, and accounted for 26% of total domain name registrations in mid-2010 (Table 5.5).

Out of more than 240 total ccTLDs, the top 10 comprised 62% of the global ccTLD market in mid-2010. Germany's ccTLD was the largest with over 13.5 million names registered under .de, followed by the United Kingdom's ccTLD (.uk) with 8.5 million registrations. ccTLD registries are responsible for the policies and operation of the domain name (including the implementation of requirements and fees), thus resulting in wide variations in the number of ccTLD registrations across countries. The large adoption of names under .de (Germany) can be explained by several factors including non-restrictive policies implemented by the registry, which allow registration of single-letter, two-letter and number-only domains, and accept all diacritics of the German language. The only restriction imposed by .de's registry is the obligation to have an administrative contact residing in Germany. As of mid-2010, .de was the most popular ccTLD and the second-most widely used among all top-level domains, second only to .com. In 2010, nearly two out of every three domain registrations in Germany were made under the .de ccTLD.

Registrations under the Chinese ccTLD .cn dropped by over 5 million between mid-2008 and mid-2010, following changes in registration requirements aimed at minimising anonymous registrations. From mid-December 2009, prospective registrants had to provide paper application forms, a business license and an identity card. Individuals are not entitled to register domains ending in .cn. In addition, .cn registrations through non-Chinese registrars have been suspended by the registry operator. China was nonetheless third out of ccTLDs with a total of 7 million .cn registrations in mid-2010. The most dynamic OECD-related ccTLDs in terms of growth over the 2000-10 period were Belgium (.be), Poland (.pl), Spain (.es),and the United States (.us) (Figure 5.6).

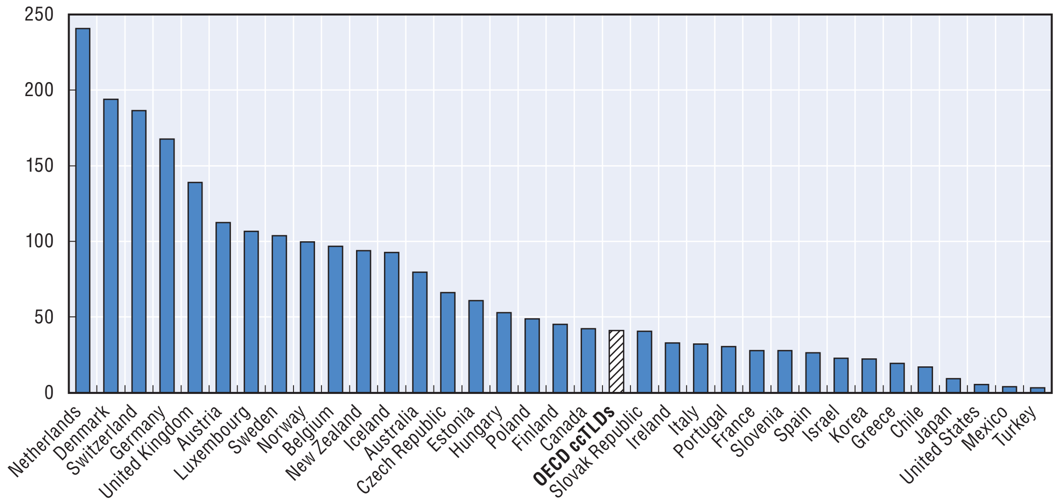
Figure 5.6. **Average annual growth in domain name registrations by domain, 2000-10 (%)**



StatLink http://dx.doi.org/10.1787/888932395231

In mid-2010, the Dutch ccTLD, .nl, was the country code with the highest ratio of registrations per capita (240 per 1 000 inhabitants, or almost one-quarter). Nearly 66% of all domain registrations in the Netherlands were made using the .nl ccTLD. Other ccTLDs with high numbers of registrations on a per capita basis were .dk (Denmark), .de (Germany)., ch (Switzerland) and .uk (United Kingdom), all of which also had over 130 domain names registered per 1 000 inhabitants (Figure 5.7).

Figure 5.7. **OECD country-related ccTLD registrations per 1 000 inhabitants, mid-2010**



Note: At mid-year or nearest available data point.

StatLink http://dx.doi.org/10.1787/888932395250

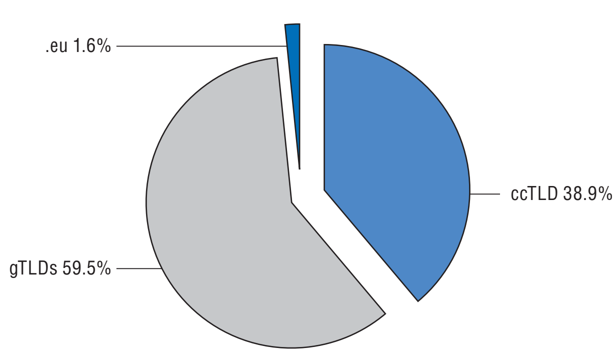
Registrations by country

ZookNIC tracks registrations of gTLDs according to the location of the registrant. ZookNIC data show the geographic distribution of domain names, and reveal that nearly all users of ccTLDs are based in the related country. It is, therefore, generally accurate to assume that ccTLD registrants are based in the country concerned. Table 5.6 shows the number of domain name registrations under related ccTLDs and major gTLDs by registrant location for OECD countries.

By mid-2010, across OECD countries there were on average 12.8 domain names registered for every 100 inhabitants, up from 10.6 in 2008 (Figure 5.8). Registrations were significantly lower in Chile, Greece, Korea, Japan, Mexico and Turkey.

In mid-2010, on average 39% of domain name registrations worldwide were completed under ccTLDs, whereas 59.5% were completed under gTLDs. The largest gTLD was .com, with 43.6% of the world's total, followed by .net (6.5%), .org (4.2%), .info (3.1%) and .biz (1%). An additional 1.6% of registrations were completed under .eu (Europe). .eu domain names

Figure 5.8. **Shares of domain name registrations under ccTLDs and gTLDs, world, mid-2010**



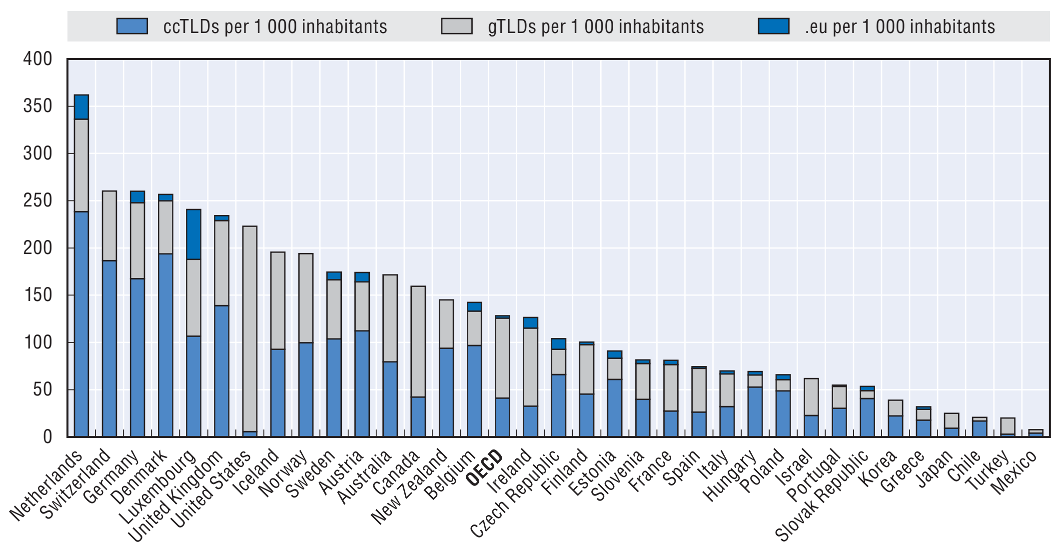
Source: OECD and Zooknic (*www.zooknic.com*).

StatLink http://dx.doi.org/10.1787/888932395269

were most popular in Luxembourg (21.9% of registrations), the Czech Republic (10.8%), Ireland (9%) and Greece (8.6%) (Figure 5.9). In absolute terms, .eu registrations were highest in France, Germany and the United Kingdom.

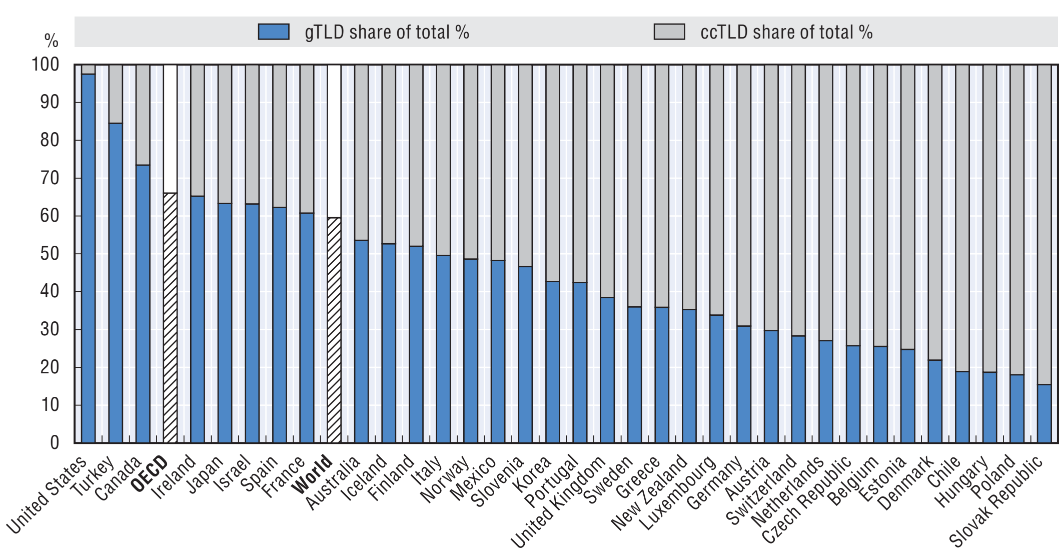
The ccTLD .us accounted for a small share of United States-related registrations, despite recent efforts by the registry to deliver new services (*e.g.* a Registry Lock Service, a .us URL shortener service, etc.). Historically, .com has been the preferred TLD for most domain names in the United States. Other countries in which gTLDs represent a high proportion of registrations include Canada, Ireland, Japan and Turkey, which register over 60% of their domain names under gTLDs. On the other hand, Chile, Denmark, Estonia, Hungary, Poland and the Slovak Republic registered over 75% of their domain names under their respective ccTLD (Figure 5.10).

Figure 5.9. **Domain name registrations per 1 000 inhabitants, mid-2010**



Source: OECD and Zooknic (*www.zooknic.com*). StatLink http://dx.doi.org/10.1787/888932395288

Figure 5.10. **Share of gTLD and OECD country-related ccTLD domain name registrations, mid-2010**

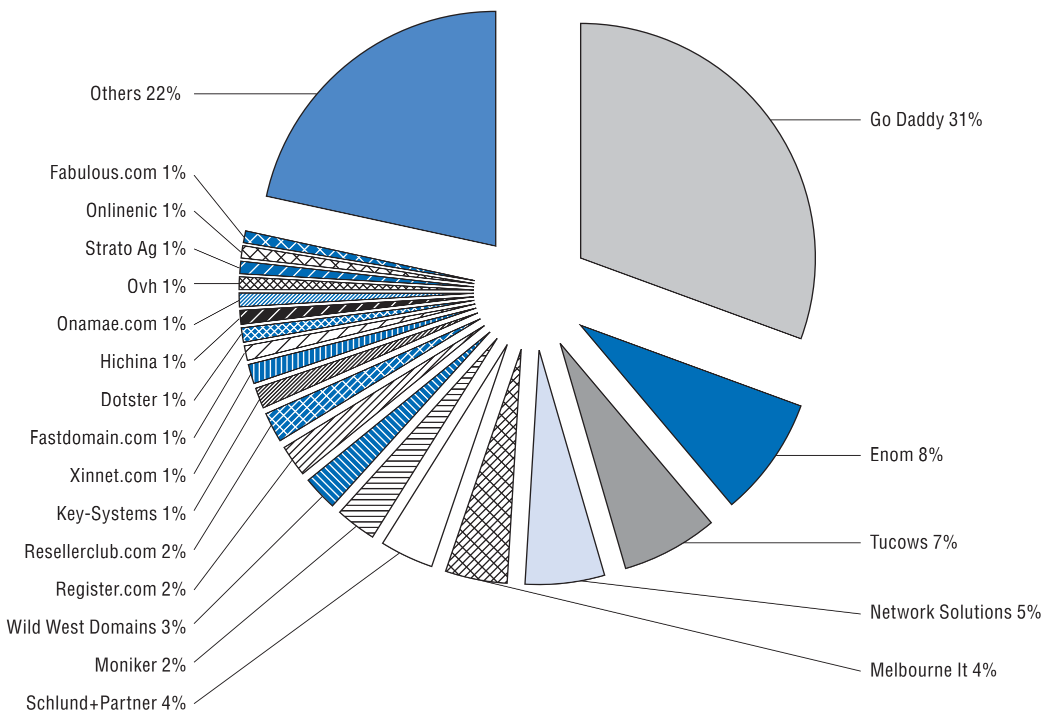


Source: OECD and Zooknic (*www.zooknic.com*). StatLink http://dx.doi.org/10.1787/888932395307

The domain name registration market

gTLD registries perform back-office functions and provide services to registrars (the organisations that manage the reservation of Internet domain names), which in turn provide services to end users. Since the creation of ICANN in 1998, the market for domain name registrars has been highly competitive. In 2010, the top 20 gTLD registrars accounted for about 80% of the market and the top five registrars managed over half of the world's domains. Go Daddy increased its market share from 25% in October 2008 to 31% in October 2010 and continues to be the only registrar with over 10% of market share. Enom's market share decreased from 9% to 8% over the same time period (Figure 5.11).

Figure 5.11. **Domain name registrars' market share, October 2010**



Source: OECD, compiled from country and generic NICs and WebhostingInfo (*www.webhosting.info*).

StatLink http://dx.doi.org/10.1787/888932395326

Address space

The Internet Protocol (IP) is a communications protocol responsible for transporting data from a host to its destination across the Internet. IP uses a numeric addressing system and routes messages based on IP addresses, which specify the locations of the source and destination nodes. There are two versions of IP addresses in active use: IP version 4 (IPv4) and IP version 6 (IPv6). IPv4, deployed starting 1983, is still the most commonly used version. However, due to the tremendous growth of the Internet and the forecasted exhaustion of IPv4 addresses, a newer version of the Internet protocol, IPv6, was designed to accommodate this growth. Deployment of the IPv6 protocol began in 1999.

Both IPv4 and IPv6 addresses are generally assigned in a hierarchical manner. The Internet Assigned Numbers Authority (IANA) delegates blocks of IP addresses and Autonomous Systems (AS) numbers to each Regional Internet Registry (RIR) to meet the needs of that region. RIRs follow regional policies to allocate resources to Local Internet Registries (LIRs), or to National Internet Registries (NIRs) in those countries that have the latter. LIRs either assign address space to end users or allocate address space to ISPs who, in turn, assign IP addresses to enterprises and end users. Routed IP addresses are the number of addresses that Autonomous Systems advertise into the Internet routing table (*i.e.* the set of prefixes they can deliver traffic to).

Several caveats warrant stressing in using RIR assignment data. First of all, the RIRs record the country of the entity to which the address was assigned/allocated, and this may be different to the recorded country of the assigned AS number which originates the IPv6 address, and may also be different to the country in which the Internet service is being provided. Second, allocation of prefixes does not indicate actual use of these prefixes. Third, allocations do not show sub-allocations from Local Internet Registries (LIRs) to other entities.

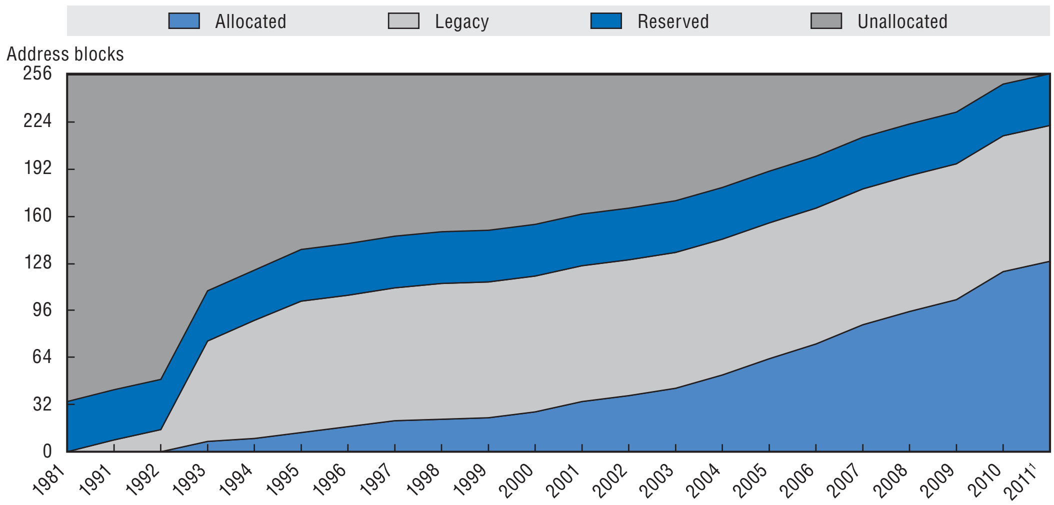
The supply of available unallocated IPv4 addresses started to run out in early 2011, with the IANA distributing its last five IPv4 blocks to the five RIRs in February 2011. Although the RIRs will be able to allocate their remaining addresses for several months to come, total depletion is fast approaching. The shortage of IPv4 addresses has driven the creation of various network techniques and technologies aimed at delaying the exhaustion of the IPv4 pool (*e.g.* Classless Inter-Domain Routing, Network Address Translation, etc.). Nevertheless, the implementation of IPv6 is considered to be the only readily available long-term solution to the diminishing supply of Internet address space.

IPv4 address space

IPv4 uses 32-bit addresses, generally expressed in decimal notation with each octet (*i.e.* group of eight bits) separated by a period (*e.g.* 80.124.192.0). This limits the address space to 2^{32} (4 294 967 296) possible unique addresses, often counted in terms of /8 prefix sizes. Some of these addresses are reserved for special purposes (*e.g.* private networks, multicast addresses, etc.), thus reducing the number of addresses that could potentially be allocated for use on the public Internet. At the start of 2011, legacy assignments (*i.e.* address space allocated before the creation of the RIR system) represented 35.9% (92/8 prefixes) of the IPv4 address space, while 13.7% (35/8's) was reserved for other uses or was unavailable for technical reasons. The remaining 50.4% of IPv4 address space (2.16 billion addresses or 129/8 prefixes) had been allocated by the IANA to the RIRs (Figure 5.12).

At the start of 2011, OECD countries accounted for about 65% (2.4 billion out of 3.7 billion) of allocated IPv4 address space (Table 5.7). The United States had the largest allocations, which represented over 1.5 billion IPv4 addresses (40% of the world's total), reflecting the original development of the Internet in the United States and legacy assignments of early US-based networks. Japan had the second-largest share of allocated IPv4 addresses (4.92%), followed by Korea (2.72%), Germany (2.4%) and the United Kingdom (2.15%). Some of the newer OECD members had the fastest growth of IPv4 address space allocation in the 2000-10 period, with Estonia growing by 36%, followed by Chile (35%) and Slovenia (32%) (Figure 5.13).

Figure 5.12. **IANA IPv4 address pool, 1981-2011**

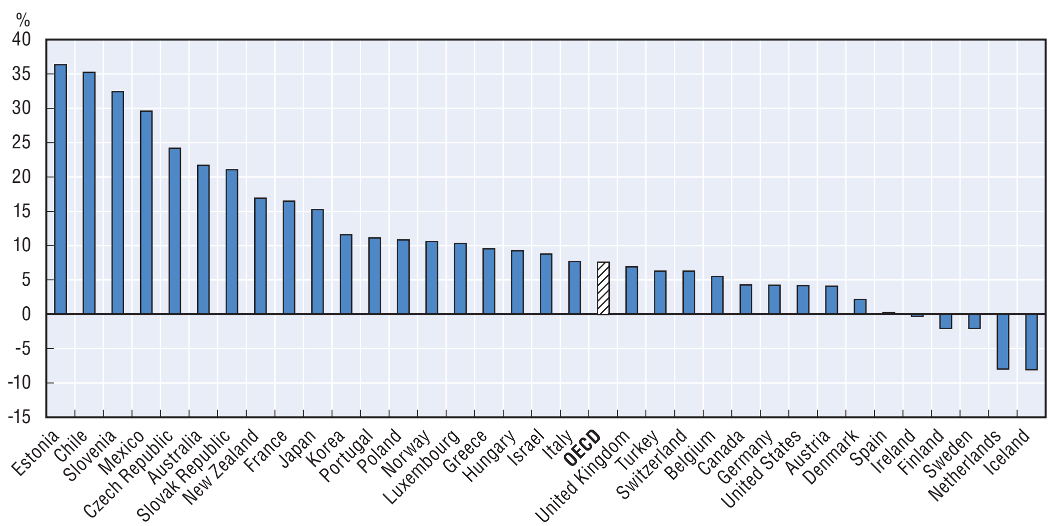


1. As of February 2011.

Source: OECD. Based on data from the IANA.

StatLink http://dx.doi.org/10.1787/888932395345

Figure 5.13. **Average yearly growth of allocated IPv4 addresses, by country, 2000-10 (year-end)**

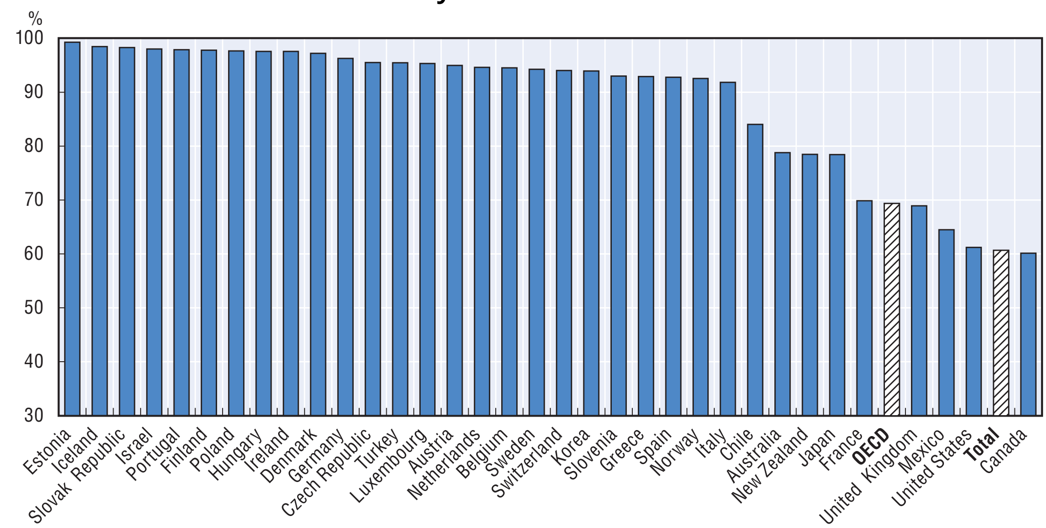


Source: OECD. Potaroo (*www.potaroo.net*).

StatLink http://dx.doi.org/10.1787/888932395364

For an allocated IP address to be "visible" on the public Internet, organisations must publish the address in the Internet routing tables, which list the "routes" to network destinations. Routed prefixes provide some indication of the number of addresses that are used. In mid-2010, routed prefixes represented 60% of allocated prefixes worldwide (Table 5.8). It is important to note that even if addresses are routed on the public Internet, they are still not necessarily used. In addition, some public IPv4 addresses are used in private networks and are therefore not visible in public routing tables (Figure 5.14).

Figure 5.14. **Percentage of allocated IPv4 address space that is routed, year-end 2010**

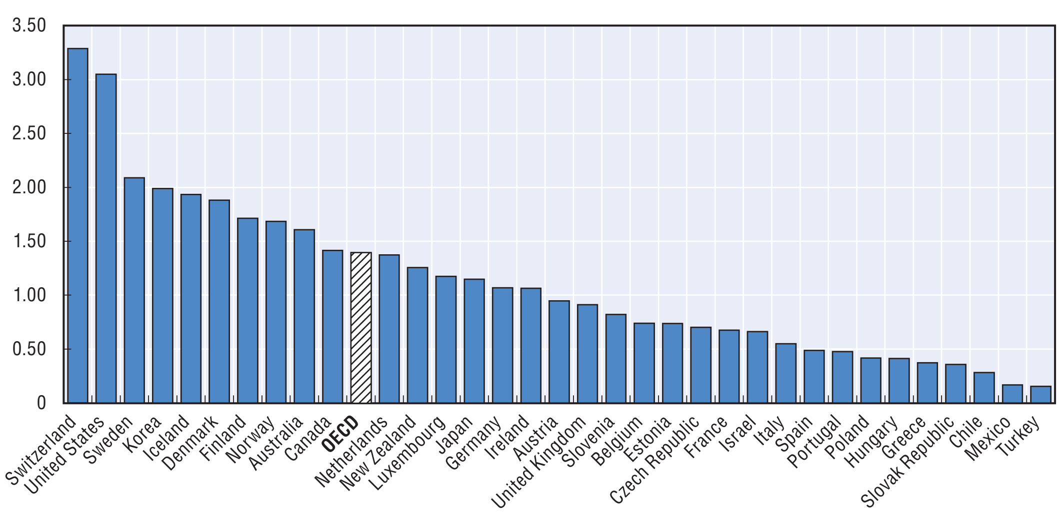


Source: OECD. Based on data from the RIRs and Potaroo (*www.potaroo.net*).

StatLink http://dx.doi.org/10.1787/888932395383

By the start of 2011, there were over 2.3 billion routed IPv4 addresses, up from 2.1 billion in early 2009. OECD countries accounted for 74% of the world's total announced IPv4 addresses. Despite its decrease in percentage of routed IPv4 addresses since 2007, the United States continued to lead in this area with over 937 million routed IPv4 addresses (40% of the world's total). This was down from over 50% in 2005. The next largest shares were attributable to Japan (6.4%), Korea (4.2%), Germany (3.8%) and the United Kingdom (2.4%). Switzerland represented the largest user of routed IPv4 addresses on a per capita basis, with 3.2 addresses per inhabitant (Figure 5.15). Countries that had over 1.7 addresses per inhabitant included Denmark, Finland, Iceland, Korea, Sweden and the United States. Chile, Mexico and Turkey were the only OECD countries to have less than 0.3 addresses per inhabitant.

Figure 5.15. **Routed IPv4 addresses per inhabitant, year-end 2010**

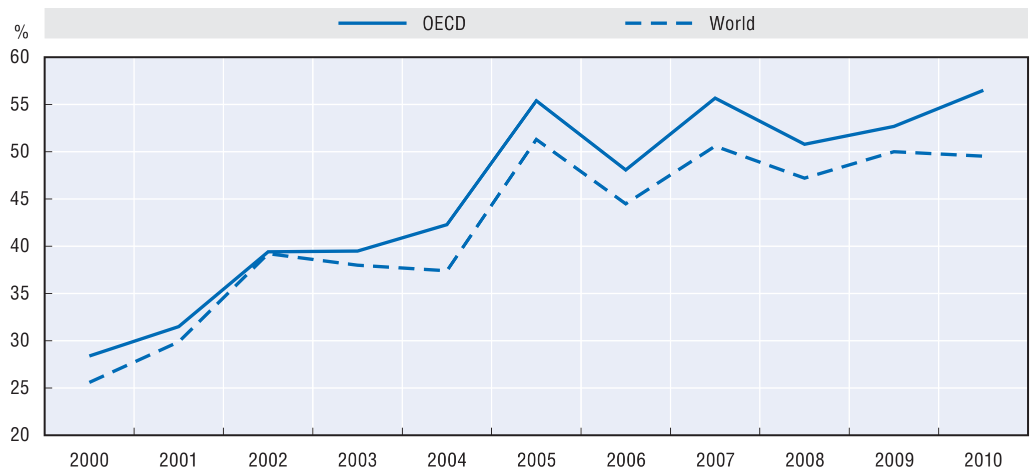


Source: Potaroo (*www.potaroo.net*).

StatLink http://dx.doi.org/10.1787/888932395402

Although absolute membership of the Regional Internet Registries (RIRs) has grown, allocation of IPv4 address space is increasingly concentrated in a few large ISPs and other Local Internet Registries, such as enterprise networks (Table 5.9). During 2010, the top 1% of address holders represented approximately 50% of allocated IPv4 address space, up from only 25% at the turn of the century (Figure 5.16). This increasing concentration suggests that the development of existing networks has been the major demand driver for IPv4 address space.

Figure 5.16. **Share of IPv4 addresses allocated to top 1% of holders, 2000-10 year-end**



Source: Potaroo (*www.potaroo.net*).

StatLink http://dx.doi.org/10.1787/888932395421

Nevertheless, there are strong variations between countries depending on market structure. For example, in 2010 the top 1% of players were allocated over 80% of address space in France and Mexico, but under 25% in Chile, Hungary, Japan and Korea.

On average, throughout 2010 half of the allocated IPv4 address space in OECD countries went to just 0.75% of address holders, down from 4.4% in the year 2000. In Australia, France, the United Kingdom and the United States, 50% of IPv4 space was allocated to just 1.5% of players, whereas 50% of IPv4 space was allocated to about 35% of address holders in Iceland and Luxembourg. Despite these differences, all OECD countries experienced an increase in the concentration of address resources between 2000 and 2010.

IPv6 address space

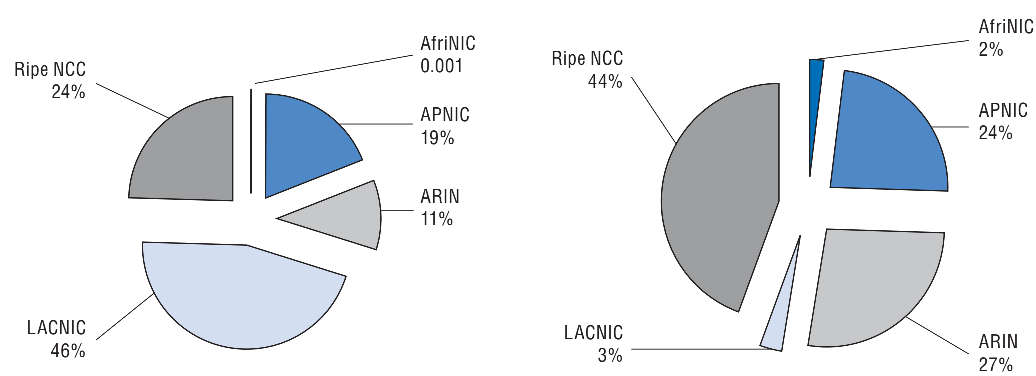
The IPv6 protocol was established between 1993 and 1998. It uses 128-bit addresses, which are conventionally expressed using hexadecimal notation (*e.g.* 2001:db8:85a3::8a2e:370:7334), and thus provides virtually unlimited address space (2^{128} or $3.40281367 \times 10^{38}$ IP addresses). IPv6 offers several additional advantages such as improved quality of service (QoS) for new Internet applications (*e.g.* IP telephony), authentication and privacy capabilities, and better support for mobile Internet, among others.

Implementation of IPv6 remains slow and considerable challenges must be overcome to achieve a complete and successful transition. Immediate costs are associated with the deployment of IPv6, whereas many benefits are only evident in the long-term and depend on a critical mass of actors adopting the new protocol. In addition, IPv6 is not backward-compatible with IPv4-only resources, and transition mechanisms must be deployed to access IPv4 hosts (*e.g.* tunnelling). Experience to date with IPv6 implementation suggests that increased awareness is needed, and that finding resources is a substantial challenge.

As with IPv4, the IANA delegates IPv6 address space to the RIRs, which then allocate this to interested entities based on need. The number of allocated prefixes provides an indicator of the number of organisations interested in implementing the protocol (Figure 5.17, left). At the end of 2010, RIRs had made over 6 000 allocations (Table 5.10). OECD countries accounted for 75% of total IPv6 allocations worldwide. The United States (24%) was the country with the largest share of IPv6 allocations in total, followed by Germany (6%), Japan (5%) and the United Kingdom (5%). Particularly noteworthy was the surge in IPv6 allocations starting in 2007 in the United States: 200 IPv6 prefixes were registered in 2007, followed by 220 in 2008, over 360 in 2009 and 330 by mid-2010. This surge, at least at the beginning, was likely linked, in part, to the mandate of the United States' Office of Management Budget (OMB). This demanded that all agency infrastructure (network backbones) use IPv6, and that agency networks be ready to interface with this infrastructure by June 2008. In Australia, the Strategy for the Transition to IPv6 of the Australian Government Information Management Office has requested that Australian Government agencies be IPv6-capable by the end of 2012. This is also visible in the trend of allocations to Australian entities, which accelerated starting in 2008. (Figure 5.18).

Figure 5.17. **Distribution of total IPv6 allocations by the RIRs, 2010 (year-end)**

Distribution of IPv6 allocations by size of allocations | Distribution of IPv6 allocations by number of allocations

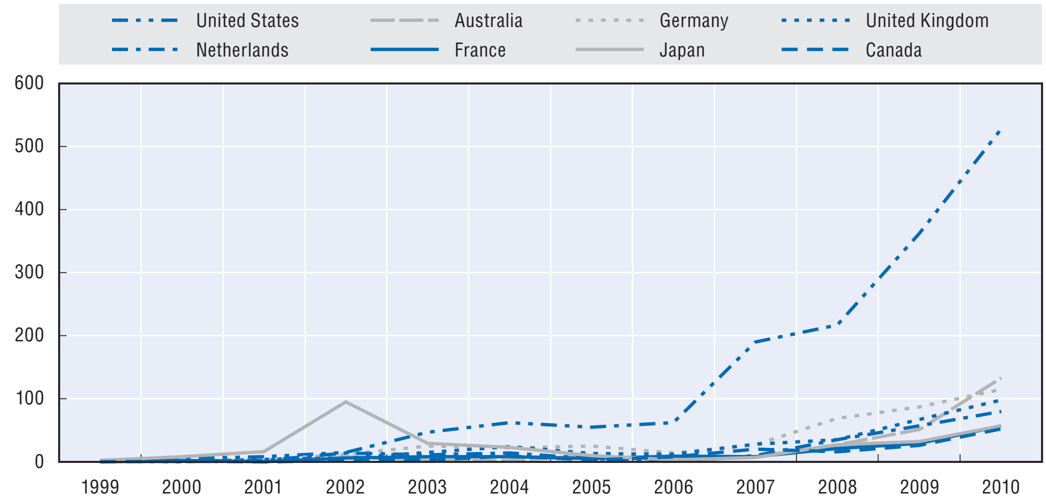


Source: OECD. Based on data from the RIRs.

StatLink http://dx.doi.org/10.1787/888932395440

The size of IPv6 allocations could provide some idea of the scale of planned deployments. However, it is important to note that extremely large allocations were given to some operators and large users, thus making the use of data problematic and skewing the "by-size" results (Table 5.1). For instance, many large IPv6 prefixes were assigned to telecommunication operators. In addition, allocated IPv6 addresses are not necessarily used and sub-allocations from NIRs and LIRs are not detailed.

Figure 5.18. **Numbers of IPv6 allocations per year, top eight OECD countries, 1999-2010 (year-end)**



Source: Potaroo (*www.potaroo.net*).

StatLink http://dx.doi.org/10.1787/888932395459

Table 5.1. **Selected large IPv6 allocations**

Prefix	Company	Date
2804:0000:: /16	NIC Brazil	2008/11/28
2003::/19	Deutsche Telekom, Germany	2005/01/13
2a01:c000::/19	France Telecom, France	2005/12/30
2a01:2000::/20	Telecom Italia, Italy	2006/05/16
2400:2000::/20	Softbank BB IPv6 Network, Japan	2005/07/12
2400:0000::/20	Korea Telecom, Korea	2005/06/01
2401:6000::/20	Australian Government Department of Defence, Australia	2007/08/10
2a01:1000::/21	Telekomunikacja Polska S.A.	2006/02/01
2608:0000::/22	United States Department of Defense (DoD), United States	2008/05/06
2a00:2000::/22	British Telecom, United Kingdom	2007/08/29
240e:0000::/24	China Telecom	2010/05/20
240a:0000::/25	Japan NIC	2010/03/02
2a02:1000::/26	German Federal Ministry of the Interior	2009/11/16
2a02:1400::/26	B2 Bredband AB, Sweden	2010/03/01

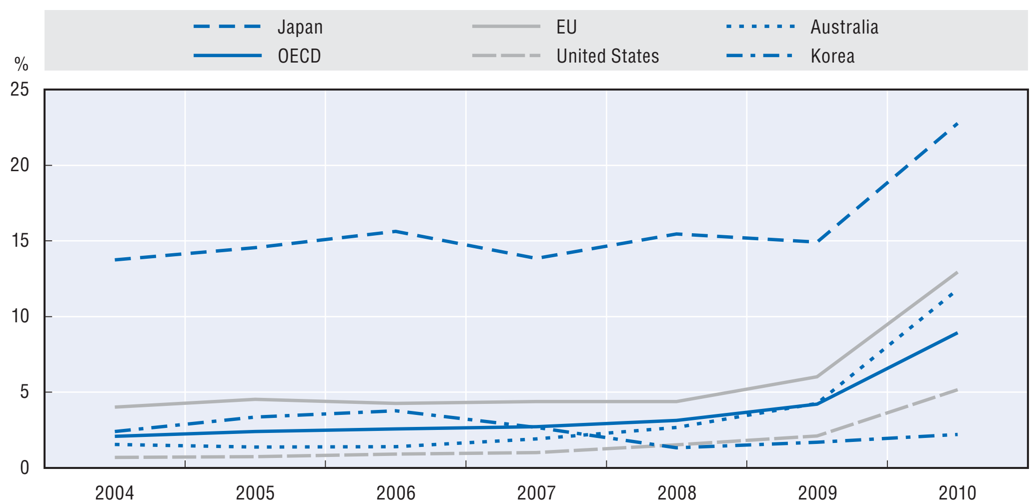
Source: OECD, extracted from *RIR IP Whois Databases*.

StatLink http://dx.doi.org/10.1787/888932395478

From a regional viewpoint, the Latin American market had the largest IPv6 allocations. This would seem to indicate an intention to deploy IPv6 on a large scale, especially considering the relatively small number of prefixes that these allocations correspond to (Figure 5.17, right). However, the results were likely skewed by an extremely large allocation to Brazil's National Internet Registry (NIR), in 2008, for further assignment to LIRs and ISPs (Table 5.1). European and Asian markets have also received large allocations in the past, especially to companies in the telecommunication sector. For example, Deutsche Telecom and France Telecom were each allocated a /19 in 2005, Telecom Italia and the Australian Government Department of Defence were allocated a /20 in 2006 and 2007 respectively, and HiNet Taiwan was allocated a /21 in 2006 (Table 5.11). To illustrate the size of these allocations, a /19 prefix represents 2^{77} times the entire IPv4 address space. The large number of smaller allocations received in North America and Africa may be indicative of greater interest in evaluating IPv6 (*e.g.* the United States Department of Defense was allocated fourteen /22 blocks in 2008).

At the start of 2011, about 58% of IPv6 addresses assigned to OECD countries were visible in the routing table, up from 50% at the start of 2009 (Figure 5.19). However, the proportion varied significantly from country to country. It should be noted that routed address space is not necessarily used. In addition, observing routed IPv6 address space may not account for the fact that, in transition mechanisms, IPv6 is tunnelled across the IPv4 Internet and is thus not directly visible as a distinct protocol in the routing system.

Figure 5.19. **Percentage of ASNs that announce at least 1 IPv6 prefix, 2004-10 (year-end)**



Source: OECD, based on data provided by RIPE NCC (*http://v6asns.ripe.net/*).

StatLink http://dx.doi.org/10.1787/888932395497

Domain Name System (DNS) support for IPv6 at various levels indicates that DNS operators have set up capability to receive requests for IPv6 records, and that they can potentially receive IPv6 traffic and provide services over IPv6 transport. At end-2010, at the top level of DNS, 82.7% of all TLDs and nearly 70% of ccTLDs had IPv6 support (*i.e.* name-servers with IPv6 glue in the root zone). Among OECD countries, all ccTLDs supported IPv6 except for Turkey. It is worth noting that all live IDN ccTLDs also had IPv6 support. Several caveats must be stressed. In particular, the inclusion of IPv6 support at *all* levels of DNS – not just the top level – is not necessarily needed to allow IPv6-enabled hosts to reach other IPv6 hosts and influence performance. In addition, IPv6 DNS support in the DNS does not mean IPv6 connectivity.

Policy initiatives for the deployment of IPv6

Although implementation has remained slow, many OECD governments have spearheaded initiatives to promote the deployment of IPv6 protocol (Table 5.12).

One focus area has been co-ordination of IPv6 deployment within government agency networks. As major consumers of networking equipment, government agency network strategies reflect a high level of commitment to IPv6 deployment on the part of some OECD governments, with a significant follow-on effect on industry, small business and home users. For example, the Australian Government Information Management Office (AGIMO) developed a strategy that aimed to have IPv6-ready hardware and software in place in all Australian Government agencies by the end of 2011, and to have all systems IPv6-enabled by the end of 2012. The Czech Republic sought to ensure access to government websites and eGovernment services over both IPv4 and IPv6 protocols by the end of 2010. Germany's Federal Government introduced a variety of projects and initiatives, with the objective of ensuring the complete technical and organisational set up necessary for a centralised IPv6 public administration by 2011. Denmark and the Netherlands are also in the process of implementing IPv6 support in public agencies.

As of 2008/09, most OECD countries had undertaken or become involved in awareness-raising efforts. For example, various national and regional IPv6 task forces received government support for the creation of action plans (Figure 5.20). These task forces were more or less active, with some reaching out to stakeholders in Internet industry sectors and others maintaining networks of experts. The Netherlands, for example, created an IPv6 platform to stimulate the deployment of IPv6 by rewarding organisations active in its implementation.

Figure 5.20. **Countries with IPv6 task forces**

Source: OECD, based on the IPv6 Portal (*www.ipv6tf.org*) and other sources.

StatLink http://dx.doi.org/10.1787/888932395516

There has also been ongoing interest in IPv6 network research. For example, Germany has established pilot projects and working groups after requesting and being assigned a sufficiently large IPv6 address space in 2009 (/26). The Dutch government has also initiated several pilot projects with the objective of deploying IPv6 in its applications.

Networks on the Internet

Autonomous Systems

The Internet is composed of individual networks under single administrative control. These networks are called autonomous systems (AS). They can be ISPs (regardless of the size), academic or government networks, or firms with a particular need for some independence of networking (*e.g.* AT&T, France Telecom, Google or NTT). They obtain, aggregate and announce hierarchical, aggregated blocks of IP addresses for a network. A unique number is assigned to each autonomous system in order to identify it. An AS will use the Border Gateway Protocol (BGP) routing protocol to announce (*i.e.* advertise) the aggregated IP addresses to which it can deliver traffic. For example, the fact that network 80.124.192.0/24 is inside Autonomous System number 8228 (AS8228) means that AS8228 will announce to other providers that it can deliver any traffic destined for 80.124.192.0/24.

Networks that connect to two or more ASs with different routing policies need their own AS. In order to help decrease global routing complexity, RIRs will only assign new Autonomous System Numbers to networks with different routing policies from those of other individual networks on the public Internet (BGP peers).

Border Gateway Protocols (BGP) routing tables provide a snapshot of the Internet topology for a particular place and time. At the end of 2010, there were a total of 36 579 Autonomous Systems visible in the Internet routing table, up from 27 235 at the end of 2007. Of all routed ASs, 63% were attributable to OECD countries. The United States had the largest share of ASs (35% of the world's total), although it should be noted that these networks could be offering service elsewhere in the world. By comparison, the United Kingdom accounted for 3.6% of the worldwide total, followed by Poland with 3%.

In terms of routed ASs per capita – operating over either IPv4 or IPv6 – Iceland led the count with 10 ASs per 100 000 inhabitants, followed by Slovenia (8.9), Luxembourg (6.2) and the Czech Republic (5.2). Ten OECD countries had less than one AS per 100 000 inhabitants (Tables 5.13 and 5.14). Countries with a high number of Autonomous Systems per capita all had well-developed Internet markets. However, some countries with well-developed Internet markets had a much lower ratio of ASs (*e.g.* France and Japan). This may be attributed to factors such as industrial structure or number of ISPs.

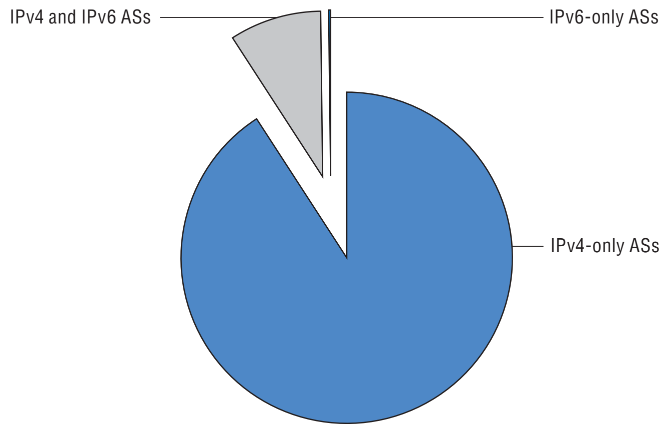
Despite its comparatively large share of ASs, the United States' proportion of total ASs has fallen from 50% in 2000 to 35% in 2010. Nevertheless, in absolute numbers, the number of ASs in the United States increased from 4 502 in 2000 to 12 792 in 2010, or by 11% per annum over the same period. The decreasing share of ASs attributed to the United States reflects the growing use of the Internet in the rest of the world, with all other OECD countries increasing their share of the worldwide total from 20.6% of global ASs in 2000 to 28.8% in 2010. Eastern Europe in particular is a large growth area for ASs. Non-OECD countries also experienced an increase in the number of Autonomous Systems during the same period, from 28.5% to 36%.

The average number of routed IPv4 addresses per routed AS has been decreasing, with ASs continuing to use fewer IPv4 addresses by about 11% on average a year since 1997 (Table 5.15). This is mainly due to entities increasingly using their own AS numbers (*i.e.* growth in the number of ASs) and their own IPv4 address blocks, as well as extensive use of techniques to delay the exhaustion of IPv4 addresses. Such measures include the "Classless" address architecture (Classless Inter-Domain Routing or CIDR), which created smaller sizes of address blocks to enable more efficient use of the remaining IPv4 space, and the use of Network Address Translation (NAT), which allows a small number of public addresses to be shared across a much larger number of hosts using private, that is, not globally unique, addresses.

Networks that run IPv6

By the end of 2010, over 8% of networks on the protocols were being maintained simultaneously. It is also worth mentioning that most IPv6-only ASs are test-networks, except for a few companies that announced their IPv6 address blocks in separate ASs (*e.g.* Apple, Google or Verizon). In Luxembourg, the Netherlands and Norway, over 30% of routed ASs announced IPv6 addresses, demonstrating relatively early adoption of IPv6 by networks in these countries (Figure 5.22).

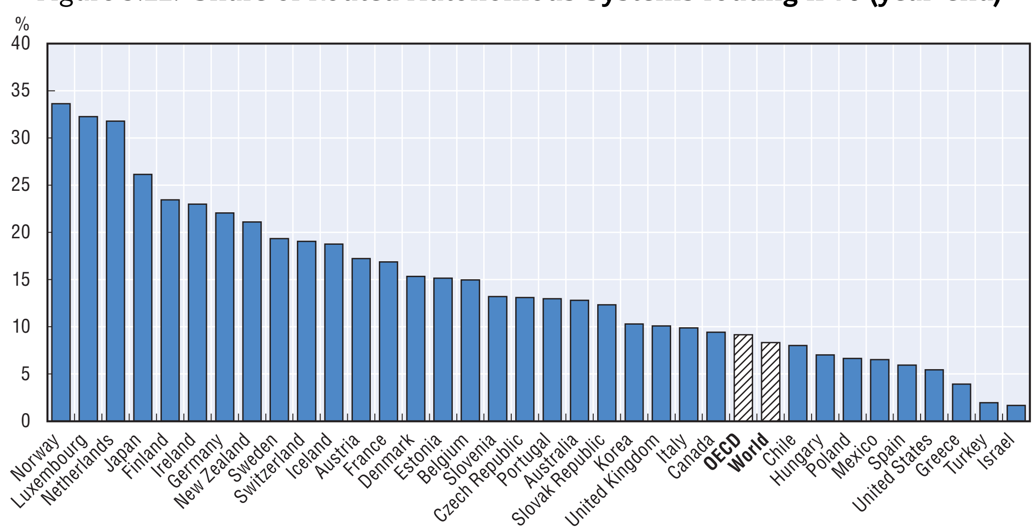
Figure 5.21. **Autonomous Systems routing IPv4, IPv6 or both IPv4 and IPv6, 2010 (year-end)**



Source: Potaroo (*www.potaroo.net*).

StatLink http://dx.doi.org/10.1787/888932395535

Figure 5.22. **Share of Routed Autonomous Systems routing IPv6 (year-end)**



Source: Potaroo (*www.potaroo.net*).

StatLink http://dx.doi.org/10.1787/888932395554

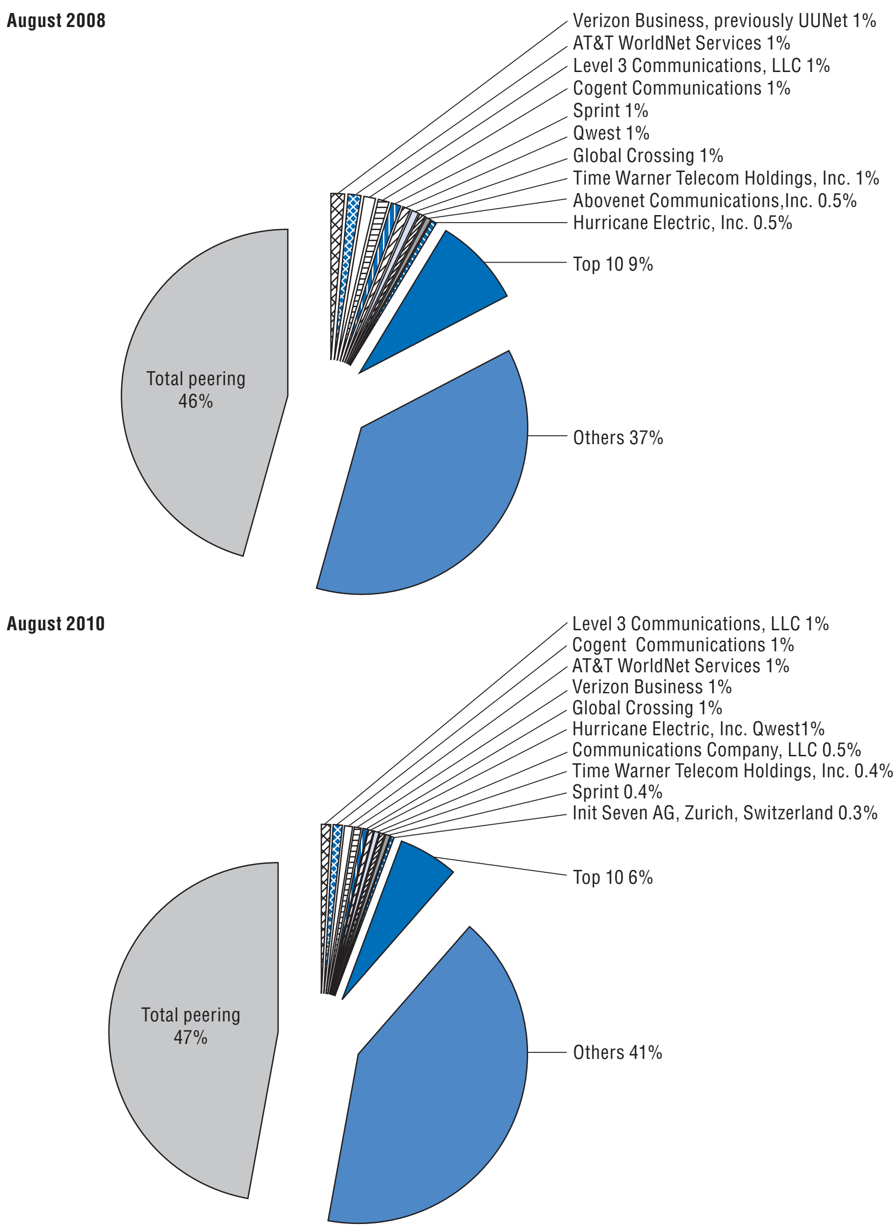
Peering

Peering is an arrangement for Internet traffic exchange between networks (*e.g.* Internet service providers or ISPs). For example, Large ISPs with their own backbone networks agree to exchange traffic with other large ISPs. They may also choose to exchange traffic with smaller ISPs so that they can reach regional end points. ISPs may also peer with firms that have AS networks, but do not provide direct Internet access. An AS which provides content or services may peer with an ISP because its content or services are valued by the ISP's customers. Peers add value to a network by providing access to users on their own network, in addition to allowing access through the other networks with which they peer. The main motivation for peering is a reduction in transit costs between different networks. Motivations also include reduced latencies, local connectivity and increased redundancy and operational stability.

The Cooperative Association for Internet Data Analysis (CAIDA) uses publicly available BGP data to rank ASs peering according to the number of ASs that can be reached recursively through their customers and their customers' customers. In August 2010, CAIDA reported a total of 144 326 peerings, up from 78 862 in August 2008 (Table 5.16). In the same period, the peering share of the top 10 networks worldwide decreased to 12.1%, its lowest point since 2004, suggesting new entrants and an increasingly competitive and fragmented market. In contrast, Level 3 Communications increased its peering relationships by nearly 40% (from mid-2008 to mid-2010) and lead CAIDA's ranking by connecting directly with 2 703 other networks (with 9% of ASs). Cogent Communications followed closely with 2 696 peering relationships, or 1.87% of the world's total, while AT&T and Verizon accounted for 1.62% and 1.39% respectively. These large networks play a central role in Internet traffic exchange, but none accounted for more than 2% of peering relationships (Figure 5.23).

Figure 5.23. **Top 10 networks defined by number of peers, 2008-10**

Share of total peering, per cent



Source: OECD, compiled from caida AS-Rank (*http://as-rank.caida.org/*).

StatLink http://dx.doi.org/10.1787/888932395573

Security

Despite its numerous benefits, the Internet can often represent an insecure channel for hosts, while the growing reliance on Internet services increases security risks. The OECD's 2008 report on Computer Viruses and Other Malicious Software identified various types of malware attacks, that is, denying access attacks, indirect attacks on DNS, attacks that modify data, attacks on identity, attacks on single and multi-factor authentication, and attacks on digital certificates and secure socket layer (SSL).

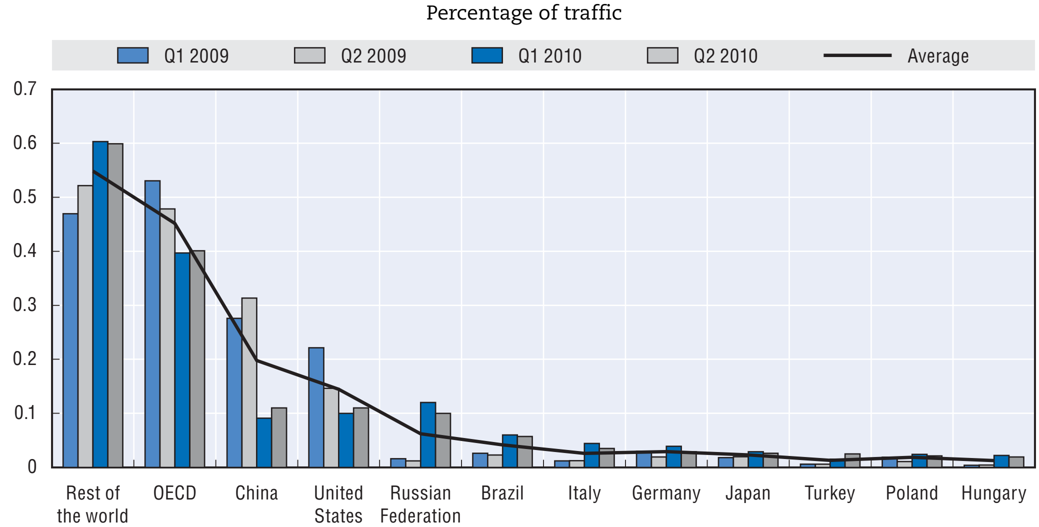
Akamai, a company that provides a computing platform for Internet content delivery, uses its globally distributed content distribution network to gather data on the state of the Internet, including data on attack traffic or Denial of Service (DDoS) attacks, hacking attempts and DNS hijackings. Akamai observes attack traffic originating from 200 unique countries/regions. Attack traffic is measured across the Internet by capturing packets generally issued from automated scanning trojans and worms that seek to infect new computers by scanning randomly generated IP addresses. Akamai collects real-time data on the number of connections that are attempted, the source IP address, the destination IP address, and the source and destination ports.

The data collected by Akamai must be considered with two caveats. First, the country in which attack traffic originates does not necessarily indicate where the attack was launched, but instead represents the location of the web-hosting company or ISP to which the attack was allocated. Second, the data are based on traffic observed by Akamai agents, and are not necessarily consistent with the percentages that would be observed across the entire Internet.

Although their share of total attack traffic declined dramatically in 2010, China and the United States continued to be the top countries of attack origin, as measured by Akamai in the second quarter of 2010. They each accounted for 11% of the world's attack traffic, down from 14.6% for the United States, and from 31.3% for China as compared to the second quarter of 2009 (Figure 5.24). Russia fell to third place, generating only 10% of observed attack traffic in the second quarter of 2010. Among OECD countries, Italy was second with 3.5%, followed by Germany (2.9%) and Japan (2.6%). OECD countries altogether accounted for 40% of originating attack traffic. Attack concentration among the top

Figure 5.24. **Attack traffic, top originating countries, 2009-10 (mid-year)**

Percentage of traffic



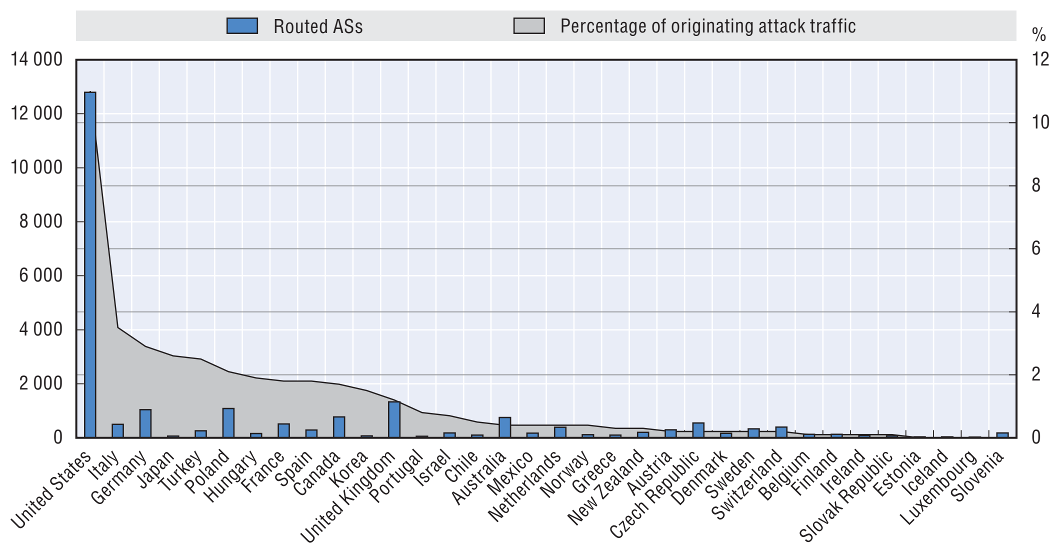
Source: Akamai, 2010, The State of the Internet (*www.akamai.com/*).

StatLink http://dx.doi.org/10.1787/888932395592

10 countries continued to decline, dropping to 58% in the second quarter (Table 5.17). Aggregating the observed attack traffic at a continental level, Akamai finds that the percentage of attacks that Europe was responsible for decreased by approximately 11% in the second quarter to 39%, while all of the other geographies saw corresponding increases.

Greater levels of Internet usage may account for higher levels of attack traffic. While the link with broadband penetration is not clear, six of the 10 OECD countries contributing the highest attack were also among the top 10 countries advertising IPv4 addresses and autonomous systems in the global routing table traffic (Canada, France, Germany, Italy, Japan and the United States) (Figure 5.25). The tendency of attack traffic to originate in certain countries may also have a link with such countries' hosting market, including the hosting of underground economy servers.

Figure 5.25. **Originating attack traffic and routed ASs in OECD countries year-end 2010**



Source: Akamai, 2010, "The State of the Internet" (*www.akamai.com/*).

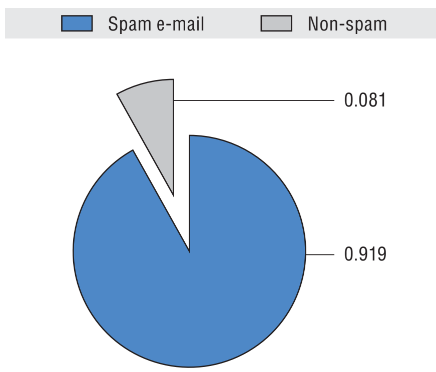
StatLink http://dx.doi.org/10.1787/888932395611

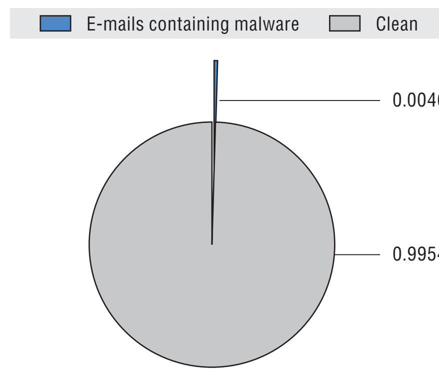
Symantec, one of the largest makers of security software, gathers security threat data through a combination of products and services, as well as third-party data sources that monitor 240 000 sensors in over 200 countries. The inclusion of additional sources not specific to Symantec customers reduces geographical bias. From these data, a subsidiary of Symantec, MessageLabs, releases a monthly report with statistics and trends on Internet security.

Spam (*i.e.* unsolicited e-mails sent in bulk to numerous recipients) remains an ongoing concern, causing network disruptions and serving as a vehicle for spreading malware. An average 84% of spam was identified as being sent through botnets (*i.e.* malicious software that runs automatically). In September 2010, MessageLabs intelligence report found that the ratio of spam in e-mails is 91.9%. Hungary was the most spammed country with a spam rate of 96%, followed by Luxembourg (95.3%), Italy (94.8%), France (94%) and Denmark (93.9%) (Figure 5.26, left).

MessageLabs also collects data on e-mail-borne malware. Computer viruses can spread from one computer to another by e-mail. The malicious code may arrive in spam or phishing messages or in automated e-mails from known contacts whose computers have been compromised. In September 2010, one in every 218.7 e-mails (0.46%) contained malware. South Africa was the most targeted country by e-mail-borne malware, with one in every 99.2 e-mails malicious or infected. The United Kingdom was second with a virus rate of one in 117.5 e-mails, followed by Hungary (one in 120.4), Switzerland (one in 145.6) and China (one in 149) (Figure 5.26, right). The most targeted industry, with one in 35.8 e-mails blocked as malicious, was the public sector. Of all e-mail borne malware, 7.6% contained links to drive-by downloaders, which require no end-user interaction other than navigation to the URLs contained in the messages.

Figure 5.26. **Worldwide share of spam and malware in e-mails, September 2010**





Source: *MessageLabs Intelligence Report*, September 2010.

StatLink http://dx.doi.org/10.1787/888932395630

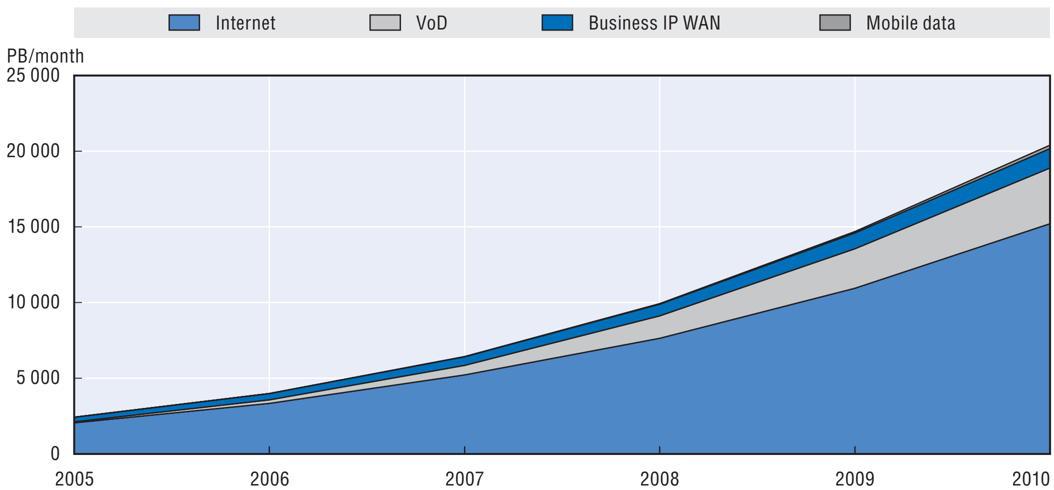
Traffic on IP networks and the Internet

Internet Protocol (IP) is used in increasing numbers of applications, which means that IP traffic plays a crucial role in communication systems. The transmission of information used for mobile data, Voice over IP (VoIP), Video on Demand (VoD) and the Internet, among others, relies on IP. Information about the growth and trends of IP-network traffic enables analysts to gain an appreciation of the scale and usage of the Internet, and anticipate future opportunities and challenges. Cisco Systems is one of the world's major producers of networking and communications technology and services. Cisco's Visual Networking Index (VNI) initiative gathers IP network traffic information with a view to tracking and forecasting growth and use of IP networks worldwide.

According to Cisco's VNI, global IP traffic has continued to grow over the past 16 years, reaching just over 20 000 Petabytes (PB) per month in 2010 – an eightfold increase in five years from just 2 426 PB/month in 2005 (Table 5.18). To provide an order of magnitude, 1 Petabyte equals 1 000 Terabytes, 1 million Gigabytes or 1 billion Megabytes. Of global IP traffic, Internet traffic (*i.e.* traffic routed through the "public" Internet) accounted for 75% in 2010. The remaining 25% of traffic was generated on private networks, including traffic on business Wide Area Networks (WANs), mobile data traffic and Video on Demand (VoD) traffic (Figure 5.27).

Traffic on the public Internet grew by nearly 50% per annum (CAGR) from 2005 to 2010. Over the same period, the subset of consumer Internet traffic grew at the slightly faster annual rate of 56% per year and represented over 80% of total Internet traffic in 2010. Meanwhile business traffic on the public Internet grew 29% per year and accounted for the remaining 20% of Internet traffic in 2010.

Figure 5.27. **Global IP traffic, 2005-10**



Source: Cisco Visual Networking Index (VNI).

StatLink http://dx.doi.org/10.1787/888932395649

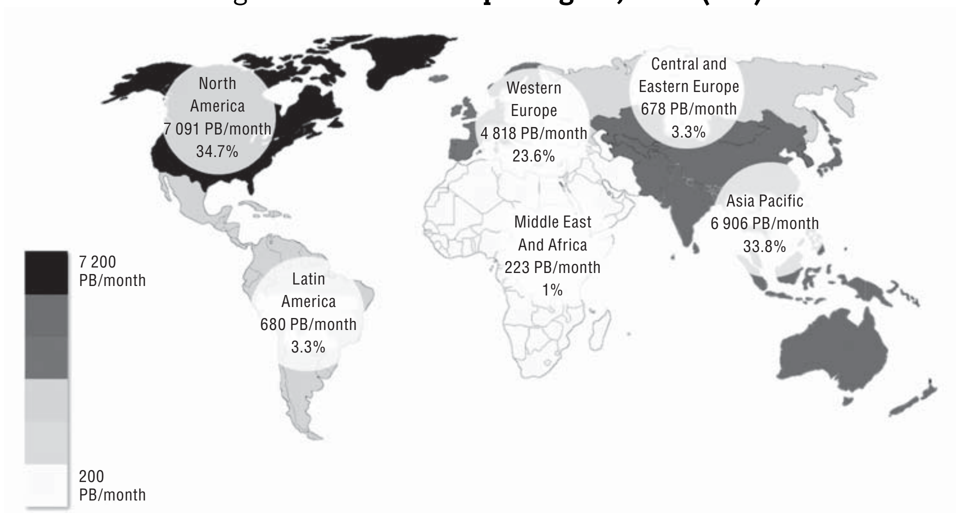
Traffic on private IP networks grew slightly slower than that on the public Internet, at 33% annually. Traffic on private business networks (which is transported over IP but remains within the corporate WAN), grew by 33% per annum and accounted for about 6% of all IP traffic in 2010. Video on Demand systems, which allow consumers to access video or audio content upon request, generated 3 680 PB/month (18% of total IP traffic), up from only 65 PB/month in 2005 and constituting a year-on-year growth of 124% over the same time period. Due to the high demand for mobile services and the introduction of increasingly high performance networks (*e.g.* 3G), mobile data traffic in 2010 reached 228 PB/month (1.1% of total IP traffic), starting from a very small base but representing yearly growth of over 200% between 2005 and 2010. As such, mobile data was the fastest growing IP traffic category (Figure 5.27).

There are important differences among world regions in regard to total generated IP traffic (both public Internet and private IP networks). North America generated the most IP traffic in 2010, representing 34.7% of the world's total (7 091 PB/month), followed by Asia Pacific at 33.8% (6 906 PB/month) and Western Europe at 23.6% (4 818 PB/month). Over the same period, Latin America and Central and Eastern Europe generated 680 PB and 678 PB/month respectively, accounting for 3.3% of the world's total; whereas Middle East and Africa's share of the world's IP traffic was only 1% in 2010 (223 PB/month) (Figure 5.28).

The top traffic-generating countries in 2010 were the United States with an estimated 31% of the world's IP traffic (6 337 PB/month), followed by Korea with 10% (2 196 PB/month) and China with 6.3% (1 277 PB/month). On a per-capita basis, Korea is the country that generated the highest amount of IP traffic with 4 555 TB/month per 100 000 inhabitants, followed by Canada (2 288 TB/month) and the United States (2 110 TB/month). It is worth noting that the United States' share of VoD traffic was particularly high (60%), mainly due to the wide adoption of VoD systems, usually available from cable providers (*e.g.* AT&T's U-verse TV, SureWest's Advanced Digital TV and Verizon's FiOS TV, among others).

The Asia Pacific region generated the most public Internet traffic, with a share of about 39% of the world's total (5 871 PB/month) and an annual growth of 47% from 2005 to 2010. This reflects the fact that Korea and Japan are among the countries with the fastest average consumer Internet connection speeds and highest broadband penetrations in the world.

Figure 5.28. **IP traffic per region, 2010 (est.)**



Source: Cisco Visual Networking Index (VNI). StatLink http://dx.doi.org/10.1787/888932395668

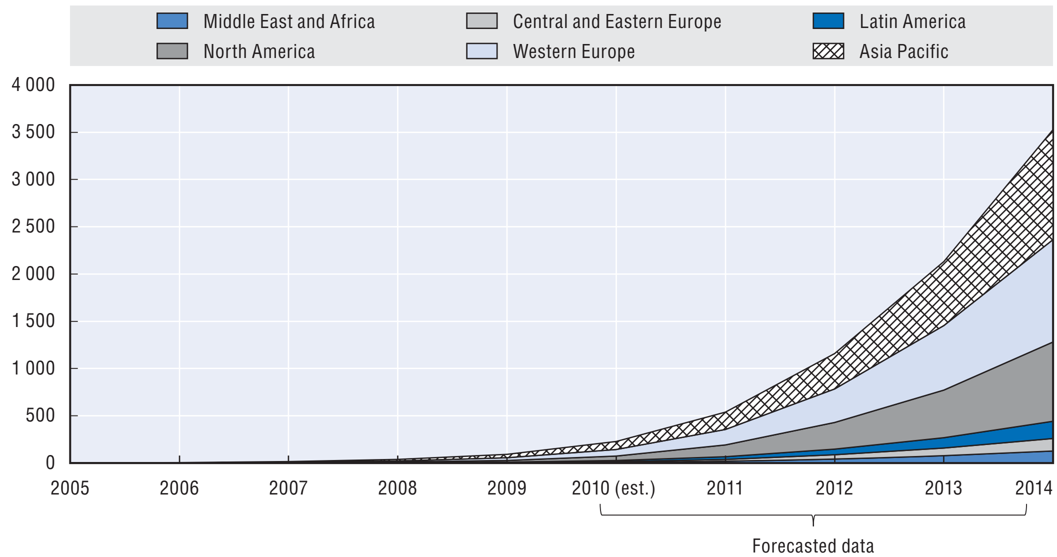
Nevertheless, given that they generated comparatively less VoD and private business IP network traffic, they generated less total IP traffic than the North American region. North America was the second region to generate the most Internet traffic with 28% of all Internet traffic (4 225 PB/month), growing at a yearly rate of 50% from 2005 to 2010.

The Asia Pacific region also generated the most mobile IP traffic in 2010, with approximately 37% share of the world's total. This can be explained in part by the fact that Japan and Korea were among the countries with the highest 3G penetration rates and consumer demand for 3G handsets and services, which generate much more traffic than their 2G mobile network predecessors. Despite low 3G penetration, some other countries in the region had significant numbers of mobile subscribers (*e.g.* China with 785 million and India with 635 million). In India, 3G services are scheduled to be launched during the first quarter of 2011, while China's Ministry of Industry and Information Technology plans to increase the number of 3G users to 150 million in 2011. Western Europe, with a mobile penetration of roughly 130%, accounted for 30% of the world's mobile IP traffic. Cisco's VNI forecast expects worldwide mobile IP traffic to grow exponentially over the next few years, as more mobile subscribers migrate to 3G networks (Figure 5.29). This is an important consideration for fixed broadband network providers planning future demand, as operators of wireless networks will transfer this traffic to fixed backbone networks across a country or around the world, depending on the communication involved.

By 2010, global IP traffic was equivalent to each OECD country inhabitant sending about four DVDs or 24 CDs every month. IP traffic has grown exponentially since 1984 (Table 5.19), with average yearly growth of 150% from 1984 to 2010. As might be expected, however, growth rates have varied significantly over the time period. For example, yearly traffic growth was nearly 1 000% in 1995 and 1996 and 100% from 1997 to 2002. Traffic growth, which remained very strong, has progressively decelerated following the turn of the century peak of 200%, to reach about 50% in 2009 and 2010.

In its first decade of existence (1984-94), the Internet was very United States-centric (Figure 5.29, left). Traffic generated by the rest of the world caught up with United States

Figure 5.29. **Mobile IP traffic worldwide by region, 2005-14 (forecasted)**

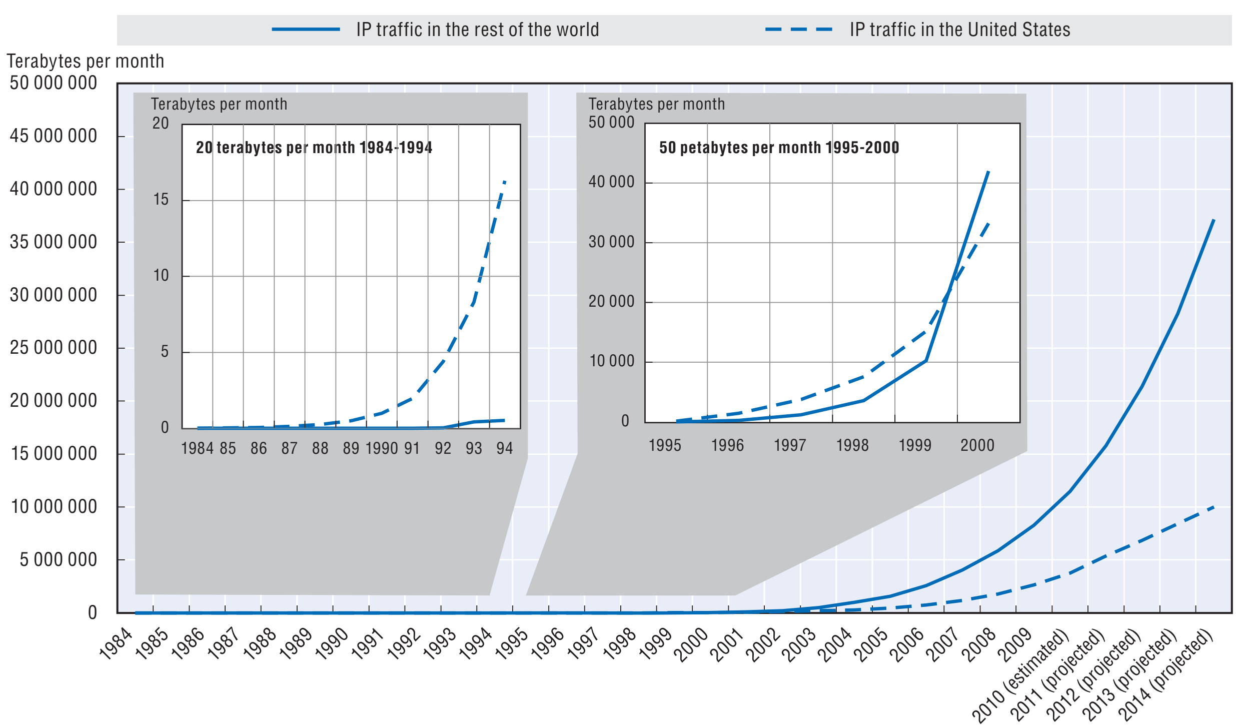


Source: Cisco Visual Networking Index (VNI).

StatLink http://dx.doi.org/10.1787/888932395687

levels at the end of 1999 (Figure 5.30, middle), and by 2010, represented over twice that of the United States. The growth of IP traffic is forecasted to continue unabated in all regions in the coming few years, as penetration levels worldwide increase, ultra-fast fibre connectivity is deployed, new services leveraging very fast connectivity are launched, and the Internet becomes truly global.

Figure 5.30. **Global IP traffic growth, 1984-2014 (forecasted)**



Source: Cisco Visual Networking Index (VNI).

StatLink http://dx.doi.org/10.1787/888932395706

Table 5.2. **Internet hosts by domain, 1998-2010**

	Domain	Number of hosts, January of each year 1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Annual growth 2000-2010 (%)
Australia	.au	665 403	792 351	1 090 468	1 615 939	2 288 584	2 564 339	2 847 763	4 820 646	6 039 486	8 529 020	10 707 139	11 337 838	12 666 849	27.8
Austria	.at	109 154	143 153	274 173	504 144	657 173	838 026	982 246	1 594 059	1 957 154	2 330 325	2 589 316	2 903 737	3 112 683	27.5
Belgium	.be	87 938	165 873	320 840	417 130	668 508	1 052 706	1 454 350	2 012 283	2 546 148	3 150 856	3 618 495	4 367 700	4 586 719	30.5
Canada	.ca	839 141	1 119 172	1 669 664	2 364 014	2 890 273	2 993 982	3 210 081	3 839 173	2 817 010	4 257 825	4 717 308	6 511 157	7 684 092	16.5
Chile	.cl	17 821	29 006	40 190	74 708	122 727	135 155	202 429	294 575	462 420	621 565	816 460	865 205	945 109	37.1
Czech Republic	.cz	52 498	73 770	112 748	153 902	213 803	239 885	315 974	724 631	993 778	1 502 537	2 093 497	3 126 690	3 302 696	40.2
Denmark	.dk	159 358	279 790	336 928	435 556	707 141	1 154 053	1 467 415	1 908 737	2 316 370	2 807 348	3 256 134	3 795 480	4 044 843	28.2
Estonia	.ee	14 299	21 991	29 682	40 094	68 729	109 643	113 154	237 461	355 015	449 036	564 608	656 053	713 772	37.4
Finland	.fi	450 044	546 244	631 248	771 725	944 670	1 140 838	1 224 155	1 915 506	2 505 805	3 187 643	3 728 551	4 041 241	4 358 465	21.3
France	.fr	333 306	488 043	779 879	1 229 763	1 670 694	2 157 628	2 770 836	4 999 770	6 863 156	10 335 974	14 356 747	13 650 159	14 828 048	34.2
Germany	.de	994 926	1 316 893	1 702 486	2 163 326	2 681 325	2 891 407	3 421 455	6 127 262	9 852 798	13 093 255	20 659 105	23 304 039	22 398 022	29.4
Greece	.gr	26 917	51 541	77 954	148 552	182 812	202 525	245 650	377 221	503 685	797 884	1 326 917	2 263 303	2 367 179	40.7
Hungary	.hu	46 082	83 530	113 695	158 732	210 804	254 462	313 576	611 887	894 800	1 176 592	1 689 456	2 168 182	2 523 024	36.3
Iceland	.is	17 450	21 894	29 598	44 040	61 682	68 282	106 296	144 636	191 528	209 071	229 916	268 100	271 042	24.8
Ireland	.ie	38 406	54 872	59 681	88 406	95 381	97 544	111 467	138 833	240 958	1 208 345	1 247 734	1 253 720	1 305 913	36.1
Israel	.il	64 233	102 090	139 946	180 263	223 012	230 167	634 001	1 004 141	1 212 264	1 311 769	1 397 740	1 522 217	1 612 648	27.7
Italy	.it	243 250	338 822	658 307	1 630 526	2 282 457	3 864 315	5 469 578	9 343 663	11 222 960	13 853 673	16 730 591	19 487 125	22 493 165	42.4
Japan	.jp	1 168 956	1 687 534	2 636 541	4 640 863	7 118 333	9 260 117	12 962 065	19 543 040	24 903 795	30 841 523	36 803 719	43 461 277	52 081 808	34.8
Korea[1]	.kr	121 932	186 414	283 459	397 809	439 859	407 318	253 242	213 045	245 566	304 113	342 178	331 231	297 268	0.5
Luxembourg	.lu	4 273	21 894	9 670	11 744	16 735	17 260	28 214	61 785	84 257	89 938	158 681	209 367	240 728	37.9
Mexico	.mx	41 659	112 620	404 873	663 553	918 288	1 107 795	1 333 406	1 868 583	2 555 047	6 697 570	10 071 370	12 515 249	12 471 162	40.9
Netherlands	.nl	381 172	564 129	820 944	1 309 911	1 983 102	2 415 286	3 419 182	6 443 558	7 258 159	9 014 103	10 540 083	11 682 001	12 512 224	31.3
New Zealand	.nz	169 264	137 247	271 003	345 107	408 290	432 957	474 395	651 065	971 900	1 355 534	1 687 494	1 772 571	2 458 678	24.7
Norway	.no	286 338	318 631	401 889	525 030	629 669	589 621	1 013 273	1 237 270	2 109 283	2 370 078	2 725 031	3 113 496	3 181 501	23.0
Poland	.pl	77 594	108 588	183 057	371 943	654 198	843 475	1 296 766	2 482 546	3 941 769	5 001 786	7 134 976	8 350 365	9 737 427	48.8
Portugal	.pt	39 533	49 731	90 757	177 828	263 821	291 355	299 923	605 648	1 378 817	1 510 958	1 643 768	1 919 035	2 208 550	37.6
Slovak Republic	.sk	11 836	17 953	25 906	36 680	68 972	80 660	98 788	188 352	322 753	486 020	695 520	759 106	1 003 248	44.1
Slovenia	.si	15 432	17 984	20 535	23 594	26 475	30 002	34 734	48 133	61 408	64 284	69 356	80 502	102 739	17.5
Spain	.es	168 913	264 245	415 641	663 553	1 497 450	1 694 601	1 127 366	1 304 558	2 459 614	2 929 627	3 085 513	3 325 990	3 706 492	24.5
Sweden	.se	319 065	431 809	594 627	764 011	1 141 093	1 209 266	1 539 917	2 668 816	2 817 010	3 039 770	3 513 170	3 868 362	3 999 207	21.0
Switzerland	.ch	114 816	224 350	306 073	461 456	613 918	723 243	1 018 445	1 785 427	2 125 269	2 570 891	3 308 684	3 464 568	3 974 072	29.2
Turkey	.tr	24 786	32 496	90 929	113 603	139 805	199 823	344 859	611 557	794 795	1 581 866	2 425 789	2 596 496	3 104 180	42.3
United Kingdom	.uk	987 733	1 423 804	1 901 812	2 291 369	2 462 915	2 583 753	3 715 752	4 449 190	5 778 422	6 650 334	7 727 550	8 980 515	9 430 637	17.4
United States		*6 618 382*	*8 746 846*	*10 490 416*	*12 052 491*	*12 579 595*	*11 683 370*	*11 422 195*	*13 872 605*	*14 831 525*	*14 896 066*	*15 758 584*	17 554 317	*19 536 508*	6.4
	.us	1 076 583	1 562 391	1 875 663	2 267 089	2 125 624	1 735 734	1 757 664	2 429 244	2 441 426	2 026 166	1 971 396	2 091 917	2 196 419	1.6
	.edu	3 944 967	5 022 815	6 085 137	7 106 062	7 754 038	7 459 219	7 576 992	8 992 398	9 806 021	10 177 586	10 659 326	11 812 901	12 316 029	7.3
	.mil	1 099 186	1 510 440	1 751 866	1 844 369	1 906 902	1 880 903	1 410 944	1 667 794	1 861 535	1 991 136	2 193 578	2 510 868	2 628 382	4.1
	.gov	497 646	651 200	777 750	834 971	793 031	607 514	676 595	783 169	722 543	701 178	934 284	1 138 631	2 395 678	11.9
OECD total		14 711 910	19 975 308	27 015 619	36 871 365	46 932 293	53 564 859	65 272 948	98 129 662	123 614 724	158 227 179	197 421 180	225 506 394	249 260 698	24.9
Europe	.eu	0	0	0	0	0	0	0	0	0	8 696	25 259	82 072	131 471	147.3
gTLDs		*14 005 613*	*21 742 617*	*42 685 540*	*68 514 456*	*93 617 371*	*103 654 125*	*150 831 956*	*197 045 451*	*242 569 353*	*241 428 097*	*287 188 078*	329 980 596	*398 748 549*	25.0
	.com	8 201 511	12 140 747	24 863 331	36 352 243	44 520 209	40 555 072	48 688 919	56 428 268	69 578 775	76 984 153	95 448 209	123 324 475	142 526 322	19.1
	.net	5 283 568	8 856 687	16 853 655	30 885 116	47 761 383	61 945 611	100 751 276	139 057 448	171 346 396	162 929 985	190 267 719	204 683 342	253 853 098	31.2
	.org	519 862	744 285	959 827	1 267 662	1 321 104	1 116 311	1 332 978	1 459 335	1 516 898	1 396 498	1 333 870	1 711 252	1 994 366	7.6
	.int	672	898	8 727	9 435	11 048	11 594	13 625	13 120	15 756	16 808	16 484	18 944	18 487	7.8
	.biz	0	0	0	0	1 477	16 680	28 586	53 672	45 934	39 592	36 612	64 073	66 683	..
	.info	0	0	0	0	2 128	8 349	15 502	30 828	60 533	54 351	75 764	146 340	253 710	..
	.name	0	0	0	0	7	217	318	913	1 267	1 210	1 471	2 949	3 331	..
	.pro	0	0	0	0	2	2	5	15	36	46	61	164	418	..
	.aero	0	0	0	0	0	132	315	627	768	690	1 431	1 729	1991	..
	.coop	0	0	0	0	9	148	417	1 191	2 953	4 705	6 354	23 262	25 272	..
	.museum	0	0	0	0	4	9	15	19	22	20	23	27	37	..
	.travel	0	0	0	0	0	0	0	15	**15**	39	80	4 039	4 834	..
World total	World	29 669 611	43 229 694	72 398 092	109 574 429	147 344 723	171 638 297	233 101 481	317 646 084	394 991 609	433 193 199	541 677 360	625 226 456	732 740 444	26.0

1. Korea's actual number of hosts may be underestimated as the ISC survey methodology relies on ARPA zone information which is not reported by Korean network operators.

Source: Internet Software Consortium (*www.isc.org*)

StatLink http://dx.doi.org/10.1787/888932398157

Table 5.3. **Web servers by domain, 2000-2010**

	Domain	Number of web servers, July of each year 2000	2002	2004	2006	2008	2010	Annual growth
Australia	.au	26 119	66 605	121 004	163 737	268 387	380 857	30.7%
Austria	.at	22 078	43 816	75 113	119 022	184 311	250 420	27.5%
Belgium	.be	7 386	19 147	51 684	180 654	205 713	279 672	43.8%
Canada	.ca	22 105	53 335	106 883	152 681	238 565	317 182	30.5%
Chile	.cl	2 022	5 243	10 956	17 231	31 759	43 731	36.0%
Czech Republic	.cz	12 626	35 600	69 120	116 240	261 879	414 375	41.8%
Denmark	.dk	25 280	135 984	147 681	204 654	247 777	300 857	28.1%
Estonia	.ee	4 803	11 777	15 645	20 531	25 785	32 885	21.2%
Finland	.fi	9 836	16 708	25 284	37 762	59 465	88 202	24.5%
France	.fr	20 471	47 200	55 981	155 163	411 471	613 391	40.5%
Germany	.de	179 542	493 016	1 063 877	1 593 296	2 311 389	2 829 820	31.8%
Greece	.gr	3 337	9 779	18 488	28 993	56 822	83 284	37.9%
Hungary	.hu	5 392	15 919	41 556	118 214	263 090	379 531	53.0%
Iceland	.is	1 199	2 914	7 243	9 731	21 385	36 525	40.7%
Ireland	.ie	2 905	7 291	11 545	17 592	30 110	45 448	31.7%
Israel	.il	8 387	10 277	14 605	20 681	44 648	68 021	23.3%
Italy	.it	33 168	89 517	191 690	297 304	484 154	629 917	34.2%
Japan	.jp	45 581	145 929	297 446	399 275	808 599	1 184 736	38.5%
Korea	.kr	11 576	39 791	433 837	140 699	158 754	224 297	34.5%
Luxembourg	.lu	1 409	2 467	3 747	5 321	8 559	10 767	22.6%
Mexico	.mx	4 552	9 605	14 860	21 065	33 330	50 293	27.2%
Netherlands	.nl	48 014	167 993	305 358	601 492	1 126 853	1 585 323	41.9%
New Zealand	.nz	8 757	23 834	40 055	58 330	83 377	108 188	28.6%
Norway	.no	10 531	26 646	48 471	69 061	104 585	137 574	29.3%
Poland	.pl	22 265	133 501	373 468	524 888	741 599	1 340 977	50.7%
Portugal	.pt	5 113	8 645	14 637	25 588	43 724	47 611	25.0%
Slovak Republic	.sk	4 479	15 930	22 711	62 126	61 167	101 091	36.6%
Slovenia	.si	2 632	9 411	10 665	10 140	18 124	26 457	26.0%
Spain	.es	9 146	13 526	19 342	36 269	96 600	171 443	34.1%
Sweden	.se	23 265	33 870	50 773	82 574	158 249	287 732	28.6%
Switzerland	.ch	36 082	77 166	190 134	182 553	273 771	366 676	26.1%
Turkey	.tr	4 897	9 546	14 227	19 918	37 650	54 537	27.3%
United Kingdom	.uk	131 415	277 031	437 404	634 677	955 977	1 193 585	24.7%
United States								
	.us	17 299	29 876	98 633	115 445	155 239	200 409	27.8%
	.edu	46 272	78 213	106 244	129 458	156 845	182 515	14.7%
	.gov	6 648	10 462	14 642	18 909	23 735	27 517	15.3%
Total ccTLDs world						13 392 745	18 833 904	
Total gTLDs world						19 849 192	27 027 292	
	.com	992 618	4 689 003	7 239 594	8 884 634	14 782 393	20 587 353	35.4%
	.net	106 613	534 214	1 078 762	1 293 624	2 138 109	2 888 408	39.1%
	.org	124 150	451 254	791 389	1 081 603	1 628 373	2 124 981	32.8%
World total	World	2 213 960	8 420 350	14 978 181	19 863 342	33 241 937	45 861 196	35.4%

Source: Security Space *(www.securityspace.com)*

StatLink http://dx.doi.org/10.1787/888932398176

Table 5.4. **Secure servers in OECD countries, 1998-2010**

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Australia	632	1 305	2 828	3 704	4 795	6 533	8 079	10 513	12 343	16 971	21 229	27 096	39 317
Austria	98	241	447	881	1 019	1 277	1 590	1 976	2 416	3 321	4 010	4 707	7 182
Belgium	52	159	268	431	458	658	912	1 284	1 549	2 041	2 678	3 523	5 329
Canada	929	1 789	3 896	6 050	8 497	12 623	15 166	18 946	21 383	26 789	30 200	33 826	42 258
Chile			131		197	253		353	378	482	589	694	904
Czech Republic	19	88	194	383	194	262	315	443	681	1 081	1 569	2 067	3 349
Denmark	44	112	289	523	794	1 284	1 681	2 679	3 441	4 397	5 698	6 598	10 386
Estonia			75		81	103		139	225	288	375	418	582
Finland	68	180	343	660	804	1 055	1 255	1 671	2 054	2 871	3 635	4 429	6 680
France	222	632	1 297	1 969	2 566	3 245	3 799	4 973	6 049	8 676	10 653	13 578	19 275
Germany	492	1 630	3 761	6 442	8 096	9 438	13 163	23 566	29 376	37 803	45 143	53 658	71 312
Greece	8	48	87	176	160	247	270	357	461	589	688	950	1 406
Hungary	18	26	90	165	101	162	199	312	370	593	838	1 190	1 662
Iceland	13	29	67	91	151	196	249	313	397	442	495	560	803
Ireland	56	97	245	467	639	959	1 201	1 542	1 790	2 408	3 001	3 372	4 472
Israel			306		430	660		1 142	1 308	1 637	1 993	2 222	3 024
Italy	167	432	795	1 264	1 196	1 669	1 977	2 696	3 236	4 330	5 552	6 733	9 340
Japan	429	1 170	2 900	7 952	9 196	15 044	19 610	34 379	43 960	51 013	60 235	66 917	82 823
Korea	38	106	243	397	626	793	878	991	1 180	4 704	5 005	6 008	8 195
Luxembourg	11	26	44	68	91	133	184	226	274	354	445	559	716
Mexico	26	58	176	310	358	508	605	899	1 054	1 404	1 667	1 890	2 337
Netherlands	127	306	541	1 064	1 466	2 553	3 595	5 519	6 945	12 786	18 173	24 398	37 828
New Zealand	90	227	482	778	1 054	1 427	1 668	2 111	2 524	3 503	4 184	4 635	6 506
Norway	55	130	273	491	599	865	1 122	1 474	1 864	2 929	4 030	5 062	8 073
Poland	23	61	188	467	358	447	557	865	1 518	2 104	3 229	4 999	8 049
Portugal	27	59	116	192	234	355	443	623	686	918	1 224	1 463	1 847
Slovak Republic	15		45	110	40	52	61	100	160	228	313	469	693
Slovenia			96		122	104		170	197	281	347	435	622
Spain	239	432	759	1 194	1 491	2 280	2 745	3 697	4 570	6 405	7 753	9 082	10 756
Sweden	145	406	811	1 261	1 302	1 860	2 826	3 134	3 831	5 495	7 119	8 103	11 895
Switzerland	152	401	854	1 370	1 668	2 179	2 826	3 622	4 486	6 137	7 456	8 882	14 614
Turkey	7	50	116	285	420	606	855	1 287	1 860	2 818	4 230	5 154	7 202
United Kingdom	714	1 735	4 404	7 916	10 853	16 061	20 339	29 100	34 548	46 011	55 564	66 051	86 878
United States	14 674	32 053	65 565	86 025	112 359	165 479	197 769	239 137	262 610	319 836	357 246	386 499	446 992
OECD	19 590	43 988	92 732	133 086	172 415	251 370	305 939	400 239	459 724	581 645	676 566	766 227	963 307
Unknown			1		0	98		37 335	78 876	175 484	291 302	441 434	561 776
World	20 300		119 020	140 841	182 678	261 094	324 816	452 630	556 022	779 920	996 172	1 242 270	1 522 128

Note: Data collected at the end of the year.

Source: Netcraft *(www.netcraft.com)*

StatLink http://dx.doi.org/10.1787/888932398195

Table 5.5. **Domain name registrations under top level domains, 2000-2010**

	Domain	2000	2002	2004	2006	2008	2010	Annual growth (%) 2000-2010	Share of world domains (%)
Australia	.au	148 539	300 000	447 384	721 952	1 199 365	1 759 295	28.0	0.9
Austria	.at	157 387	252 441	341 841	548 060	759 033	939 951	19.6	0.5
Belgium	.be	32 709	206 989	348 401	1 056 976	802 287	1 044 492	41.4	0.5
Canada	.ca	60 000	300 000	447 689	720 094	1 063 378	1 428 172	37.3	0.7
Chile	.cl	34 319	77 632	106 795	156 491	218 174	288 302	23.7	0.1
Czech Republic	.cz	66 555	119 145	174 914	259 590	453 932	693 760	26.4	0.4
Denmark	.dk	208 300	397 552	528 886	708 693	930 904	1 070 525	17.8	0.5
Estonia	.ee	..	..	22 327	40 135	59 500	81 500	24.1	0.0
Finland	.fi	17 603	36 210	86 793	137 040	172 201	241 659	29.9	0.1
France	.fr	89 097	155 554	268 361	564 839	1 170 383	1 787 767	35.0	0.9
Germany	.de	1 732 994	5 666 269	7 799 823	10 013 686	12 148 809	13 723 381	23.0	7.0
Greece	.gr	18 670	55 190	80 000	150 332	*200 000*	218 521	27.9	0.1
Hungary	.hu	39 470	81 804	100 000	250 000	390 000	529 000	29.6	0.3
Iceland	.is	3 300	8 200	10 500	15 500	22 000	29 586	24.5	0.0
Ireland	.ie	15 506	29 920	40 205	63 933	107 167	146 937	25.2	0.1
Israel	.il	..	..	..	..	128 861	169 168	14.6	0.1
Italy	.it	417 609	735 156	909 241	1 236 918	1 566 390	1 932 090	16.6	1.0
Japan	.jp	190 709	482 644	587 412	845 603	1 033 412	1 170 965	19.9	0.6
Korea	.kr	494 074	479 643	612 840	693 515	939 819	1 086 635	8.2	0.6
Luxembourg	.lu	11 404	15 454	17 845	24 376	40 305	53 076	16.6	0.0
Mexico	.mx	49 947	71 590	91 559	174 490	266 896	430 259	24.0	0.2
Netherlands	.nl	532 596	748 510	1 005 292	1 991 799	3 027 731	3 976 244	22.3	2.0
New Zealand	.nz	56 765	107 046	149 269	221 433	341 490	402 331	21.6	0.2
Norway	.no	45 541	150 000	208 546	285 947	395 211	481117	26.6	0.2
Poland	.pl	56 708	139 373	262 986	485 891	1 134 298	1 859 365	41.8	0.9
Portugal	.pt	18 739	38 048	57 546	118 452	222 293	322 843	32.9	0.2
Slovak Republic	.sk	22 081	57 091	64 100	97 811	161 888	220 364	25.9	0.1
Slovenia	.si	..	..	10 869	21 300	39 525	56 531	31.6	0.0
Spain	.es	29 590	43 476	85 309	298 600	1 024 795	1 207 851	44.9	0.6
Sweden	.se	45 241	102 785	225 507	468 825	750 000	968 405	35.8	0.5
Switzerland	.ch	267 425	445 230	609 426	785 406	1 169 074	1 454 660	18.5	0.7
Turkey	.tr	22 428	40 059	62 163	94 076	161 017	223 803	25.9	0.1
United Kingdom	.uk	1 938 740	3 635 585	3 802 885	5 141 040	6 941 940	8 587 726	16.0	4.4
United States	.us	6 468	269 233	875 016	1 003 212	1 397 964	1 634 491	73.9	0.8
OECD ccTLDs		6 830 514	*15 247 829*	*20 441 730*	*29 396 015*	*40 440 042*	50 220 772	22.1	25.6
China	.cn	103 203	126530	393974	1173330	12 364 615	7 246 686	53.0	3.7
Argentina	.ar	255536	..	..	1150000	1527461	1 850 000	21.9	0.9
Brazil	.br	305 002	394508	653113	927146	1 366 991	2 168 330	21.7	1.1
India	.in	2 319	..	7000	170000	389 858	510 000	71.5	0.3
Rest of world ccTLDs		1 806 964	*2 314 679*	*5 951 209*	*8 834 134*	*24 559 958*	26 079 228	30.6	13.3
Total ccTLDs		8 637 478	*17 562 508*	*26 392 939*	38,230,149	65 000 000	76 300 000	24.3	38.9
Major gTLDs		17 476 025	*27 113 371*	*38 278 040*	*65 242 646*	*94 202 651*	*106 660 193*	19.8	54.3
	.com	13 721 175	21 198 557	30 267 141	52 752 949	75 779 078	85 583 963	20.1	43.6
	.net	2 305 075	3 586 124	4 910 121	7 728 195	11 521 124	12 839 575	18.7	6.5
	.org	1 449 775	2 328 690	3 100 778	4 761 502	6 902 449	8 236 655	19.0	4.2
	.biz	..	700 962	1 028 314	1 423 179	1 973 994	2 028 703	14.2	1.0
	.info	..	864 457	1 235 485	3 132 195	4 851 813	6 163 763	27.8	3.1
	.name	..	78 041	99,509	205 326	284 692	243 337	15.3	0.1
	.mobi	..	..	..	..	924 690	975 568		0.5
Europe		..	..	..	2 036 467	2 882 361	3 250 336	12.4	1.7
World total		..	..	*64,500,000*	*105,000,000*	*168 000 000*	*196 300 000*	*20.4*	100.0

Note: Registrations at mid year, or nearest available count. Values in italics are estimates.

Source: OECD, compiled from country and generic NICs and from ZookNIC, August 2010.

StatLink http://dx.doi.org/10.1787/888932398214

Table 5.6. **Domain name registrations by top-level domain**

	ccTLD	gTLDs	.eu	Total
Australia	1 759 295	2 032 268		3 791 563
Austria	939 917	432 327	83 198	1 455 442
Belgium	1 044 492	392 648	99 467	1 536 607
Canada	1 428 172	3 953 902		5 382 074
Chile	285 593	66 529		352 122
Czech Republic	693 735	281 144	117 656	1 092 535
Denmark	1 069 772	310 528	37 078	1 417 378
Estonia	81 500	30 157	10 280	121 937
Finland	242 658	278 498	14 679	535 835
France	1 769 359	3 174 873	281 216	5 225 448
Germany	13 723 381	6 579 281	989 065	21 291 727
Greece	200 013	129 204	30 813	360 030
Hungary	529 000	129 604	35 502	694 106
Iceland	29 586	32 880		62 466
Ireland	145 653	368 809	50 800	565 262
Israel	169 168	290 174		459 342
Italy	1 932 090	2 086 801	188 901	4 207 792
Japan	1 170 965	2 021 961		3 192 926
Korea	1 086 439	808 688		1 895 127
Luxembourg	53 076	40 492	26 175	119 743
Mexico	430 259	400 973		831 232
Netherlands	3 940 604	1 615 997	423 202	5 979 803
New Zealand	402 331	218 822		621 153
Norway	481 117	455 444		936 561
Poland	1 859 365	451 846	198 838	2 510 049
Portugal	322 633	246 897	12 777	582 307
Slovak Republic	220 364	44 757	24 741	289 862
Slovenia	81 067	77 553	7 721	166 341
Spain	1 207 851	2 126 869	79 723	3 414 443
Sweden	968 405	586 417	74 277	1 629 099
Switzerland	1 454 660	574 718		2 029 378
Turkey	222 029	1 213 388		1 435 417
United Kingdom	8 587 726	5 561 266	320 347	14 469 339
United States	1 721 848	66 800 713		68 522 561
OECD	50 254 123	103 816 428	3 106 456	157 177 007
World	78 126 186	119 717 950	3 224 064	201 068 200

Note: gTLD and .eu registrations at September 2010 and ccTLD registrations at June 2010. gTLD registrations are estimates based on the country location of the registrant of a domain.

Source: Zooknic, October 2010.

StatLink http://dx.doi.org/10.1787/888932398233

Table 5.7. **Cumulative total of IPv4 address allocations by country, 1997-2010**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Australia	19 351 552	19 623 168	19 979 264	20 914 688	21 761 536	22 297 600	23 056 384	24 537 856	26 220 544	30 033 152	32 743 168	35 802 368	38 439 936	45 114 112
Austria	1 367 296	1 595 136	1 988 992	2 588 288	3 358 880	3 640 736	4 050 336	4 834 976	5 451 936	6 003 680	6 660 576	6 966 496	7 451 872	8 348 128
Belgium	941 824	974 592	1 220 352	1 585 664	1 987 328	2 695 424	3 014 144	3 694 336	4 248 320	5 000 576	5 421 696	6 264 704	7 817 600	8 442 240
Canada	53 848 832	54 403 072	55 491 584	57 220 352	58 582 272	59 905 280	60 809 216	62 521 344	64 647 168	66 518 784	70 966 016	74 239 232	76 815 360	79 445 760
Chile	1 663 232	1 663 232	1 728 768	1 767 936	2 042 368	2 181 632	2 387 712	2 615 040	2 998 016	3 502 336	4 070 656	4 528 384	4 878 592	5 679 104
Czech Republic	740 096	789 248	846 592	953 088	1 120 000	1 318 144	1 633 792	2 483 456	3 085 824	4 261 248	4 908 160	5 911 936	6 802 816	7 731 072
Denmark	1 093 888	1 589 760	1 802 752	2 354 560	3 176 448	3 697 984	4 769 088	5 212 096	6 804 416	7 399 296	7 900 384	9 210 080	10 007 016	10 689 512
Estonia	122 880	131 072	147 456	151 552	208 896	266 496	340 224	444 928	634 624	811 008	846 336	875 288	904 216	995 128
Finland	2 815 232	3 182 336	3 399 424	3 752 448	4 110 592	4 697 216	5 079 936	6 304 640	7 470 720	8 439 936	8 682 112	8 908 800	9 070 720	9 357 760
France	2 944 000	3 325 696	3 842 304	4 655 072	6 062 688	7 620 960	12 623 456	14 702 176	27 720 928	40 736 512	54 111 872	54 737 696	58 592 672	62 335 072
Germany	25 942 152	27 301 384	28 914 952	33 041 400	38 784 760	39 648 376	40 757 688	47 507 192	53 541 560	64 699 864	73 812 952	81 100 504	84 634 488	90 894 840
Greece	322 048	496 896	545 536	828 672	1 080 320	1 103 872	1 176 064	1 358 848	1 606 400	2 196 736	2 925 824	3 532 800	3 815 168	4 519 936
Hungary	557 824	624 896	674 048	793 856	1 001 472	1 075 712	1 285 120	1 972 736	2 261 376	2 913 152	3 315 840	3 593 856	3 940 736	4 231 296
Iceland	139 264	147 456	147 456	184 320	208 896	270 336	356 352	376 832	505 856	581 632	593 920	610 816	611 328	627 200
Ireland	258 816	285 440	303 872	537 344	561 920	603 136	800 000	1 032 192	2 848 000	3 368 704	3 923 968	4 203 264	4 643 136	4 869 920
Israel	147 712	196 864	525 568	799 744	851 200	1 204 992	1 496 576	2 279 040	2 627 520	3 040 448	3 593 408	3 909 824	4 398 272	5 033 408
Italy	2 015 232	2 498 560	3 234 816	4 524 288	6 604 640	8 559 712	11 039 328	12 953 696	17 499 232	18 281 792	23 364 160	29 210 432	33 367 104	36 070 720
Japan	65 607 168	66 680 576	69 072 640	71 366 400	81 701 120	92 345 856	104 744 704	117 129 728	140 434 176	148 825 600	155 969 280	165 965 824	176 984 832	186 463 488
Korea	7 403 264	8 320 768	10 549 504	19 069 184	23 140 608	27 339 008	31 140 096	34 310 400	43 195 904	51 126 528	58 859 008	66 820 352	77 768 192	103 287 808
Luxembourg	64 768	72 960	98 560	111 104	135 680	158 720	169 984	238 592	287 744	298 496	368 128	456 768	579 648	613 184
Mexico	4 784 640	4 784 640	4 915 712	5 308 928	5 505 536	5 640 704	6 296 064	7 344 640	11 014 656	16 257 536	21 500 416	21 502 208	22 550 784	27 793 664
Netherlands	2 617 088	3 098 368	3 927 040	6 384 160	7 683 360	8 778 784	11 487 552	14 232 416	16 353 384	18 071 912	19 934 440	20 844 264	22 923 752	23 996 136
New Zealand	2 925 312	2 979 584	3 140 608	3 292 672	3 381 760	3 529 728	3 691 776	3 972 864	4 278 016	4 784 128	5 264 128	5 948 672	6 125 056	6 849 792
Norway	1 859 328	1 962 560	2 054 464	2 342 720	2 954 624	3 111 200	3 423 008	4 258 848	5 843 616	6 429 088	6 872 736	7 434 160	7 995 312	8 785 072
Poland	875 008	1 182 976	1 466 880	2 141 952	2 988 288	3 405 120	5 941 312	6 506 848	7 392 608	10 140 744	12 178 280	13 430 760	14 367 624	16 255 592
Portugal	578 048	595 456	874 752	1 002 816	1 092 928	1 257 536	1 483 840	1 965 632	2 610 752	3 270 720	3 552 576	4 203 616	4 820 832	5 188 192
Slovak Republic	358 144	419 584	437 248	476 416	530 176	584 960	618 752	739 072	992 256	1 164 288	1 341 184	1 428 736	1 705 472	1 970 496
Slovenia	262 912	279 296	353 024	374 272	400 128	446 976	500 480	579 456	700 544	963 712	1 053 824	1 221 760	1 452 928	1 804 928
Spain	1 165 056	1 402 624	2 361 088	3 770 112	5 901 568	7 463 424	9 167 360	13 212 928	16 143 136	18 514 976	20 323 488	21 616 544	22 697 120	24 142 496
Sweden	3 173 632	3 550 208	4 347 392	5 687 808	6 689 792	8 209 344	8 790 016	11 930 496	12 680 064	15 557 408	17 615 712	18 076 320	19 625 640	20 715 240
Switzerland	20 095 744	20 497 408	20 776 192	21 329 408	21 816 160	22 305 120	22 757 472	23 422 944	24 383 200	24 881 120	25 286 528	25 434 792	26 244 520	27 261 864
Turkey	377 600	648 448	1 000 960	1 556 736	1 691 904	2 018 560	2 137 856	3 376 576	5 556 928	5 695 424	8 307 392	9 997 504	10 602 688	11 626 688
United Kingdom	24 612 232	25 924 768	28 374 176	32 225 904	35 571 472	39 665 240	45 331 960	46 975 096	56 698 552	60 528 728	66 923 768	69 954 136	74 127 192	81 638 488
United States	1 069 200 128	1 122 866 176	1 142 442 752	1 167 516 928	1 192 882 744	1 213 104 184	1 234 095 616	1 263 509 760	1 308 641 792	1 353 211 136	1 401 646 080	1 455 414 016	1 493 947 392	1 531 657 472
OECD	1 320 231 952	1 384 095 208	1 420 986 728	1 480 610 792	1 545 572 064	1 600 152 072	1 666 453 264	1 748 537 680	1 887 379 768	2 007 510 400	2 134 838 016	2 243 356 912	2 340 710 016	2 464 435 808
World	2 081 772 576	2 150 270 472	2 194 302 488	2 266 423 960	2 348 856 400	2 417 816 440	2 504 714 800	2 628 351 728	2 802 844 608	2 970 995 144	3 175 058 024	3 378 458 456	3 568 013 928	3 792 840 392

Note: Data collected at the end of the year.

Source: www.potaroo.net/reports/oecd, based on report files published by the RIRs.

StatLink http://dx.doi.org/10.1787/888932398252

Table 5.8. **Routed IPv4 addresses by country, 1997-2010**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	CAGR 1997-2010
Australia	11 090 443	11 195 665	11 431 699	12 457 761	16 189 577	16 141 484	16 920 773	17 909 564	19 457 412	21 873 194	25 184 216	26 829 266	29 425 428	35 533 600	9%
Austria	1 163 266	1 402 881	1 599 745	1 873 412	2 305 291	3 058 443	3 239 691	4 178 957	4 972 815	5 402 419	6 176 288	6 586 624	7 020 800	7 926 784	16%
Belgium	699 904	719 617	930 050	1 169 412	1 618 182	2 476 295	2 762 767	3 425 037	3 954 962	4 615 442	5 031 424	5 717 760	7 389 696	7 979 776	21%
Canada	21 681 439	23 421 216	23 492 903	28 877 965	31 382 432	30 894 240	31 135 372	32 759 167	34 660 775	35 114 176	40 514 816	43 709 952	45 675 264	47 770 624	6%
Chile	1 396 737	1 324 800	1 406 209	1 414 660	1 515 013	1 644 044	1 725 712	2 111 514	2 419 747	2 921 781	3 397 632	3 817 984	4 187 648	4 772 608	10%
Czech Republic	802 560	841 728	910 593	1 102 592	1 136 385	1 463 555	1 575 940	2 044 166	2 827 800	3 970 323	4 695 552	5 654 272	6 192 640	7 382 016	19%
Denmark	1 158 850	1 536 739	1 758 820	1 922 529	2 429 893	3 560 834	3 923 650	4 916 675	6 546 371	6 907 398	7 753 728	9 034 496	9 763 200	10 389 888	18%
Estonia	125 184	133 121	133 122	149 249	244 480	269 056	342 016	396 288	551 168	781 568	841 216	873 984	896 256	987 904	17%
Finland	2 320 387	2 795 023	3 272 704	3 367 690	3 528 975	4 606 212	4 619 398	5 904 580	7 190 921	8 184 452	8 423 424	8 643 072	8 775 936	9 150 208	11%
France	2 008 836	2 532 867	3 101 740	3 605 929	4 697 231	6 564 498	7 360 144	9 609 363	16 573 975	25 152 156	37 613 444	41 377 536	43 310 592	43 537 152	27%
Germany	23 075 591	24 607 273	25 887 918	28 396 705	33 996 292	36 715 285	37 521 241	43 819 810	49 013 555	59 857 340	70 462 704	77 762 288	81 314 032	87 505 904	11%
Greece	291 329	446 467	523 010	584 961	629 507	1 051 393	1 144 065	1 518 854	1 640 462	1 845 522	2 542 362	3 315 200	3 439 104	4 198 656	23%
Hungary	536 832	604 418	654 338	761 602	937 474	1 057 538	1 232 128	1 760 773	2 034 435	2 664 962	3 170 816	3 499 008	3 792 896	4 128 768	17%
Iceland	131 584	147 968	214 528	243 200	267 008	320 256	344 832	360 960	494 080	573 440	576 768	607 488	602 112	617 472	13%
Ireland	212 481	231 168	245 504	295 680	366 848	586 240	631 041	1 045 507	2 828 035	3 323 141	3 779 584	4 093 696	4 473 856	4 751 104	27%
Israel	219 136	304 640	558 850	702 531	754 692	1 129 477	1 422 602	1 952 278	2 401 819	2 601 258	3 550 720	3 816 960	4 349 440	4 933 888	27%
Italy	1 918 883	2 562 471	3 296 165	3 832 232	5 003 184	7 093 780	7 909 397	9 217 561	13 740 841	16 540 653	20 555 456	26 662 656	30 105 856	33 118 208	24%
Japan	31 623 436	32 908 827	34 047 269	36 206 914	46 052 653	57 101 366	63 912 487	77 484 985	87 656 783	107 654 500	119 096 896	124 540 480	138 532 416	146 193 216	12%
Korea	6 873 859	7 698 444	9 776 937	16 275 525	20 442 849	23 767 433	27 886 953	33 526 649	41 290 737	46 952 482	57 714 368	62 967 272	74 597 216	97 006 112	23%
Luxembourg	52 992	66 880	77 888	89 920	107 584	141 569	152 064	197 888	238 080	273 152	345 856	396 288	553 728	584 448	20%
Mexico	4 078 858	4 284 939	4 578 317	4 762 389	5 007 906	5 227 561	5 419 564	5 661 235	6 871 351	12 662 096	15 359 232	17 744 128	18 550 784	17 919 488	12%
Netherlands	2 446 083	2 989 570	3 660 545	4 283 943	6 185 224	7 999 003	9 074 203	11 806 760	15 464 753	17 185 330	18 786 560	19 716 608	21 599 488	22 697 472	19%
New Zealand	2 523 911	2 284 801	2 255 618	2 277 895	2 242 841	2 465 810	2 613 006	2 873 356	2 991 380	3 255 586	4 001 280	4 278 784	4 888 832	5 373 184	6%
Norway	1 669 120	1 792 080	1 875 264	2 083 331	2 341 891	2 757 382	3 181 576	4 232 196	5 426 690	5 879 558	6 558 976	7 093 248	7 663 360	8 130 048	13%
Poland	1 067 328	1 365 313	1 532 480	2 160 450	2 406 217	3 363 591	3 737 093	6 254 350	7 389 203	9 284 887	11 711 296	13 009 984	13 910 016	15 875 520	23%
Portugal	407 585	443 681	633 378	848 931	919 841	1 190 402	1 263 618	1 552 643	2 534 408	3 072 780	3 385 344	3 773 440	4 685 312	5 078 784	21%
Slovak Republic	345 601	417 793	439 555	443 907	492 290	566 530	606 529	676 672	973 891	1 150 468	1 331 200	1 379 840	1 680 128	1 936 896	14%
Slovenia	279 553	296 704	387 072	406 018	427 776	450 560	508 672	582 913	745 221	990 211	1 071 872	1 233 920	1 417 472	1 678 336	15%
Spain	923 968	1 380 960	2 179 430	2 745 714	3 996 619	5 826 195	6 992 921	9 829 407	13 704 739	16 590 121	18 583 104	20 177 728	21 057 600	22 393 152	28%
Sweden	2 409 699	2 732 936	3 333 227	3 967 656	5 165 643	7 074 585	7 364 118	9 801 488	11 277 841	14 127 973	16 366 592	17 044 736	17 408 768	19 519 488	17%
Switzerland	18 898 726	19 288 037	19 685 349	20 060 898	20 376 452	21 120 004	21 352 968	22 166 533	23 050 502	23 286 280	23 776 000	23 798 560	24 478 976	25 636 096	2%
Turkey	521 735	696 836	1 072 643	1 444 868	1 526 789	1 852 936	2 028 041	2 242 319	3 512 856	5 617 177	7 857 664	8 584 704	10 209 024	11 098 624	27%
United Kingdom	6 835 012	24 832 977	26 377 809	28 702 835	15 113 678	20 862 514	25 175 227	25 254 286	37 186 411	41 002 804	47 144 752	50 163 984	52 543 120	56 268 816	18%
United States	581 284 068	633 983 109	654 421 285	660 050 861	656 061 841	674 535 833	708 352 725	732 010 152	748 877 252	807 986 066	829 755 728	879 399 104	931 740 640	937 645 056	4%
OECD	731 074 976	812 271 949	845 751 964	877 570 165	895 870 558	954 935 904	1013 432 534	1089 084 886	1180 501 271	1319 300 696	1427 116 870	1527 305 050	1636 231 636	1709 719 296	7%
Total	906 549 532	987 485 967	1052 995 286	1113 786 358	1151 669 200	1170 042 306	1225 701 565	1342 943 190	1454 433 941	1661 193 828	1800 217 130	1978 812 322	2161 312 348	2300 994 816	7%

Note: Data collected at the end of the year. UK data points INCLUDE data reported under GB.

Source: www.potaroo.net/reports/oecd, based on report files published by the RIRs.

StatLink http://dx.doi.org/10.1787/888932398271

Table 5.9. **IPv4 addresses allocated to top 1% of holders, by country, 1999-2010**

	Prior to 1998	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Australia	22.4	6.0	9.2	7.0	7.7	6.1	8.6	35.4	38.9	13.8	38.7	42.8	49.7	62.8
Austria	14.4	28.8	16.6	21.9	34.0	23.3	32.0	66.8	42.5	47.5	39.9	42.8	54.0	29.2
Belgium	20.9	25.0	26.7	35.9	32.6	37.0	41.1	77.1	47.3	69.7	62.2	62.2	67.5	42.0
Canada	42.6	11.8	24.1	15.2	19.2	19.8	29.0	28.5	26.4	24.5	63.6	28.5	40.7	42.4
Chile	11.8	0.0	100.0	20.9	23.9	11.8	15.9	14.4	17.1	26.0	23.1	28.6	37.4	16.4
Czech Republic	26.6	16.7	14.3	15.4	19.6	33.1	10.4	30.9	43.5	44.6	20.3	39.2	29.4	22.9
Denmark	6.0	26.4	30.8	23.8	31.9	50.3	48.9	59.2	65.9	22.0	52.3	40.0	65.8	76.8
Estonia	53.3	100.0	50.0	100.0	57.1	56.9	44.4	62.6	34.5	74.3	46.4	56.6	56.6	72.1
Finland	11.6	17.9	30.2	18.6	18.3	44.7	17.1	21.4	22.5	54.1	27.1	28.9	40.5	22.8
France	40.1	17.2	12.7	16.1	37.2	33.6	41.9	25.2	59.9	72.5	62.7	41.9	81.6	84.1
Germany	78.3	4.8	12.2	38.1	73.0	15.2	17.7	77.7	60.8	65.8	74.8	71.9	51.9	50.2
Greece	20.3	37.5	42.1	23.1	52.1	69.6	79.4	35.9	52.9	44.4	36.0	86.4	23.2	37.2
Hungary	11.7	24.4	33.3	13.7	63.1	22.1	62.6	38.1	22.7	40.2	16.3	23.6	37.8	22.6
Iceland	47.1	100.0	0.0	22.2	66.7	53.3	76.2	80.0	50.8	43.2	66.7	48.5	50.0	25.8
Ireland	25.3	30.8	44.4	28.1	33.3	79.5	66.6	28.2	57.7	50.3	47.2	46.9	59.6	28.9
Israel	44.4	16.7	19.9	23.9	63.7	37.0	45.0	33.5	75.2	63.5	94.8	41.4	53.7	41.3
Italy	9.8	13.6	17.8	20.3	25.2	53.6	42.3	54.8	46.1	16.7	82.5	53.8	50.5	58.2
Japan	54.7	24.4	21.9	45.7	40.6	39.4	33.8	50.8	74.2	25.0	22.0	31.5	47.6	22.1
Korea	10.6	14.3	5.9	6.2	25.8	12.5	27.6	66.1	23.6	52.9	27.1	39.5	19.2	24.7
Luxembourg	25.3	100.0	32.0	65.3	16.7	35.6	72.7	47.8	66.7	38.1	47.1	37.0	53.3	48.9
Mexico	43.8	0.0	100.0	66.7	66.7	48.5	40.0	50.0	57.1	80.0	40.0	57.1	100.0	80.0
Netherlands	12.5	13.6	7.9	16.0	10.1	23.9	19.4	19.1	74.2	68.6	42.2	64.8	50.4	61.1
New Zealand	20.2	15.1	20.3	21.5	36.8	44.3	40.4	23.3	43.0	25.9	27.3	38.3	37.2	36.2
Norway	10.6	63.5	17.8	22.7	21.4	20.9	21.0	31.4	33.1	22.4	29.5	46.7	23.4	33.2
Poland	7.5	21.3	23.1	38.8	61.9	15.7	85.3	23.2	29.6	57.2	51.5	36.6	28.0	34.7
Portugal	11.3	94.1	23.5	25.6	72.7	39.8	57.9	27.2	81.3	39.7	46.5	40.3	42.5	71.4
Slovak Republic	18.3	53.3	46.4	41.8	61.0	29.9	24.2	27.2	25.9	38.1	74.1	37.4	47.4	49.5
Slovenia	24.9	50.0	22.2	38.6	63.4	69.9	30.6	41.5	27.1	49.8	36.4	39.0	28.3	37.2
Spain	11.3	27.6	6.8	9.3	24.6	67.1	61.5	25.9	71.6	44.2	58.0	40.5	48.5	36.3
Sweden	8.3	17.4	32.9	9.8	52.3	69.0	22.6	33.4	17.5	72.9	50.9	14.2	67.7	48.1
Switzerland	86.4	16.3	23.5	23.7	26.9	26.8	58.0	39.4	54.6	52.6	64.7	11.1	32.4	51.5
Turkey	17.4	24.2	18.6	11.8	48.5	80.3	54.9	84.6	96.2	47.3	80.3	62.0	43.3	51.2
United Kingdom	72.4	5.0	13.4	34.0	31.3	76.8	60.1	16.0	70.1	61.6	73.8	69.2	69.1	62.8
United States	64.9	70.3	42.2	35.3	19.1	23.0	20.0	36.0	45.0	37.8	49.5	51.9	57.0	67.1
OECD	62.8	72.9	30.8	28.4	31.5	39.4	39.5	42.3	55.4	48.1	55.7	50.8	52.7	56.5
World	70.3	69.5	28.7	25.6	29.9	39.2	38.0	37.4	51.3	44.5	50.6	47.2	50.0	49.5

Note: Data collected on 1 January 2011.

Source: www.potaroo.net/reports/oecd, based on report files published by the RIRs.

StatLink http://dx.doi.org/10.1787/888932398290

Table 5.10. **Annual number of IPv6 prefixes allocated by country and by RIR, yearly basis, 1998-2010**

	Prior to 1999	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Australia	0	0	0	1	9	11	13	23	24	32	59	110	243
Austria	0	1	1	2	9	12	18	23	26	28	41	66	99
Belgium	0	0	1	1	1	5	6	8	10	14	23	32	51
Canada	0	0	1	1	3	6	15	18	26	46	62	88	140
Chile	0	0	0	0	0	1	1	3	3	7	10	13	21
Czech Republic	0	0	0	1	1	8	12	14	17	24	40	70	106
Denmark	0	0	0	1	2	7	7	7	7	12	21	27	55
Estonia	0	0	0	0	1	4	6	6	9	9	10	14	16
Finland	0	0	1	3	7	12	15	15	16	16	19	29	53
France	0	0	2	2	8	16	24	29	38	46	67	96	153
Germany	0	2	3	6	18	43	65	90	104	131	200	287	402
Greece	0	1	1	1	1	1	1	1	1	3	6	10	17
Hungary	0	0	0	1	1	1	2	4	6	8	14	23	27
Iceland	0	0	0	0	0	0	1	1	1	3	6	10	12
Ireland	0	0	0	1	2	4	6	7	13	17	23	31	38
Israel	0	0	0	0	0	1	2	4	4	5	6	8	10
Italy	0	0	1	3	6	17	26	32	34	39	61	77	103
Japan	0	2	10	26	121	150	173	183	186	193	220	252	309
Korea	0	2	5	11	43	58	71	76	78	84	91	95	103
Luxembourg	0	0	0	0	2	6	6	6	6	8	13	16	19
Mexico	0	0	1	1	1	3	4	8	10	10	12	16	23
Netherlands	0	1	2	4	18	29	43	48	49	59	94	151	231
New Zealand	0	0	0	0	0	3	4	7	12	19	32	45	90
Norway	0	0	0	1	4	6	9	12	13	18	34	51	92
Poland	0	0	1	2	6	8	18	21	24	27	36	59	95
Portugal	0	0	1	1	5	8	9	10	12	12	16	20	24
Slovak Republic	0	0	0	0	0	0	3	3	5	8	10	17	19
Slovenia	0	0	0	0	0	3	3	3	4	4	10	22	39
Spain	0	0	0	1	3	9	13	17	22	22	28	36	47
Sweden	0	0	1	2	6	15	18	19	24	31	48	76	120
Switzerland	0	1	1	1	6	13	19	27	32	38	71	93	126
Turkey	0	0	0	0	1	2	3	3	4	7	17	20	28
United Kingdom	0	1	1	5	11	26	50	63	75	103	138	205	303
United States	0	1	6	14	29	76	138	193	255	445	662	1 024	1 552
OECD	0	12	40	93	325	564	804	984	1 150	1 528	2 200	3 189	4 766
World	20	36	68	128	397	678	968	1 211	1 451	1 934	2 810	4 072	6 342
AfriNIC	0	0	0	0	0	0	1	4	22	42	59	73	122
APNIC	0	5	19	44	210	285	349	403	446	509	670	861	1 490
ARIN	0	1	8	16	33	83	154	213	284	496	729	1 121	1 709
LACNIC	0	0	0	0	0	5	9	40	56	82	112	145	192
Ripe NCC	0	9	20	47	133	284	434	530	622	784	1 219	1 851	2 808

Note: Data collected at the end of year. RIR data does not include blocks assigned to the IANA.

Source: www.potaroo.net/reports/oecd , based on report files published by the RIRs.

StatLink http://dx.doi.org/10.1787/888932398309

Table 5.11. **Annual size of IPv6 allocations (/32's) by country and by RIR, 1998-2010**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Australia	0	0	0	2	4	4 101	4 105	4 105	8 208	8 231	8 275	8 367
Austria	1	1	2	9	12	18	23	26	28	41	61	78
Belgium	0	1	1	1	3	4	6	9	13	20	28	296
Canada	0	1	1	3	6	15	18	22	35	45	66	104
Chile	0	0	0	0	1	1	3	3	7	9	12	19
Czech Republic	0	0	1	1	7	11	13	15	22	38	60	87
Denmark	0	0	1	2	6	6	6	6	11	20	25	46
Estonia	0	0	0	1	3	5	5	7	7	8	10	11
Finland	0	1	3	6	10	13	13	14	14	17	26	43
France	0	2	2	8	16	23	8 219	8 228	8 236	8 318	8 342	8 393
Germany	2	3	5	16	39	60	9 298	9 565	9 653	9 721	9 865	10 459
Greece	1	1	1	1	1	1	1	1	3	5	9	16
Hungary	0	0	1	1	1	2	3	5	7	13	22	26
Iceland	0	0	0	0	0	1	1	1	3	6	8	10
Ireland	0	0	1	2	3	5	6	12	16	22	27	33
Israel	0	0	0	0	1	2	4	4	4	5	7	9
Italy	0	1	3	5	14	23	29	4 126	4 131	4 153	4 168	4 193
Japan	0	1	3	36	57	2 135	7 262	7 265	8 294	8 317	8 350	10 577
Korea	0	0	0	10	16	29	4 143	5 183	5 189	5 196	5 200	5 207
Luxembourg	0	0	0	2	5	5	5	5	7	12	14	16
Mexico	0	1	1	1	3	4	8	10	10	12	15	34
Netherlands	1	2	3	16	26	550	555	556	566	600	645	704
New Zealand	0	0	0	0	1	2	8	13	17	28	38	69
Norway	0	0	1	4	5	263	266	267	272	287	303	339
Poland	0	1	2	6	8	18	21	2 071	2 089	2 097	2 118	2 147
Portugal	0	1	1	4	7	7	8	10	10	14	18	22
Slovak Republic	0	0	0	0	0	2	2	4	6	8	15	17
Slovenia	0	0	0	0	3	3	3	4	4	9	20	32
Spain	0	0	1	3	8	11	15	20	20	26	34	76
Sweden	0	1	2	5	12	15	16	19	26	169	191	283
Switzerland	1	1	1	5	41	47	55	59	65	98	115	160
Turkey	0	0	0	1	2	3	3	4	7	17	20	28
United Kingdom	1	1	2	7	20	74	85	98	1 146	1 181	1 243	1 328
United States	1	6	14	24	62	92	145	193	314	14 792	15 024	15 514
OECD	8	26	53	183	404	7 552	34 354	41 931	48 441	63 536	64 376	68 745
World	522	541	573	728	981	14 317	41 300	51 095	57 777	138 782	139 864	145 075
AfriNIC	0	0	0	0	0	1	4	22	36	49	58	94
APNIC	0	1	4	69	117	6 330	15 703	18 929	24 166	24 307	24 480	27 413
ARIN	1	8	16	28	69	108	165	217	353	14 841	15 098	15 634
LACNIC	0	0	0	0	5	9	62	78	118	65 868	65 898	65 941
Ripe NCC	9	20	41	119	278	7 357	24 854	31 337	32 592	33 205	33 817	35 480

Note: Data collected at the end of year. RIR data does not include blocks assigned to the IANA.

Source: OECD, based on data from the RIRs *(www.nro.net)*.

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Table 5.12. **Policy initiatives for the deployment of IPv6, 2010**

	IPv6 adoption in government	Awareness-building efforts	Initiatives
Australia	Yes	Yes	The Australian Government Information Management Office (AGIMO) is coordinating the transition of Australian Government agencies to IPv6, and has developed "A Strategy for the Implementation of IPv6 in Australian Government Agencies", that aims for Australian Government networks to be IPv6-enabled by the end of 2012.
Austria		Yes	An industry platform (IPV6 Task Force Austria) dealing with various IPv6 issues was founded in 2004 with the support of the government and telecommunications regulatory authority.
Belgium		Yes	
Canada		Yes	Canada does not currently plan to use legislation or other government-led measures, such as target setting for industry, to influence the introduction of IPv6. The American Registry for Internet Numbers (ARIN) has assisted with awareness-raising efforts within the Canadian government.
Chile			
Czech Rep	Yes		In June 2009, the government approved a resolution according to which ministries and central state bodies must: (i) Include IPv6 support as a public procurement condition, and (ii) ensure that by the end of 2010 government websites and eGovernment services are accessible over both IPv4 and IPv6.
Germany	Yes	Yes	A national IPv6 plan for Germany was launched in 2009 (German IPv6 Roadmap). The objective is a complete technical and organisational setup for a centralised IPv6 public administration in Germany as of 2011. IPv6 was also included in the 3rd and 4th German IT Summits declarations under the patronage of German Chancellor Angela Merkel. The German Federal Ministry of the Interior was allocated and administers a /26 IPv6 address block for all federal, state and local public administration in Germany at the end of 2009. In 2008, two large programmes were launched to modernize the communication infrastructure of the public administration based on IPv6: (i) "Netze des Bundes" (NdB), the Common network for the federal administration, and (ii) "Deutschland-Online Infrastructure" (DOI), which serves federal government, states and municipalities. In addition to these two large network infrastructures operated by the Federal Government, IPv6 is being introduced through a variety of IPv6 projects and initiatives at different policy, organizational and technical levels, with numerous IPv6 pilot projects, working groups and activities at state and local level.
Denmark		Yes	The National IT and Telecom Agency has developed a strategy as well as an action plan for the deployment of IPv6 in Denmark, approved by the Minister of Science, Technology and Innovation after public hearings. It has four prongs: (i) creating awareness of IPv6 and the exhaustion of IPv4 addresses, through the establishment of a private/public partnership that represents relevant Danish stakeholders (*e.g.* content providers and telecom operators); (ii) a public procurement IPv6-compliant mandate; (iii) creating an IPv6 test-bed in the future, and; (iv) potentially making IPv6 support mandatory for Danish state institutions and agencies (as opposed to the current "recommended standard").
Estonia			No active policies for IPv6 deployment, some trials.
Finland		Yes	
France		Yes	
Hungary			
Ireland		Yes	No active policies for IPv6 deployment. However, an IPV6 Task Force is in place, co-founded in 2004 by the TSSG research centre, the HEAnet and the Department of Communications, Energy and Natural Resources (DCENR). In 2005, the Irish National IPv6 Centre was established.
Iceland			
Israel			
Italy		Yes	IPv6 taskforce
Japan		Yes	In February 2009, the Japanese Ministry of Information and Communication (MIC) convened a "Study Group Concerning the Improved Use of IPv6 on the Internet". MIC is also developing policies such as the "Guideline of information disclosure for ISPs to cope with IPv4 address exhaustion". The MIC has developed an IPv6 testing platform to build IPv6 expertise. The "Task Force on IPv4 Addresses Exhaustion, Japan", launched by MIC and telecommunications/Internet associations in September 2008 helps interested Internet operators to build action plans, publicise IPv6 activities, and develop IPv6 educational programmes.

StatLink http://dx.doi.org/10.1787/888932398347

Table 5.12. **Policy initiatives for the deployment of IPv6, 2010** *(cont.)*

	IPv6 adoption in government	Awareness-building efforts	Initiatives
Korea		Yes	In December 2008, the Korea Communications Commission (KCC) announced the "Second Basic Plan for the Promotion and Management of Internet Address Resources for 2009-2011" and has been conducting various activities to help all stakeholders adopt IPv6. In order to encourage the voluntary adoption of IPv6 by Internet stakeholders such as ISPs and Web portals, the KCC created a public-private consultative body and is providing systematic support for the deployment of IPv6 in Korea through pilot projects, offering training, conducting promotional activities, and operating IPv6 interconnection networks. The Ministry of Strategy and Finance stipulates in its "2010 Guidelines for the Execution of Budget and Fund Operation Plan" that all of its network infrastructure should support both IPv4 and IPV6. The Ministry of Public Administration and Security also issued a government notification that applies the same principle to public administrative organizations
Luxembourg		Yes	
Mexico		Yes	
Netherlands	Yes	Yes	IPv6 is expected to become compulsory by the end of 2010 for governmental procurement of ICT equipment.
			The promotion of IPv6 by government is an action point in the progress report of the National ICT Agenda 2008-2011. The central government has taken the initiative to deploy IPv6 in its applications, starting with pilots. In 2009, the Dutch IPv6 task Force rewarded winners of IPv6 implementation in different categories and did so again in 2010. In 2010 research funds were awarded to monitor the implementation of IPv6 in The Netherlands.
Norway		Yes	The Norwegian Government is working with the private sector and other relevant stakeholders to increase awareness of the need for IPv6 adoption. The Norwegian strategy for the deployment of IPv6 is focused on creating awareness of the need to focus on IPv6 among managers and CEOs in the private and public sectors, rather than technical staff, as a pre-requisite for a successful IPv6 transition. In October 2010, a national meeting on IPv6 resources was held to exchange knowledge and information on the IPv6 transition. The Norwegian Post and Telecommunications Authority and The Ministry of Transport and Communications, invited Internet providers, the .no registry, hardware and software suppliers, the public sector and other interested organizations.
New Zealand		Yes	To date, the government response to IPv6 deployment has generally been to raise awareness of the issue. Recommendations have been issued to government agencies: (i) Procurement: Agencies should ensure that any hardware or software purchased is IPv6-capable, through a clear statement in all requests for proposals. (ii) Training: Agencies should consider training key technical staff on IPv6 to build test IPv6 networks and build experience and capability for IPv6. Agencies with good technical capability should consider implementing IPv6-only networks for new offices or new buildings. (iii) IPv6 support by applications: Agencies with in-house applications should check for potential IPv4/IPv6 issues. New applications should be required to be IPv6-capable.
Poland		Yes	There is political debate on IPv6 in Poland. Poland wishes to take into account commitments made at the OECD level by further promoting the development of IPv6 in the country.

StatLink http://dx.doi.org/10.1787/888932398347

Table 5.12. **Policy initiatives for the deployment of IPv6, 2010** *(cont.)*

	IPv6 adoption in government	Awareness-building efforts	Initiatives
Portugal		Yes	The Portuguese IPv6 Task-Force was created in 2004. FCCN, which manages the Portuguese Research and Education Network, has been an active promoter of IPv6 since the late 1990s. As it manages the ccTLD for Portugal and the national Internet Exchange Points, it assured IPv6 capabilities of DNS at top level very early. Its other main activities are related to the promotion of the adoption of IPv6 in a timely manner in all higher education and R&D institutions. The backbone of the network operates in dual-stack mode (IPv4 and IPv6) since 2003. During 2008 significant investments have been done to enable dual-stack operation of the following services in these institutions: DNS servers, mail servers and Web servers. Trainings and Workshops have been organized as well. There is still a long work to be done in terms of IPv6 awareness and IPv6 training. Some vendors have already included IPv6 content in their training programs, but in some cases the real IPv6 support is still not comparable to IPv4 support. IPv6 is a mature protocol in terms of standards defined in the IETF, however there is still a long path to be taken in order to make all Internet applications compatible with IPv6. Portugal considers that the main problem with the low degree of IPv6 deployment is its low priority status in each network/environment, despite its efforts close to national entities in particular electronic communications providers.
Slovak Republic			
Slovenia		Yes	In 2008, the Slovene Government adopted a strategy for the development of broadband networks in the Republic of Slovenia. One of the commitments included in the strategy is that broadband networks will be ready for the implementation of IPv6 protocol, to enable further development of e-government, e-health, e-education, e-commerce and other services. Moreover, the IPv6 Forum for Slovenia and the Go6 Institute endeavour to accelerate IPv6 deployment among industry, research communities and state administration.
Spain		Yes	
Sweden			
Switzerland		Yes	Switzerland does not have an active policy to encourage IPv6 deployment. However, IPv6 support is a requirement for public procurement contracts.
Turkey			In December 2010, a Prime Ministry Circular was published addressing all Turkish public institutions. This Circular asks public institutions to conduct an equipment/software inventory, to not invest in IPv6 incompliant network equipment, to acquire necessary training, to put a pilot web service on IPv6 networks and later to ensure that services provided are IPv6-compatible. Furthermore, in February 2009, the Turkish ICT Regulatory Authority kicked off a project named "National IPv6 Infrastructure Design and Transition Project" which is scheduled to be finalised in May 2011. This project involves estimating the cost of Turkey's transition to IPv6, developing an IPv6 honeypot (named KOVAN) and an IPv6 videoconferencing software (named FI6GEN) and organising conferences and workshops to increase IPv6 awareness. The project is being carried out by the ICT Regulatory authority, the public ISP serving academic institutions (ULAKBIM) and two Turkish universities (Gazi University and Çanakkale 18 Mart University).
United Kingdom		Yes	The United Kingdom encourages a market-led, needs-driven approach. The UK wishes to encourage stakeholders to be proactive in adopting IPv6, while being mindful of their commercial needs and costs. The UK has set up 6UK, a not-for-profit membership organisation founded in April 2010 to help the UK and UK organisations secure every competitive advantage available from the rapid adoption of the new protocol, and otherwise to make sure no segment of UK industry and wider society gets left behind.
United States	Yes	Yes	The United States has set a timeline for adopting IPv6 6 for use on public servers by the end of 2012.

StatLink http://dx.doi.org/10.1787/888932398347

Table 5.13. **Routed autonomous systems by country, 1997-2010**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	CAGR 1997-2010	Per capita
Australia	50	100	146	211	251	292	308	353	410	457	502	578	657	750	23%	3.4
Austria	18	26	35	47	79	94	109	144	182	209	231	261	276	296	24%	3.5
Belgium	5	7	11	10	25	29	41	55	70	84	100	112	122	127	28%	1.2
Canada	89	122	172	255	324	378	411	477	529	574	615	649	710	776	18%	2.3
Chile	4	9	9	29	43	52	58	57	60	61	73	80	89	100	8%	0.6
Czech Republic	8	9	12	16	35	50	66	86	102	121	148	197	328	550	38%	5.2
Denmark	7	9	17	21	39	43	50	64	79	85	112	131	137	163	27%	3.0
Estonia	2	1	3	3	4	5	6	8	12	16	21	26	27	33	12%	2.5
Finland	6	11	16	17	34	42	47	60	69	86	93	100	115	128	27%	2.4
France	26	46	77	86	151	165	187	211	261	313	343	399	454	510	26%	0.8
Germany	43	91	160	211	372	430	475	585	690	766	831	911	957	1038	28%	1.3
Greece	13	24	31	42	52	56	60	70	82	90	93	104	103	102	17%	0.9
Hungary	18	19	26	30	48	52	62	71	80	96	115	132	146	157	18%	1.6
Iceland	1	1	1	2	3	6	7	12	13	16	18	26	27	32	31%	10.0
Ireland	4	5	8	8	11	14	19	29	38	46	61	77	86	87	27%	1.9
Israel	6	11	20	34	57	67	78	87	103	114	128	147	170	181	9%	2.4
Italy	29	49	76	104	195	222	243	285	308	341	378	420	465	496	24%	0.8
Japan	11	13	12	13	21	28	33	36	40	47	48	50	50	65	15%	0.1
Korea	29	33	33	42	40	49	59	64	65	72	71	74	70	68	7%	0.1
Luxembourg	2	4	7	7	8	10	12	11	12	14	16	19	25	31	23%	6.2
Mexico	35	42	49	70	87	91	95	112	129	132	147	151	166	169	13%	0.2
Netherlands	21	29	36	53	91	121	144	183	224	256	289	315	343	390	25%	2.4
New Zealand	6	17	29	40	54	60	60	78	91	99	118	151	175	199	31%	4.6
Norway	6	8	11	14	34	36	42	50	58	67	73	85	101	113	25%	2.3
Poland	13	23	38	60	133	168	193	306	409	532	670	785	898	1085	41%	2.8
Portugal	4	6	13	17	21	24	27	33	40	41	45	51	53	54	22%	0.5
Slovak Republic	5	9	11	13	25	27	30	35	43	49	50	55	63	73	23%	1.3
Slovenia	3	3	5	5	16	30	38	53	64	77	97	128	149	182	17%	8.9
Spain	10	13	29	41	95	106	121	142	159	175	207	231	257	287	29%	0.6
Sweden	26	35	48	45	74	92	106	138	170	199	238	272	304	331	22%	3.5
Switzerland	18	35	54	72	123	135	147	185	211	250	292	328	364	399	27%	5.1
Turkey	9	24	25	34	69	81	93	119	138	155	196	222	240	258	29%	0.4
United Kingdom	61	81	135	175	328	429	517	681	792	901	1 008	1 134	1 245	1329	27%	2.2
United States	1 602	2 180	3 119	4 502	6 020	6 856	7 409	8 388	9 131	9 891	10 580	11 304	12 026	12792	17%	4.2
OECD	2 190	3 095	4 474	6 329	8 962	10 340	11 353	13 268	14 864	16 432	18 007	19 705	21 398	23351	20%	1.9
Rest of world	1 035	1 353	1 819	2 530	3 552	4 232	4 622	5 524	6 608	7 844	9 228	10 550	11 790	13228	22%	-
Total	3 225	4 448	6 293	8 859	12 514	14 572	15 975	18 792	21 472	24 276	27 235	30 255	33 188	36579	21%	-

Note: Data collected at the end of the year. UK data points INCLUDE data reported under GB.

Source: www.potaroo.net/reports/oecd, based on report files published by the RIRs.

StatLink http://dx.doi.org/10.1787/888932398366

Table 5.14. **Routed autonomous systems by country and type, 2010**

	Transit AS numbers with IPv4 support	Announced AS numbers with IPv4	Transit AS numbers with IPv6 support	Announced AS numbers with IPv6	Total announced AS numbers	IPv6 only AS	Percentage of IPv6 capable AS (%)
Australia	120	747	23	96	750	3	12.80
Austria	38	295	9	51	296	1	17.23
Belgium	23	127	5	19	127	0	14.96
Canada	122	776	11	73	776	0	9.41
Chile	15	100	4	8	100	0	8.00
Czech Republic	78	549	17	72	550	1	13.09
Denmark	16	163	4	25	163	0	15.34
Estonia	5	33	2	5	33	0	15.15
Finland	17	127	7	30	128	1	23.44
France	69	508	15	86	510	2	16.86
Germany	158	1 034	45	229	1038	4	22.06
Greece	10	102	1	4	102	0	3.92
Hungary	25	157	1	11	157	0	7.01
Iceland	6	32	1	6	32	0	18.75
Ireland	15	86	5	20	87	1	22.99
Israel	16	181		3	181	0	1.66
Italy	69	496	11	49	496	0	9.88
Japan	17	62	7	17	65	3	26.15
Korea	8	68	4	7	68	0	10.29
Luxembourg	8	31	2	10	31	0	32.26
Mexico	32	169	4	11	169	0	6.51
Netherlands	73	387	26	124	390	3	31.79
New Zealand	39	199	14	42	199	0	21.11
Norway	20	112	8	38	113	1	33.63
Poland	132	1 084	15	72	1085	1	6.64
Portugal	9	54	2	7	54	0	12.96
Slovak Republic	17	73	2	9	73	0	12.33
Slovenia	14	181	6	24	182	1	13.19
Spain	35	287	2	17	287	0	5.92
Sweden	50	329	16	64	331	2	19.34
Switzerland	47	396	16	76	399	3	19.05
Turkey	20	258	1	5	258	0	1.94
United Kingdom	165	1 326	27	134	1329	3	10.08
United States	1 310	12 777	114	694	12792	15	5.43
OECD	2 798	23 306	427	2138	23351	45	9.16
World	5 155	36 492	639	3041	36579	87	8.31

Note: Data collected at the end of the year.

Source: www.potaroo.net/reports/oecd , based on report files published by the RIRs.

StatLink http://dx.doi.org/10.1787/888932398385

Table 5.15. **Average routed IPv4 addresses per AS by country, 2007-10**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Australia	221 809	111 957	78 299	59 042	64 500	55 279	54 938	50 735	47 457	47 863	50 168	46 417	44 788	47 378
Austria	64 626	53 957	45 707	39 860	29 181	32 537	29 722	29 021	27 323	25 849	26 737	25 236	25 438	26 780
Belgium	139 981	102 802	84 550	116 941	64 727	85 389	67 385	62 273	56 499	54 946	50 314	51 051	60 571	62 833
Canada	243 612	191 977	136 587	113 247	96 859	81 731	75 755	68 677	65 521	61 175	65 878	67 350	64 331	61 560
Chile	349 184	147 200	156 245	48 781	35 233	31 616	29 754	37 044	40 329	47 898	46 543	47 725	47 052	47 726
Czech Republic	100 320	93 525	75 883	68 912	32 468	29 271	23 878	23 769	27 724	32 813	31 727	28 702	18 880	13 422
Denmark	165 550	170 749	103 460	91 549	62 305	82 810	78 473	76 823	82 865	81 264	69 230	68 966	71 264	63 742
Estonia	62 592	133 121	44 374	49 750	61 120	53 811	57 003	49 536	45 931	48 848	40 058	33 615	33 195	29 936
Finland	386 731	254 093	204 544	198 099	103 793	109 672	98 285	98 410	104 216	95 168	90 574	86 431	76 312	71 486
France	77 263	55 062	40 282	41 929	31 107	39 785	39 359	45 542	63 502	80 358	109 660	103 703	95 398	85 367
Germany	536 642	270 410	161 799	134 582	91 388	85 384	78 992	74 906	71 034	78 143	84 793	85 359	84 968	84 302
Greece	22 410	18 603	16 871	13 928	12 106	18 775	19 068	21 698	20 006	20 506	27 337	31 877	33 389	41 163
Hungary	29 824	31 811	25 167	25 387	19 531	20 337	19 873	24 800	25 430	27 760	27 572	26 508	25 979	26 298
Iceland	131 584	147 968	214 528	121 600	89 003	53 376	49 262	30 080	38 006	35 840	32 043	23 365	22 300	19 296
Ireland	53 120	46 234	30 688	36 960	33 350	41 874	33 213	36 052	74 422	72 242	61 960	53 165	52 022	54 610
Israel	36 523	27 695	27 943	20 663	13 240	16 858	18 238	22 440	23 319	22 818	27 740	25 966	25 585	27 259
Italy	66 168	52 295	43 371	36 848	25 657	31 954	32 549	32 342	44 613	48 506	54 380	63 483	64 744	66 771
Japan	2 874 858	2 531 448	2 837 272	2 785 147	2 192 983	2 039 335	1 936 742	2 152 361	2 191 420	2 290 521	2 481 185	2 490 810	2 770 648	2 249 126
Korea	237 030	233 286	296 271	387 513	511 071	485 050	472 660	523 854	635 242	652 118	812 878	850 909	1 065 675	1 426 560
Luxembourg	26 496	16 720	11 127	12 846	13 448	14 157	12 672	17 990	19 840	19 511	21 616	20 857	22 149	18 853
Mexico	116 539	102 022	93 435	68 034	57 562	57 446	57 048	50 547	53 266	95 925	104 485	117 511	111 752	106 032
Netherlands	116 480	103 089	101 682	80 829	67 969	66 107	63 015	64 518	69 039	67 130	65 005	62 592	62 972	58 199
New Zealand	420 652	134 400	77 780	56 947	41 534	41 097	43 550	36 838	32 872	32 885	33 909	28 336	27 936	27 001
Norway	278 187	224 010	170 479	148 809	68 879	76 594	75 752	84 644	93 564	87 755	89 849	83 450	75 875	71 947
Poland	82 102	59 361	40 328	36 008	18 092	20 021	19 363	20 439	18 067	17 453	17 480	16 573	15 490	14 632
Portugal	101 896	73 947	48 721	49 937	43 802	49 600	46 801	47 050	63 360	74 946	75 230	73 989	88 402	94 052
Slovak Republic	69 120	46 421	39 960	34 147	19 692	20 983	20 218	19 333	22 649	23 479	26 624	25 088	26 669	26 533
Slovenia	93 184	98 901	77 414	81 204	26 736	15 019	13 386	10 998	11 644	12 860	11 050	9 640	9 513	9 222
Spain	92 397	106 228	75 153	66 969	42 070	54 964	57 793	69 221	86 193	94 801	89 773	87 349	81 936	78 025
Sweden	92 681	78 084	69 442	88 170	69 806	76 898	69 473	71 025	66 340	70 995	68 767	62 664	57 266	58 971
Switzerland	1 049 929	551 087	364 544	278 624	165 662	156 444	145 258	119 819	109 244	93 145	81 425	72 557	67 250	64 251
Turkey	57 971	29 035	42 906	42 496	22 127	22 876	21 807	18 843	25 455	36 240	40 090	38 670	42 538	43 018
United Kingdom	112 049	306 580	195 391	164 016	46 078	48 631	48 695	37 084	46 953	45 508	46 771	44 236	42 203	42 339
United States	362 849	290 818	209 818	146 613	108 980	98 386	95 607	87 269	82 015	81 689	78 427	77 795	77 477	73 299
OECD	333 824	262 447	189 037	138 659	99 963	92 354	89 266	82 084	79 420	80 289	79 253	77 509	76 467	73 218
World	281 101	222 007	167 328	125 724	92 030	80 294	76 726	71 464	67 736	68 429	66 099	65 404	65 123	62 905

Note: Data collected at the end of the year.

Source: www.potaroo.net/reports/oecd , based on report files published by the RIRs.

StatLink http://dx.doi.org/10.1787/888932398404

Table 5.16. **Top 10 networks defined by number of peers, 2004-10**

	Top 10: September 2004		Top 10: August 2006		Top 10: August 2008		Top 10: August 2010	
Rank	Network	Peers	Network	Peers	Network	Peers	Network	Peers
1	UUNET Technologies, Inc.	2 347	UUNET Technologies, Inc.	2 402	Verizon Business, previously UUNet	2 288	Level 3 Communications, LLC	2 703
2	AT&T WorldNet Services	1 902	AT&T WorldNet Services	2 025	AT&T WorldNet Services	2 157	Cogent Communications	2 696
3	Sprint	1 732	Sprint	1 720	Level 3 Communications, LLC	1 945	AT&T WorldNet Services	2 332
4	Level 3 Communications, LLC	1 171	Level 3 Communications, LLC	1 302	Cogent Communications	1 824	Verizon Business	2 009
5	Qwest	1 092	Cogent Communications	1 210	Sprint	1 624	Global Crossing	1 390
6	Verio, Inc.	636	Qwest	1 176	Qwest	1 356	Hurricane Electric, Inc.	1 385
7	Cogent Communications	623	Global Crossing	739	Global Crossing	1 122	Qwest Communications Company, LLC	1 377
8	Global Crossing	597	Time Warner Telecom, Inc.	715	Time Warner telecom holdings, inc.	983	Time Warner telecom holdings, inc.	1 326
9	Abovenet Communications, Inc	549	Abovenet Communications, Inc	701	Abovenet Communications, Inc	845	Sprint	1 316
10	Globix Corporation	533	SBC Internet Services	655	Hurricane Electric, Inc.	838	Init Seven AG, Zurich, Switzerland	958
	Top 10	11 182	Top 10	12 645	Top 10	14 982	Top 10	17 492
	Others	67 680	Others	81 993	Others	63 880	Others	126 834
	Total peering	78 862	Total peering	94 638	Total peering	78 862	Total peering	144 326

Source: Cooperative Association for Internet Data Analysis (CAIDA).

StatLink http://dx.doi.org/10.1787/888932398423

Table 5.17. **Attack traffic, originating countries**

Percentage of traffic, quarterly

	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	Q2 2010
Australia	0.73%	0.51%	0.17%	0.36%	0.40%	0.25%	0.30%	0.30%	0.30%	0.40%
Austria	0.46%	0.51%	0.06%	0.23%	0.20%	0.11%	0.30%	0.20%	0.30%	0.20%
Belgium	0.09%	0.23%	0.27%	0.14%	0.40%	0.24%	0.10%	0.10%	0.10%	0.10%
Canada	1.10%	0.90%	1.94%	1.68%	1.00%	1.77%	1.20%	1.40%	1.50%	1.70%
Chile	1.32%	0.27%	0.75%	1.03%	0.70%	1.35%	0.50%	0.50%	0.40%	0.50%
Czech Republic	0.23%	0.18%	0.90%	0.27%	0.70%	1.22%	0.20%	0.20%	0.20%	0.20%
Denmark	0.29%	0.55%	1.03%	1.15%	0.30%	0.20%	0.20%	0.20%	0.20%	0.20%
Estonia	0.02%	0.03%	0.04%	0.04%	0.10%	0.01%	0.00%	0.00%	0.00%	0.00%
Finland	0.09%	0.51%	1.09%	0.18%	0.10%	0.11%	0.10%	0.10%	0.10%	0.10%
France	1.14%	1.89%	0.87%	1.42%	1.50%	1.84%	1.20%	1.30%	1.50%	1.80%
Germany	1.58%	5.56%	2.20%	2.15%	2.95%	1.93%	4.80%	4.40%	3.90%	2.90%
Greece	0.21%	0.18%	0.21%	0.21%	0.20%	1.84%	0.20%	0.20%	0.20%	0.30%
Hungary	0.15%	0.30%	0.25%	0.48%	0.40%	0.43%	2.10%	2.10%	2.20%	1.90%
Iceland	0.04%	0.00%	0.03%	0.01%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%
Ireland	0.06%	0.12%	0.10%	0.07%	0.20%	0.02%	0.00%	0.10%	0.20%	0.10%
Israel	0.35%	0.26%	0.29%	0.31%	0.10%	1.31%	0.50%	0.60%	0.70%	0.70%
Italy	0.72%	1.19%	0.71%	1.28%	1.20%	1.22%	5.40%	4.50%	4.40%	3.50%
Japan	3.56%	30.07%	3.13%	2.00%	1.79%	1.95%	3.00%	2.90%	2.90%	2.60%
Korea	3.43%	2.25%	9.37%	2.52%	7.53%	6.83%	2.50%	1.60%	1.70%	1.50%
Luxembourg	0.00%	0.01%	0.00%	0.03%	0.60%	0.40%	0.00%	0.00%	0.00%	0.00%
Mexico	1.34%	0.68%	1.08%	0.73%	1.21%	1.96%	0.40%	0.40%	0.40%	0.40%
Netherlands	0.22%	0.47%	1.38%	0.44%	1.16%	2.06%	0.20%	0.50%	0.50%	0.40%
New Zealand	0.11%	0.15%	0.02%	0.46%	0.10%	0.00%	0.20%	0.20%	0.30%	0.30%
Norway	0.35%	0.15%	0.08%	0.12%	0.40%	0.07%	0.00%	0.10%	0.10%	0.40%
Poland	1.05%	1.58%	1.17%	0.99%	1.87%	1.05%	1.90%	2.20%	2.40%	2.10%
Portugal	0.19%	0.31%	0.07%	0.25%	0.20%	0.08%	0.80%	0.60%	0.50%	0.80%
Slovak Republic	0.06%	0.05%	0.01%	0.07%	0.10%	0.05%	0.10%	0.10%	0.10%	0.10%
Slovenia	0.01%	0.02%	0.00%	0.05%	0.10%	0.10%	0.00%	0.00%	0.10%	0.00%
Spain	0.97%	1.54%	0.86%	1.48%	0.70%	1.31%	1.40%	1.30%	1.30%	1.80%
Sweden	0.20%	0.48%	3.86%	10.67%	2.48%	1.51%	0.20%	0.20%	0.30%	0.20%
Switzerland	0.41%	0.48%	0.11%	0.31%	0.20%	0.39%	0.20%	0.20%	0.20%	0.20%
Turkey	2.69%	0.59%	0.67%	0.61%	0.60%	0.57%	1.50%	1.20%	1.50%	2.50%
United Kingdom	1.16%	1.56%	1.20%	1.45%	1.30%	1.04%	1.60%	1.00%	1.20%	1.20%
United States	14.33%	21.52%	19.68%	22.85%	22.15%	14.63%	6.90%	12.00%	10.00%	11.00%
OECD	38.66%	75.10%	53.60%	56.04%	53.04%	47.85%	38.00%	40.70%	39.70%	40.10%
Rest of the world	61.34%	24.90%	46.40%	43.96%	46.96%	52.15%	62.00%	59.30%	60.30%	59.90%
Brazil	4.75%	1.53%	2.64%	1.68%	2.60%	2.29%	8.60%	6.40%	6.00%	5.70%
China	16.77%	8.90%	26.85%	19.30%	27.59%	31.35%	6.50%	7.50%	9.10%	11.00%
India	2.53%	1.02%	1.63%	1.16%	1.60%	3.93%	3.40%	3.30%	2.20%	1.90%
Russian Federation	0.80%	1.64%	1.94%	2.33%	1.60%	1.20%	13.00%	13.00%	12.00%	10.00%
South Africa	0.11%	0.32%	0.08%	0.10%	0.10%	0.41%	0.10%	0.10%	0.10%	0.10%

Source: Akamai *(www.akamai.com)*

StatLink http://dx.doi.org/10.1787/888932398442

Table 5.18. **Global IP traffic by type and by country (PB/month), 2005-10 (est.)**

	2005	2006	2007	2008	2009	2010 (est.)	CAGR
Global IP traffic	2 426	3 992	6 431	9 928	14 686	20 396	53%
Total Internet	2 055	3 339	5 219	7 639	10 942	15 205	49%
Consumer Internet	1 362	2 341	3 859	5 939	8 930	12 684	56%
Business Internet	693	998	1 360	1 701	2 013	2 522	29%
Consumer IP VOD	65	232	628	1 480	2 606	3 680	124%
Business IP WAN	305	417	569	771	1 046	1 283	33%
Mobile data	1	4	15	38	91	228	202%
Mexico	8	18	33	54	83	128	73%
Brazil	13	28	53	89	144	230	77%
Rest of Latin America	23	45	80	131	211	323	69%
Canada	83	142	239	377	507	754	55%
United States	612	1 035	1 791	2 990	4 609	6 337	60%
United Kingdom	101	165	264	399	592	813	52%
Italy	30	56	95	152	232	347	63%
France	116	194	314	482	713	1 009	54%
Germany	156	243	372	541	785	1 072	47%
Rest of Western Europe	226	357	550	804	1 173	1 577	48%
Rest of Central and Eastern Europe	56	95	153	229	337	470	53%
India	25	39	59	81	102	140	41%
Japan	188	306	470	734	1 068	1 539	52%
Korea	356	554	830	1 171	1 605	2 168	44%
China	126	217	357	569	936	1 277	59%
Rest of Asia-Pacific	243	392	609	891	1 277	1 782	49%
Rest of Middle East and Asia	22	38	62	93	132	191	54%
Russian Federation	33	54	82	115	155	207	44%
South Africa	8	13	20	26	25	32	31%
World	2 417	3 974	6 398	9 874	14 603	20 268	53%

Source: Cisco Visual Networking Index (VNI)

StatLink http://dx.doi.org/10.1787/888932398461

Table 5.19. **IP and Internet traffic, 1984-2014 (TB/month)**

	Global IP	U.S. IP	Global Internet	U.S. Internet
1984	0.01579	0.01562	0.01563	0.01559
1985	0.0316	0.0313	0.0313	0.0312
1986	0.0634	0.0626	0.0625	0.0623
1987	0.127	0.125	0.125	0.124
1988	0.25	0.25	0.25	0.25
1989	0.51	0.51	0.50	0.50
1990	1.02	1.01	1.00	0.99
1991	2.05	2.04	2.00	1.98
1992	4.57	4.54	4.44	4.40
1993	8.98	8.61	8.72	8.30
1994	17.4	17.0	16.8	16.3
1995	180.7	157.1	172.5	150.0
1996	1 907	1 579	1 800	1 500
1997	5 359	4 020	5 000	3 800
1998	12 143	8 080	11 200	7 600
1999	27 972	16 242	25 500	15 200
2000	83 529	35 746	75 250	33 250
2001	196 597	72 222	175 000	66 500
2002	404 817	146 903	356 000	133 000
2003	783 954	229 061	681 000	199 500
2004	1 476 799	340 690	1 267 000	285 000
2005	2 425 621	599 651	2 054 985	475 000
2006	3 991 863	1 016 427	3 339 043	760 000
2007	6 430 884	1 758 904	5 219 056	1 187 500
2008	9 928 072	2 939 957	7 639 395	1 778 673
2009	14 685 625	4 557 695	10 942 392	2 658 957
2010 (estimated)	20 396 160	6 284 175	15 205 468	3 744 499
2011 (projected)	28 490 516	8 912 533	21 180 909	5 381 859
2012 (projected)	38 241 687	11 523 507	28 232 290	6 859 044
2013 (projected)	49 918 701	14 314 101	36 709 300	8 443 529
2014 (projected)	63 904 157	16 854 934	47 176 417	9 995 112

Source: Cisco Visual Networking Index (VNI)

StatLink http://dx.doi.org/10.1787/888932398480

OECD Communications Outlook 2011

Chapter 6

Broadcasting and Audiovisual Content

Broadcasting is changing rapidly with audiovisual content now delivered over an ever-increasing range of networks and devices. This chapter traces recent developments in audiovisual platforms and devices, explores emerging trends and issues, and then looks at some of the regulatory challenges arising.

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.

From traditional networks and devices towards an era of choice

Television and video content is now available on a number of different types of networks and can be viewed on many different devices, giving viewers an expanding choice of personalised viewing options. Major trends include:

- increasing availability of audiovisual content on alternative networks, whether terrestrial television, cable or Internet Protocol Television (IPTV), cellular mobile phones, Wi-Fi or the Internet;
- a shift from linear viewing of broadcast material towards non-linear viewing of recorded content for later viewing or downloaded as video-on-demand (VoD) or catch-up television;
- a move from single to multiple devices with viewers now receiving content on personal computers, laptops, netbooks, cellular mobile phones, handheld multimedia devices (*e.g.* iPods) and tablet computers, as well as the traditional television set; and
- renewed attempts at device independence (*e.g.* Internet-enabled television and home media player devices that make computer and television content interchangeable).

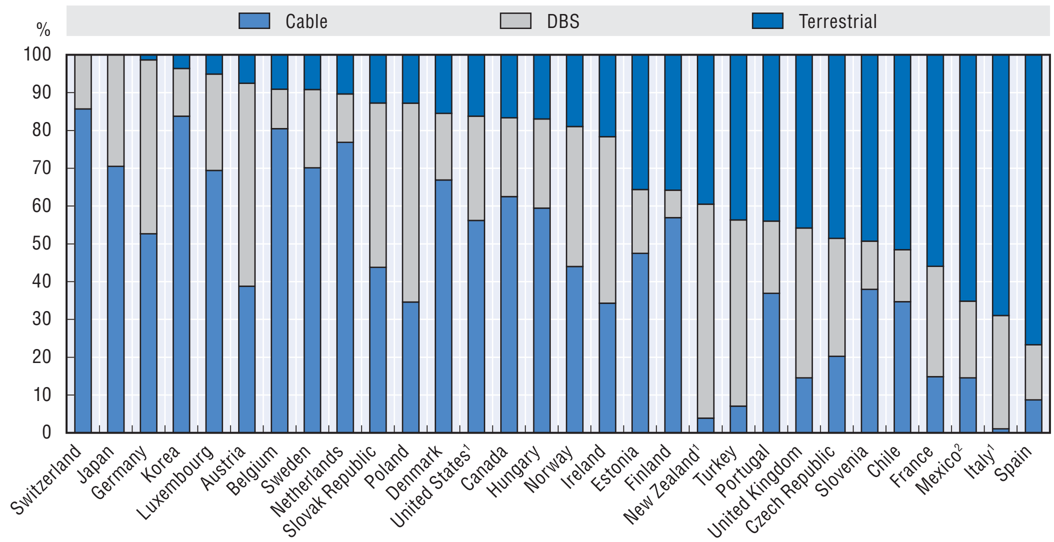
Broadcasting platforms

Traditional distribution of audiovisual content still enjoys the advantage of established networks and the near ubiquitous household availability of radios and televisions throughout OECD countries (Table 6.1). Television viewing remains popular, although there has been increasing competition with the emergence of alternative information sources and entertainment media – including the Internet (Table 6.2). Time spent online is increasing and is typically positively correlated with bandwidth. In Australia, for example, household Internet users spent an average of 57 hours online during the June quarter 2009, compared with 47 hours for the same period just one year earlier.

The market shares of the main television distribution methods are presented here (Figure 6.1); however, this does not include Internet Protocol Television (IPTV), for which data are limited (Tables 6.4 and 6.5).

Terrestrial networks usually carry free-to-air broadcasts of radio and television programmes in a linear fashion to the public over assigned frequencies. Commercial broadcasters usually rely on advertising revenue to support the creation of content or acquisition of programme rights and the broadcasting itself, and public sector broadcasters rely on a mixture of license fees, direct government support and sponsorship or advertising revenues. However, terrestrial broadcasts can also be encrypted, requiring subscription and decoding equipment on the part of the viewer, with broadcasters relying on subscription revenues and advertising revenues. Terrestrial broadcast signals can be analogue or digital, with the shift towards digital broadcasting being one of the major developments in recent years. Digital broadcasting is more efficient, freeing spectrum for other uses, including more channels and high-definition television (HDTV) broadcasts (Table 6.5). OECD governments have been promoting the switch to digital broadcasting and the switch-off of analogue signals (Table 6.6).

Figure 6.1. **Television access by distribution platform, 2009**



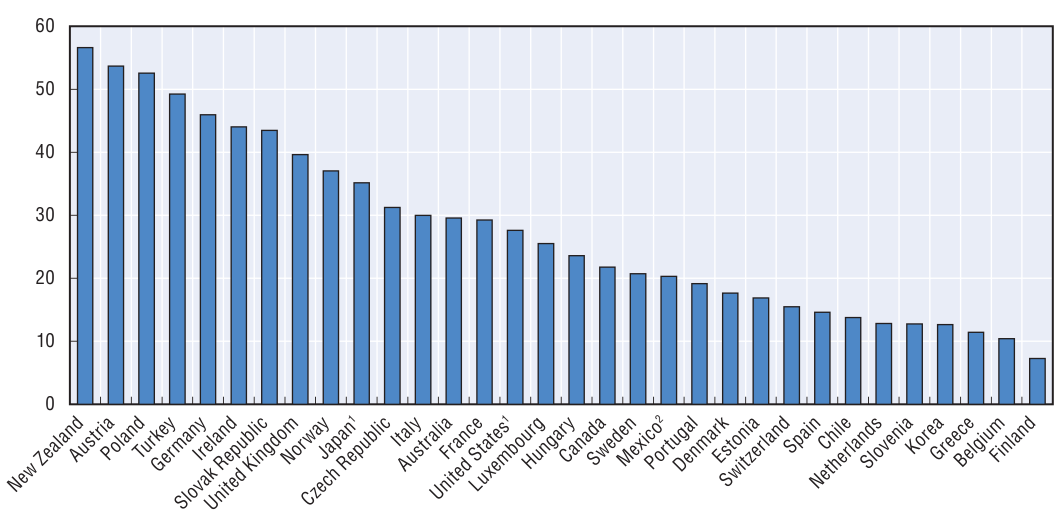
1. Data for 2008 instead of 2009.
2. Data for 2005 instead of 2009.

Source: OECD, European Audiovisual Observatory and Screen Digest.

StatLink http://dx.doi.org/10.1787/888932395725

Direct Broadcast Satellite (DBS) services provide audio and video programming in a linear fashion, with programming that may be free to viewers (public or advertising-supported channels) or available via subscriptions. Satellite transmissions can also be analogue or digital; the latter are increasing rapidly while relatively few analogue services remain. DBS subscriptions vary from country to country, with satellite services transmitted to approximately 50% of television households in Austria, New Zealand and Poland, but only 10% or less in Belgium and Finland (Figure 6.2). In a country such as Belgium, this is undoubtedly

Figure 6.2. **DBS subscribers as a percentage of households with televisions, 2009**



1. Data for 2008 instead of 2009.
2. Data for 2005 instead of 2009.

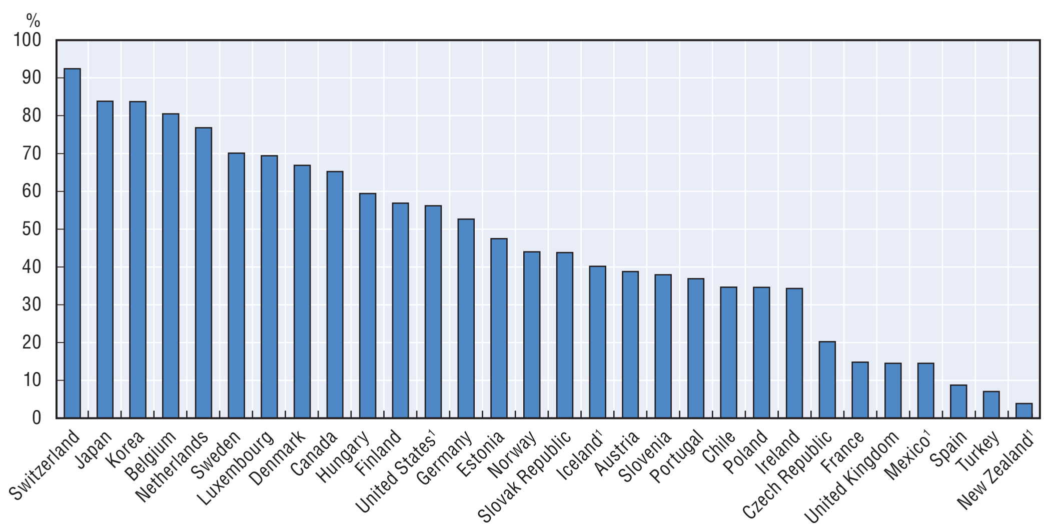
Source: OECD, European Audiovisual Observatory and Screen Digest.

StatLink http://dx.doi.org/10.1787/888932395744

related to the high historical availability of cable television networks. In contrast, there has been only limited coverage by traditional cable television networks in New Zealand.

Cable networks transmit programmes over dedicated fibre and wire networks to subscribers who pay a monthly fee. This may pay for programme content alone or a bundle of services, typically including telephone and Internet access, as well as audiovisual content. Cable networks can be analogue, but are increasingly digital. Digital cable networks offer the possibility to carry more channels and HDTV channels, as well as VoD, audio or radio stations and interactive capabilities (*e.g.* allowing viewers to participate in game shows or selecting camera angles for sporting events). Cable penetration varies significantly between countries, being in excess of 80% of television households in Belgium, Korea Japan and Switzerland, while Italy has no significant cable networks (Figure 6.3). Take-up also varies, with more than 90% of the homes passed subscribing in Belgium, Luxembourg, Netherlands and Switzerland, while less than 50% of homes passed in Portugal, Spain and the United Kingdom subscribe. Lower subscription levels are often the result of competition from alternative free-to-air and satellite services.

Figure 6.3. **Cable subscribers as a percentage of households with televisions, 2009**



1. Data for 2008 instead of 2009.

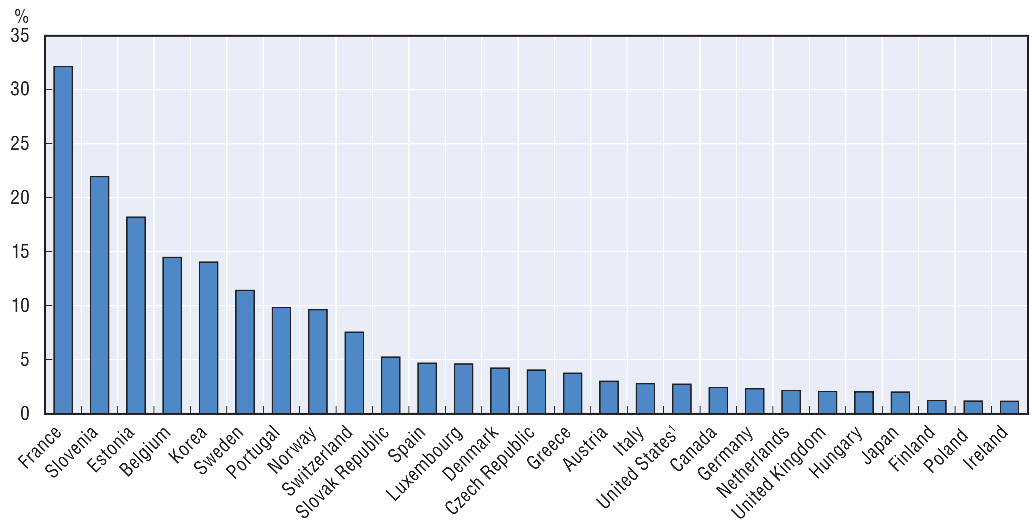
Source: OECD, European Audiovisual Observatory and Screen Digest.

StatLink http://dx.doi.org/10.1787/888932395763

Cable operators were among the early adopters of the so-called Multiple Play business model, providing television, telephone and Internet services in a single subscription package (*i.e.* triple play). Telecommunication companies turned to television over Internet Protocol (IPTV) to match the bundled offerings of cable companies, although early DSL networks could support no more than basic video services. As DSL improved and cable networks extended, IPTV became more competitive. IPTV is delivered over a controlled network, similar to cable, and is not the same as Internet Television – IPTV is not included in download caps, is intended for viewing on televisions not computers, and may provide a more defined level of service for audio and video quality than video streamed from the Internet. While IPTV has typically been offered as a part of bundled subscription packages, it can also be made available on a pay-per-view or free basis.

In Canada, IPTV is available to around 10% of households, but is not a major platform.[1] It is more important as the primary television platform in other countries, accounting for more than 30% of the primary platform in France in 2009, 14% in Belgium, 11% in Sweden, and no more than 1% in Finland, Poland and Ireland (Figure 6.4). In Australia, 8% of Internet Service Providers with more than 1 000 subscribers were offering digital television in June 2010, up from 6% one year earlier, and 4% were offering IPTV services, up from 3% one year earlier.[2] In France, the popularity of triple-play services, over unbundled xDSL, along with the competitive responses from incumbent telecommunication and cable networks, has undoubtedly contributed to its leading position with IPTV.

Figure 6.4. **IPTV subscribers as a percentage of households with televisions, 2009**



1. Data for 2008 instead of 2009.

Source: OECD, European Audiovisual Observatory and Screen Digest.

StatLink http://dx.doi.org/10.1787/888932395782

The increasing digitalisation of networks enables broadcasters to provide interactive television and video-on-demand (VoD). In 2009, 12% of Anglophone Canadians reported watching VoD during the past month.[3] In the United States, Comcast reported offering 1 700 items per month for on-demand viewing during 2004, rising to 17 000 per month by 2010. Time Warner Cable reported similar figures, with on-demand offerings of 1 700 per month in 2005 rising to 12 000 per month.[4] In September 2010, the United Kingdom cable operator Virgin Media reported that 62% of its subscribers used its VoD service at least once a week.[5] Interactive Television specialist Accedo Broadband is focusing on the use of iPads and other tablet devices for viewing television content,[6] while Virgin Media has launched an interactive online football application enabling viewers to vote on the performance of players, refereeing decisions and interact with other fans.[7]

Digital networks also enable broadcasters to produce and transmit high-definition television channels (HDTV), although viewers require HDTV sets to fully realise the benefits. In the United Kingdom, take-up of HDTV has been rapid, with 9% of households having HD decoding equipment by the end of March 2009 and 33% having an HD-ready television set.[8] Around 5.1 million households in the United Kingdom had access to HDTV channels at the end of June 2010, up from 1.9 million in March 2009.[9] The switch-off of analogue broadcasts in Denmark prompted an increase in television set sales, with two-thirds of the households adopting HDTV doing so during 2009.[10] In the Netherlands, cable operators Ziggo and UPC and telecommunication operator KPN all extended their HDTV channels during 2010. Ziggo added HD versions of local channels Net 5, SBS 6 and Veronica in June, adding to its existing HD channels, Discovery HD, History HD and National Geographic HD, as well as Eurosport HD. UPC Netherlands added MTVN HD and VRT HD in May, taking the total number of HD channels broadcast by UPC to 16. In early 2010, UPC reported that 60% of households in its footprint were equipped with HD-ready flat-screen televisions. Around the same time, KPN added HD versions of RTL channels RTL 4, RTL 5, RTL 7 and RTL 8, taking its HD line-up to 14 channels.[11] Paris-based Eutelsat now broadcasts more than 100 HDTV channels.[12] High-definition television was introduced into the United States in 1998 and has become increasingly popular. Dozens of HD channels are available in millions of homes and businesses both terrestrially and via subscription services such as satellite, cable and IPTV. A 2010 study by Leichtman Research found that 61% of homes had one HDTV, and 26% had more than one in the United States.[13] The story is similar elsewhere, as HDTV equipment and content rapidly become more widely available.

While HDTV is popular, 3DTV (Three-Dimensional Television) still remains a niche market. iSuppli forecast that manufacturers would ship around 4.2 million 3D-enabled television sets worldwide in 2010,[14] while IMS research predicted worldwide sales of almost 6 million in 2010.[15] Citing GfK, Ofcom, the United Kingdom regulator, reported that 25 000 3DTV sets had been sold in Europe by May 2010.[16] Whatever the number, the emergence of 3DTV equipment will encourage providers to air 3D content. For example, at the end of September 2010, the United Kingdom's pay-TV operator BSkyB launched a 3DTV channel focusing initially on sports programming, although it also intended to air a number of 3D movies later in the year.[17] Italian broadcaster Mediaset has begun to offer films in 3D on-demand, including one new 3D movie title every month. Dutch cable operator Ziggo has also begun broadcasting a 3D demonstration channel with content supplied by SBS Broadcasting, which has made a number of programmes from its Net 5 channel available in 3D for the service.[18] Nevertheless, many remain wary of investing too much in 3DTV until they have a greater sense of long-term consumer interest.

A wider range of devices

People can now receive audiovisual broadcasts and content on a wide range of devices, both in the home and/or elsewhere. Set-top boxes and a range of video and hard-disk recording devices (Digital Video Recorders or DVRs) have brought greater control over viewing, with recording for delayed viewing, television pause and rewind functions now widely available. This "time-shifting" has been complemented by "place-shifting", enabling viewers to feed transmissions into the Internet and access them regardless of location (*e.g.* Slingbox). Informa Telecoms and Media forecast more than 80 million DVR-equipped households worldwide by end-2009, although that constitutes only around 7% of television households.[19] A Comcast survey conducted in the United States during July 2010 reported that 60% of viewers were using DVRs for time-shifting.[20] In the United Kingdom, Ofcom reported that 37% of households had DVRs by 2010, up from 11% in 2005, with total sales of DVRs at around 9 million. Of viewers using DVRs, 76% reported fast-forwarding through advertisements "always or almost always", and a further 9% reported doing so "around half the time".[21] Advertiser-supported channels are responding to the challenge of DVR fast-forwarding and advertisement-skipping by displaying programme identifiers ahead of programme start, to encourage viewers to stop fast-forwarding earlier, and creating advertising images and text that can be seen at fast-forwarding speeds. However, such responses do not deal with viewers using a skip-ahead function to move ahead by a pre-set number of seconds or minutes.

Audiovisual content is also available on cellular mobile phones, with an increasing range of sport, financial and news content optimised for the mobile web and direct broadcasting to handsets. With the exceptions of Japan and Korea, however, the growth of television and video viewing over cellular mobile phones has been relatively modest, as the handset screen size limits viewer experience. Mobile operator 3 has offered mobile television over its network in a number of countries, often as a part of the standard monthly package. In Australia, at the time of writing, 3 Mobile is offering a television package that includes: Cricket TV, South Park, Sky News 24, CNN, FOX SPORTS News TV, Sky Racing, Cartoon Network, Nickelodeon, Nick Jr., Rage, ANIMAX, MTV, E! Entertainment, ABC Kids, Access All Areas and Adultshop TV. Similar services are available from o2, Sky Mobile, T-mobile and Vodafone, among others. However, to date, such offerings appear to play a more significant role in marketing than regular use. In the United Kingdom, for example, just 4% of cellular mobile subscribers reported using their handset to watch television or videos at the end of March 2009, which was down by one percentage point from the year before.[22] Similarly, in Australia, around 2% of cellular mobile subscribers watched mobile television during the first half of 2009 and approximately 3% streamed or downloaded videos.[23]

In Japan, however, mobile television is a popular broadcasting service. In 2009, 82% of all mobile handsets shipped during the year included television,[24] and the actual take-up rate of mobile television is increasing – from 29% in 2008 to 42% in 2009.[25] To date, mobile television in Japan has been provided as part of digital terrestrial broadcasting services and most are provided free of charge, as is the case with terrestrial broadcasting. Mobile users can watch television programmes as long as they have mobile television-compatible devices without paying an additional fee. Television programming for terrestrial television is also available to mobile television, so viewers can watch the same programme without interruption once they move away from the television in the home. Programming designed for mobile television has also been provided, such as 10-minute programmes convenient for free time (*e.g.* while waiting for a train). In September 2010, part of the spectrum released from the switch to digital television in Japan was allocated for mobile television broadcasting services using the ISDB-Tmm standard. The new service is expected to provide a wider variety of content, but mobile operators may face challenges in developing a business model for pay mobile television services, as the new service has to compete with existing free-of-charge television services, Internet video streaming services through mobile broadband, and so on.

As smartphones, handheld multimedia devices and tablet computers with larger screens and enhanced functionality become more common there is likely to be an increase in mobile television take-up. The Australian Broadcasting Corporation (ABC) recently reported a rapid growth in people using mobile devices to access news and entertainment content, with weekly visits to ABC's mobile site more than doubling during the year to August 2010, and now exceeding 50 000. Downloads of ABC's iPhone application exceeded 1 million within 17 months and the company's iPad application passed 100 000 in just two-and-a-half months.[26] In September 2010, YouTube reported in excess of 160 million mobile views per day, almost triple the number from a year earlier.[27]

Personal computers, laptops and netbooks are increasingly being shipped television-enabled, using integrated television cards or after-market "TV Sticks" that plug into standard USB ports. These bring all the functionality of viewing, pausing, rewinding, recording and playback to the computer. Some 15 million PC-TV tuners were sold in 2008, with sales forecast to rise to 50 million by 2011. In 2005, 40% of shipments were digital and the remainder analogue, but by 2007 more than 60% were digital.[28] Moreover, flat-screen computer monitors are increasingly multifunctional, and are shipped with television and often HDTV built in.

Audiovisual content is now also readily available from the Internet via downloads and streaming, targeting Internet-connected devices rather than televisions (*e.g.* computers, laptops and netbooks, MPG, video and iPlayers and cellular mobile handsets, smartphones and tablet computers).

Broadcasters themselves are a major source of programming, making content available as live streaming, VoD and catch-up television (*e.g.* ABC iView, BBC iPlayer, Fluzz.fr, Eurosport, etc.). Content can be free to view, public or advertiser-supported or subscription-based, but there are often national or regional restrictions on access. Ofcom reported that in the first quarter of 2010, 31% of household Internet users in the United Kingdom had watched catch-up television online, and the total number of requests to view television streams on the BBC's iPlayer almost doubled from 53 million to 93 million in the 12 months to April 2010.[29]

Broadcaster content may also be hosted by sharing platforms or aggregators who provide streaming, VoD and catch-up television, or on-Internet television sites (*e.g.* Hulu, NetFlix, Streamnwatch, worldtvpc, wwiTV). Again, content can be free to view, public or advertiser-supported, pay-per-view or subscription-based and, in some cases, may require the user to install an application. There can be national or regional restrictions on access, for which providers reference the user's IP address in an effort to delineate which areas can access services.

Many Internet sites operate as sharing platforms hosting user-generated content, which can be made available to selected groups of family and friends or openly available to anyone with Internet access (*e.g.* Clipmoon, Dailymotion, Flickr, Vimeo, YouTube, etc.). The range of content subject and quality is enormous, but professional content producers are increasingly making their content available as promotional material (*e.g.* music video clips) and as an alternative source of revenue. One international survey conducted in late 2008 reported that most people spent significantly more time watching professionally produced video content on the Internet than they did watching user-generated content.[30]

Online video services are a variable cost business, with delivery costs proportional to the amount of video viewed being among the most important. Only high-value content can support paid access or attract a large enough audience to be advertising-supported. A free advertising-supported service, such as Hulu in the United States, can monetise its content inventory with in-stream advertisements, which generate more revenue than traditional display advertising.

The delicate balance between content and delivery costs produces complex relationships between different players in the online video market, which waver between collaboration and competition. Although an area of competition has opened up between sharing platforms like YouTube, ISPs' IPTV services and television broadcasters' web portals for the role of aggregator and intermediary, the three main categories of player are actually interdependent: video sites and ISPs are looking for premium content, and content providers want to maintain their editorial freedom, but are having to contend with a difficult economic equation because of bandwidth costs. YouTube on the one hand and ISPs on the other are offering content providers a solution to this economic issue by shouldering delivery costs. In exchange, they assume the role of content aggregator and earn a share of the revenue. To date, neither of these solutions has been entirely satisfactory for content providers, many of whom are making their content available on the open web and generating significant traffic.[31]

YouTube is among the platforms that share advertising revenue with video rights-holders. However, making the model work requires flexibility. For example, it is reported that more than one-third of the weekly 2 billion views of YouTube videos with advertisements consist of video content uploaded without the copyright owner's permission, but left online by the owner's choice. The videos are automatically recognised by YouTube's Content ID system, which scans videos and compares them with material supplied by rights-holders. YouTube offers several types of advertisements, including display advertisements and advertisements that run in the video stream or pop up at the bottom of the video. It then shares advertising revenue with both large content right-holders and small amateur video-makers who have gained a following. It is this business model that not only encourages rights-holders to make available more professional and higher quality content, but is also beginning to turn YouTube into a profitable operation.[32] Behavioural targeting of advertising, based on previous user patterns is increasingly common, but Hulu offers an "Ad Selector" which asks viewers what type of advertisements they would like to see before their video plays and offers them a selection. It has been reported that around 85% of viewers make a selection, thereby enabling a consensual targeting of advertisements to interested viewers.[33] As a result, Hulu can charge higher prices for its advertising space (Table 6.7).

The duplication of functionality across different devices and online content availability has led to increasing attempts to integrate the home entertainment environment, with a range of media player devices now available to feed the computer-based audiovisual content into television and home theatre systems (*e.g.* WD TV Media Players), and some set-top boxes also facilitating integration (*e.g.* TiVo). This integration brings greater convenience and makes use of what is typically the most widely available and best viewing platform, the television. There are many examples. AppleTV was an early attempt to link Apple devices and content to the television to enable viewers to watch television and other video content from the Internet, but it provided somewhat limited access to content. The recent launch of GoogleTV is another attempt to integrate the Internet and television, using either a box to connect existing equipment or GoogleTV equipped television sets. Viewers can search for content and access it from whichever source best suits their needs, be it broadcast or cable or any of the Internet-based alternatives.

Tackling integration from the other end, more and more television manufacturers are releasing Internet-enabled televisions (IETV). Market research firm iSuppli suggested that 28 million IETVs would be shipped in 2010, a 125% increase from 2009, and that shipments of IETVs would increase at double-digit rates until 2014 when there would be more than 148 million units – approximately 54% of total flat-screen televisions on the market.[34] Futuresource Consulting predicted that by the end of 2010, 20% of all flat-screen televisions sold in Europe would be able to access Internet video as well as television content,[35] as would 35% of those sold in North America.[36]

Box 6.1. **Audiovisual content in "text space"**

Audiovisual content is now commonly appearing within what was formerly text-based web content as audio and video clips supplementing and sometimes replacing text content.

Audio and video interviews are supplementing newspaper content on newspaper websites in the form of interviews relating to specific reports and stories, and podcasts and vodcasts of the text content itself (*e.g. The Wall Street Journal* offers podcasts of content and supplementary interviews and *The Economist* offers audio, professionally read versions of its magazine articles).[1]

Books, newspapers and magazines can be downloaded or streamed to smartphones, tablet computers, reading devices such as Amazon's Kindle, and so forth. Text-to-speech technology enables content primarily developed for traditional media to be automatically read to consumers. Content producers are also beginning to incorporate audio and video content into products such as books.

Press releases and presentations, such as company financial reports, increasingly feature interviews and presentations of financial results as podcasts and vodcasts (*e.g.* Microsoft's investor relations includes webcasts of financial results and related events).[2]

Commercial and academic conference presentations are also increasingly webcast live and made available for later download (*e.g.* recent OECD conferences have been routinely webcast[3] as have many other commercial and academic conferences).[4]

Educational and course content is also being made available in video form[5] and YouTube recently reported that some content partners have changed their jobs as a result of earnings from their educational videos as online advertising revenue is shared.[6]

Product reviews are also increasingly available in the form of videos, providing would-be purchasers with information about their product and service choices.[7]

Increasingly noticeable is the advertising content that arrives with almost every webpage in the form of pop-ups and video boxes, not only providing the funds to support the "free" web content, which is widely available and used, but also raising issues around bandwidth needs and use, especially in countries where Internet subscribers face download caps, and around personal data and privacy, as advertisers increasingly use behavioural targeting.[8]

All of these examples demonstrate the speed with which audiovisual content has evolved from traditional broadcast radio and television to become an integral and all but ubiquitous part of the information and entertainment landscape.

1. *The Wall Street Journal,http://online.wsj.com* and *The Economist*, *www.economist.com/*.
2. Microsoft Investor Relations, *www.microsoft.com/investor/default.aspx*.
3. OECD, Open video and presentations, *http://itst.media.netamia.net/green-ict/*.
4. JISC, *www.jisc.ac.uk/events/2010/04/jisc10/keynotes.aspx*.
5. "Scanning Santorini", YouTube video, *www.youtube.com/view_play_list?p=2215CB759C7057DE&playnext=1&v=xWWBa9CM87s*.
6. "YouTube Ads Turn Videos Into Revenue", *New York Times*, 3 September 2010. *www.nytimes.com/2010/09/03/technology/03youtube.html* and "Equations 2", YouTube video, *www.youtube.com/watch?v=XoEn1LfVoTo*.
7. See, for example, "Samsung SyncMaster 2333HD HDTV Widescreen LCD Monitor (Glossy Black) LCDTvSamsung" YouTube video, *www.youtube.com/watch?v=rdoDHj2BbkQ*.
8. "The Web's New Gold Mine: Your Secrets", *The Wall Street Journal*, 30 July 2010, *http://online.wsj.com/article/SB10001424052748703940904575395073512989404.html*.

The ready availability of such a wide range of audiovisual content and integration across platforms and devices raises many issues. Content creators and broadcasters face challenges to their traditional revenue models, and regulators must grapple with a range of new content issues associated with their mandates.

Emerging trends and issues

This section explores recent trends and discusses the issues arising, including: digitalisation and the analogue television broadcasting switch-off; audience shifts and fragmentation; challenges to traditional broadcasting revenue models, and responses to those challenges; and the possible impact of new investments in fibre-optic cable networks to the home.

Digitalisation and the analogue switch-off

Cable and satellite networks have made the transition to digital transmission over a number of years, but the digitalisation of terrestrial broadcasting is now also well underway. All OECD countries have published their plans for the transition to digital terrestrial television (DTT) and switch-off of analogue broadcasts, although the update on plans and progress presented here (Table 6.6) shows that the situation varies between countries. European countries are in line with the European Commission Directive to switch off analogue televisions transmission by 2012, while others either fall within that timeframe or have set a later deadline (*e.g.* Mexico). Countries that have already completed the switch over include: Belgium, Denmark, Finland, Germany (although some cable and satellite services remain analogue), Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland and the United States.

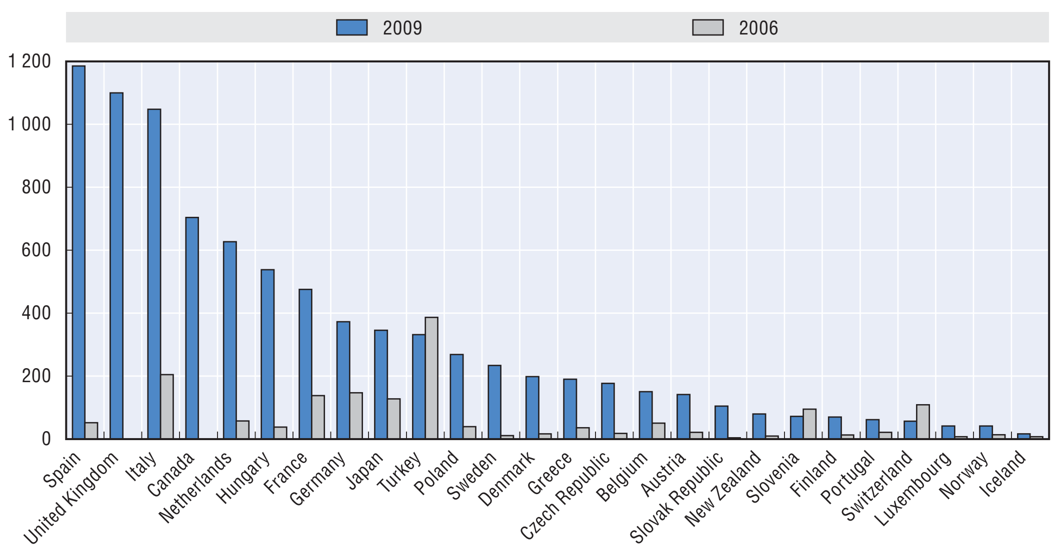
OECD countries have followed different strategies for the analogue switch-off. Two countries, Canada and Luxembourg, explicitly mentioned the market as the defining criteria for the switch-off date. In Canada, the criterion was that the analogue terrestrial signal would be terminated when more than 85% of households had access to DTT. Australia, the Czech Republic and the United Kingdom used a phased approach by region, while other countries (*e.g.* Denmark and Finland) planned a general, national switch-off. Some countries have altered their original plans, with Greece, Italy and the United States delaying their target date for switching off, while other countries brought the date forward (*e.g.* the Netherlands, the Slovak Republic and Spain).

The spectrum freed by terminating analogue broadcasting is particularly valuable as it lies in the band below 1 Ghz, which allows for broad territorial coverage and very good reception inside buildings. This "digital dividend" is considered an opportunity to improve and expand services, promote better digital coverage, and improve access to electronic communication networks, with much of the interest in the spectrum focused on providing wireless Internet access. Countries are responding to the opportunity in various ways. In the United Kingdom, Ofcom conducted a digital dividend review to ascertain the basis on which to award the spectrum resulting from the digital switchover, and set out a proposal for packaging and auction design, based on a market-led approach to spectrum, in order to maximise welfare.

In the United States, auctions of spectrum in the 700 Mhz band, made available as part of the digital television transition, have raised around USD 20 billion. Auction winners were expected to use the frequencies to build out wireless broadband networks and mobile television services. In France, ARCEP carried out a study to find the most efficient way to reallocate the spectrum. The consultants concluded that allocating a proportion of the released spectrum for mobile broadband services would add greater value to the economy than if it were allocated exclusively to digital television services.[37] In Japan, there is greater focus on using the vacated spectrum for mobile broadcasting to cellular mobile phones and other portable devices.[38]

For television broadcasting, one of the immediate impacts of DTT has been the potential to broadcast HDTV channels and launch new channels. Traditional free-to-air broadcasters are launching new channels for general and targeted audiences, which look increasingly like cable and satellite television packages and are designed to counter the erosion of their audience shares. In the United Kingdom, the BBC added five new channels (BBC 3, BBC 4, BBC 24, BBC Parliament, and CBeebies and CBBC for children, as well as BBC HD), while the German RTL group launched three new channels (RTL Crime, RTL Passion and RTL Living). Australian broadcasters have added seven new channels as well as broadcasting HD channels. Counts are increasingly difficult, but there were around 1 650 national free-to-air, cable and satellite channels available in 28 OECD countries in 2006, and 7 930 channels established in 26 countries at the end of 2009. The number of channels per country ranges from 17 in Iceland and Ireland to more than 1 000 in Italy, Spain and the United Kingdom (Figure 6.5).

Figure 6.5. **Channel availability (number of channels, 2006 and 2009)**



Source: OECD, European Audiovisual Observatory and Screen Digest.

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For others there are even wider opportunities. In the United States, the transition to DTT frees enough spectrum to enable "super Wi-Fi" use in the "white spaces" between broadcast television channels, thereby providing the opportunity for stronger and longer range wireless network communications, capable of travelling several kilometres and of speeds of 15 to 20 megabits per second. This capability could be very attractive for the equipment and content industries. The remaining barrier is ensuring no interference with television channels and other equipment in the same spectrum range (*e.g.* wireless microphones).[39]

Audience shifts and fragmentation

In addition to the increase in free-to-air channels, there has been enormous growth in the number of channels available in OECD countries through cable and satellite networks (Table 6.8). Inevitably, growth in channel availability affects audience share. Initially, the availability of premium channel television packages caused a decline in the free-to-air market share. In most countries, the audience share of incumbent terrestrial channels seems to have declined a little, to the benefit of new market entrants, with audience growth among new channels occuring mainly at the expense of the other additional channels that do not form part of DTT offerings, such as satellite. Public sector broadcaster (PSB) audience shares have typically been lower in multi-channel households and in countries with a higher number of local commercial free-to-air channels, than in countries where a higher proportion of households have depended on terrestrial television. However, the growth in channels resulting from digitalisation may offer PSBs the opportunity to defend their market share, if public or other funding supports the acquisition or production of compelling content.

The evolution of average household television viewing time can be illustrated for a number of OECD countries (Table 6.2). In spite of increasing competition in terms of the multiplication of platforms on which similar audiovisual content is offered, and more viewing options, the data do not suggest that television has lost its appeal. Television is still the most-used medium. Among the younger generation, however, the time spent on prime-time television viewing is dropping, while Internet usage (and multi-tasking) is increasing. For example:

- In the United Kingdom, television viewing time has remained stable over the last five years, while time spent using fixed Internet connection has increased by more than 17% a year to an average of 27 minutes per day.[40]
- In Canada, there is a steady decline in average weekly viewing time, while the time spent online by Internet users has tripled since 1997, and more than 60% of Anglophone Canadian Internet users report watching online videos.[41]
- In the United States, the Federal Communications Commission (FCC) recently reported that the average Internet user spends around 29 hours per month online at home, double the time reported in 2000. They also stated that 42% of users reported downloading or streaming video content and 52% reported downloading or streaming music.[42]
- And, as noted, in Australia, household time spent online increased from 47 hours during the June quarter 2008 to 57 hours during the June quarter of 2009.[43]

Audience shares and viewing times are important to advertisers and affect broadcasting revenues, as does the emergence of new advertising options. The European Audiovisual Observatory reported that among the European-located OECD countries, total audiovisual revenues increased by 2% per annum from EUR 66 billion in 2004 to EUR 72 billion in 2009, with television advertising revenue remaining flat while consumer pay-TV spending increased by 5% per annum (Table 6.9). The Internet was the only medium that Zenith Optimedia expected to attract higher advertising expenditure in 2009, with 8.6% growth to USD 54 billion, significantly down from the 21% growth seen in 2008. New formats are enjoying greater growth (29.8% for internet video and rich media, 29.7% for internet radio and 11.9% for podcasts), but these together represent just 12% of United States Internet expenditure. Television advertising spending was expected to fall 5.5% in 2009. The overall advertising market share of television in the United States is steady, while that of the Internet is increasing, from 9% in 2007 to 12% in 2009.[44]

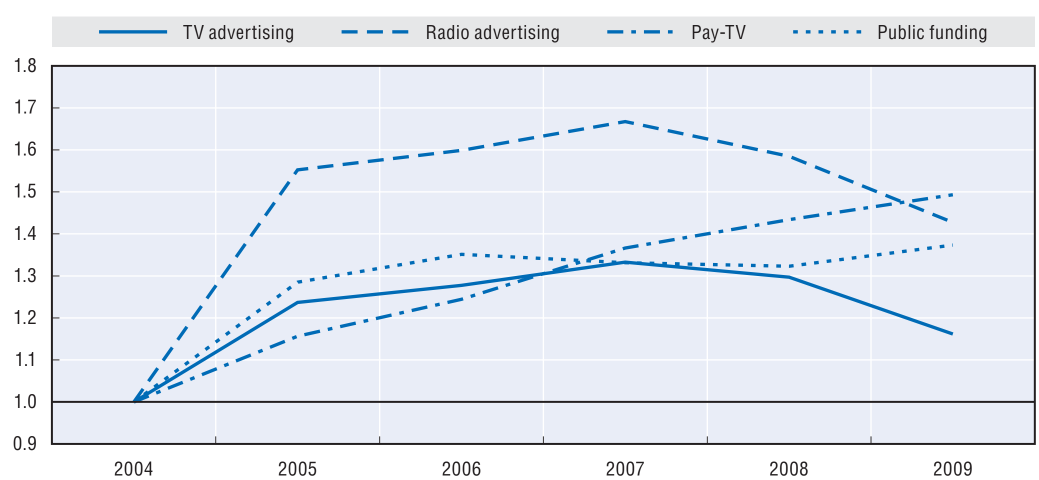
In the United Kingdom, the Internet share of advertising expenditure has been growing rapidly, from around 3% of total in 2003, to 20% in 2008. This has taken place at the expense of television and newspapers, with shares falling from 25% to 23% and 33% to 25% over the period, respectively. In other countries (*e.g.* Denmark), Internet advertising already accounted for a larger share of total advertising expenditure than newspapers and television,[45] and during 2009 online advertising expenditure grew by 6% in the United Kingdom to GBP 3.5 billion, while the net advertising revenue of television broadcasters fell by almost 10% to GBP 3.1 billion.[46]

Of course, with increasing choice and personalised viewing options including downloading to desktop computers, laptops, netbooks and mobile players, television viewing time no longer equates to time spent watching television content. This raises new challenges for traditional broadcasting revenue models and for those buying advertising time. In response, firms such as ComScore and Nielsen are implementing web advertising rating systems similar to those used for television.

Challenges to broadcasting revenue models and responses to those challenges

Advertising has been the main revenue model for terrestrial free-to-air broadcasters, together with licence fees and public support for public television channels. The business models of cable and satellite broadcasters have been based on subscriptions, with viewers paying a monthly fee to access content. Pay-TV content may also carry advertising, which supplements subscription revenues. The proliferation of access platforms has also intensified competition for advertising and this has put pressure on advertising-supported television channels. The overall trends are shown here (Figure 6.6). As noted, in European located OECD countries, total audiovisual revenues increased by 2% per annum, while television advertising revenue remained flat and consumer pay-TV spending increased by 5% per annum (Table 6.9).

Figure 6.6. **Broadcaster revenue trends in European OECD countries (indexed)**



Sources: OECD and European Audiovisual Observatory.

StatLink http://dx.doi.org/10.1787/888932395820

In 2009, television industry revenues contracted by 0.4% to GBP 1.1 billion as continued growth in pay-TV subscriptions failed to offset reductions in television advertising. United Kingdom television broadcasters experienced a 9.6% decline in net advertising revenue in 2009, to GBP 3.1 billion. Net advertising revenue experienced a fall in share of revenues of 6 percentage points between 2004 and 2009 to 28.2%, while subscriptions have increased their share by 7.4 percentage points to 41.4%.[47]

In Canada, the CRTC *Communications Monitoring Report 2010* noted that revenues from subscriptions, pay-per-view, VoD and other special services have increased by 8% per annum since 2005, and now account for 57% of total television revenues, while private conventional television revenues fell by 2% per annum, and by 7.8% during 2009. With advertising spending shifting towards the Internet and increasing opportunities for viewers to time-shift programming and skip advertisements, the pressure on the advertising-supported broadcast model is likely to increase.

Public sector broadcasters (PSBs) also face challenges. Private sector broadcasters and media operators have been increasingly vocal about the use of license fees and other public support for new media activities that were not in the original remit of public broadcasters, pointing to the potential for PSBs to dominate new and emerging markets and stifle competition. Others argue that there may be scope to expand the remit of PSBs, which are seen as reliable and pluralistic news providers. The debate is most pronounced in Australia, Germany, the United Kingdom and at the level of European Union legislation in general.[48] In the United Kingdom, this has led to the BBC announcing its intention to reduce the amount it spends on news websites by 25% over the coming year, reduce its Internet footprint, and exit some editorial areas entirely.[49] Also in the United Kingdom, the growth and popularity of catch-up television is forcing a rethink of the television license fee system. It has been suggested that people who watch television must have a television licence if they watch live television, whether on broadcast networks or streamed over the Internet, whatever device they watch it on. At the moment, as long as the viewer watches catch-up television, and not live television, no license is required.[50] If this is the case, the BBC's iPlayer catch-up service may undermine its own revenue model.

Responses to the new opportunities and challenges have been divergent. Cable and IPTV networks commonly bundle services and multiple-play responses combining television, fixed and mobile phone with broadband Internet access. Revenue from online content has typically been generated through advertising support or fragmentation rather than combination, with pay-per-view or what might be described as the "iTunes model" being foremost. However, competition from free-to-view advertising-supported content online, public sector broadcasters offering professional content free online and, to a lesser extent, to date, freely available user-generated content, may ensure that prices are kept low. This may in turn challenge the subscription Pay-TV model, as it may be cheaper for some viewing patterns to rely on downloading free and pay-per-view content, as required, rather than subscribing to multi-channel packages where, for any particular viewer or viewing household, the majority of channels are little if ever watched (*e.g.* some viewers may find direct Internet-based subscriptions to such services as EuroSport preferable to receiving the service as a part of a larger package). To date, however, bandwidth speeds and costs limit the attraction of these "over-the-top" services.[51]

New investment in fibre-optic cable networks

In addition to the challenges being faced by broadcasters and network operators, there is the ongoing investment in fibre-optic cable networks to the premises or kerb, sometimes as a result of government intervention in the form of national infrastructure development and economic stimulus spending. For example:

- In early 2009, the United States Congress directed the FCC to develop a National Broadband Plan to ensure every person in that country has "access to broadband capability". Congress also required that this plan include a detailed strategy for achieving affordability and maximising use of broadband to advance "consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, employee training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes". One of the major goals over the next decade is to ensure that at least 100 million households in the United States have affordable access to actual download speeds of at least 100 megabits per second and actual upload speeds of at least 50 megabits per second.
- In Australia, the proposed National Broadband Network involves a potential investment of up to USD 43 billion in a fibre-to-the-premises (FTTP) network covering 93% of homes and businesses, expected to be capable of 100 Mbps or higher.
- In Europe, Germany's broadband strategy, approved by the Cabinet in February 2009, seeks to accelerate telecommunication and internet connectivity, close gaps in underserved areas, and ensure nationwide access to high speed internet by 2014. The plan includes utilising frequencies no longer needed for television broadcasting following digitalisation.[52]
- And as a part of a stimulus plan to combat the economic crisis, Portugal's government has announced a USD 1.1 billion fund to support the roll-out of next-generation broadband networks, which it hopes will pave the way for improvements in high-speed Internet, television and voice services.[53]

In some cases, these new networks partly replace existing networks and may compete with or replace existing multiple-play services revenues.

Internet traffic has been growing rapidly in recent years, with 50% to 60% growth per year for some services. Video is a major driver of traffic growth, increasing by 100% to 130% per year.[54] Internet video accounted for one-quarter of all consumer Internet traffic in 2008, and was forecast to grow to 50% in 2012, with the sum of all forms of video – including television, video-on-demand, Internet and peer-to-peer – expected to account for 90% of all consumer Internet traffic by 2012.[55] Further investment in high-speed broadband network roll-outs will greatly increase the capacity of viewers to stream and download video content, enabling the development of new business models and putting further pressure on traditional models. With bandwidth limitations eased, attention may shift to network and peering costs, data traffic prioritisation, access pricing and download capping as potential barriers to innovation in business models, competition and viewer choice.

Regulatory challenges and responses

Broadcasting regulations include or have included: requirements for obtaining broadcast licences and spectrum capacity (*e.g.* ownership regulation); obligations concerning the content of broadcast programmes (*e.g.* provision of national programming or certain types of programmes, such as news or children's programmes); and restrictions on content (*e.g.* percentage of time for advertising or public decency requirements).

Typically, broadcasting services have been subject to stricter regulation than other audiovisual services or media types, because of the significant impact radio and television can have on society. As a range of new audiovisual services become available over digital distribution networks and the Internet, the question arises of whether these services should be considered to be broadcasting services, thus falling under the jurisdiction of media regulators; communication services, thus falling under the jurisdiction of telecommunications regulators; or information society services. Consequently, in most OECD countries, there are efforts underway to adjust regulation to ensure more consistency across these different communication platforms and services.

Legal definitions of broadcasting differ across the OECD. Most countries define broadcasting to include transmissions of radio and television programmes, which can be received by the general public directly through terrestrial transmission or through cable or satellite platforms, although the United States does not include cable and satellite subscription services under broadcasting. Differences also arise in the treatment of programmes distributed over the Internet and VoD. A number of countries treat VoD services differently by subjecting them to little or no regulation (*e.g.* Australia, Canada, Denmark and Italy), whereas other countries, citing the principle of technological neutrality, treat VoD in a similar way to broadcasting services. In Europe, the Audiovisual Media Services Directive specifically covers all audiovisual media services, including traditional television (linear services) and VoD (non-linear services) directed at the general public. In some limited circumstances, individual European Union countries can also restrict the retransmission of unsuitable content (*e.g.* extreme forms of "hate speech" or pornography) that may not be banned in the country of origin.[56]

The Internet, which has not been subject to much regulation, is increasingly being regulated at national and local levels, and by industry voluntary or self-regulation. The European Union is leading attempts to harmonise regulation through initiatives such as The Safer Internet Programme and The Electronic Commerce and Audiovisual Media Services Directives. The scope of the latter was extended to cover VoD services, although these were subject to a lighter regulatory regime than television content. On issues such as child pornography, terrorist propaganda and fraud there is a broad consensus in favour of monitoring and blocking offending material, including through voluntary industry action. Among European countries, Denmark, Finland, Germany, Italy, Sweden and the United Kingdom filter child pornography. Belgium has blocked access to sites revealing the names of sexual offenders. In Europe, voluntary ISP filtering and "Cleanfeed" initiatives have been a common method, but it has been suggested that attempts to block online gambling may have been less successful.[57]

In the United States, technical filtering plays a lesser role, with greater reliance on a range of legally binding and privately mediated mechanisms focusing on take-down of offending material. Copyright holders in the United States tackle online copyright infringement through the courts, using general copyright law. Some countries have looked at complementing existing copyright law with *sui generis* approaches to enforcement online, for example in France, New Zealand and the United Kingdom. Korea has a wider range of content in the sights of its Internet regulation and filtering, and relies on both filtering and ordering content and web-hosting providers to police their own content directly through deletions, suspensions and takedowns. Australia has proposed a national filtering scheme, based in part on government content classification systems operating across audiovisual media. Changes to copyright legislation following the Australia-United States Free Trade Agreement of 2004 have also led to Australia moving towards a take-down scheme for infringing copyrighted material.[58]

The main target of Internet filtering initiatives is "harmful content", which typically includes material relating to extreme and child pornography, terrorist activities and religious and racial intolerance or incitement. There are also regulatory debates around whether to seek to bring Internet content regulation into line with that of traditional broadcast content rules. Content creators and rights-holders can also exercise controls over online content. The main challenge is how to benefit effectively from the global Internet at the national level for national, social and content objectives, without hindering the networks ability to provide improved services, for legal and legitimate content, as well as the opportunities for innovation and greater consumer choice.

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Table 6.1. **Television households**

Thousands

	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	6 500	7 177	7 293	7 431	7 569	7 706	7 842	7 702	7 850	8 001	8 154
Austria	2 648	3 185	3 220	3 184	3 196	3 328	3 356	3 403	3 431	3 398	3 466
Belgium	3 794	4 176	4 179	4 181	4 275	4 300	4 330	4 363	4 414	4 506	4 506
Canada	10 485	11 575	11 796	11 924	12 067	12 276	12 474	12 660	*12 855*	*13 032*	*13 198*
Chile	..	..	..	..	..	..	4 268	4 337	4 484	4 638	4 801
Czech Republic	3 213	3 804	4 164	4 151	3 095	3 086	3 263	3 329	3 389	4 198	4 244
Denmark	2 061	2 349	2 379	2 364	2 402	2 402	2 429	2 429	2 457	2 443	2 439
Estonia	..	..	..	..	..	..	..	..	..	..	533
Finland	1 915	2 160	2 183	2 163	2 166	2 197	2 198	2 220	2 265	2 379	2 408
France	21 557	22 580	22 840	23 060	23 300	23 650	24 120	24 541	26 263	25 903	26 297
Germany	32 634	36 790	37 110	37 365	38 165	36 190	36 500	36 800	36 900	37 412	37 412
Greece	3 332	3 500	3 510	3 520	3 530	3 612	3 622	3 646	3 667	4 191	4 275
Hungary	3 773	3 740	3 729	3 717	3 701	3 810	3 900	3 962	3 962	3 686	3 677
Iceland	91	98	99	101	101	101	115	110	110	117	117
Ireland	991	1 204	1 194	1 262	1 329	1 359	1 379	1 350	1 450	1 546	1 472
Israel	..	36 236	37 953	..	..	..	..	..	..	..	..
Italy	16 091	20 660	20 900	20 693	22 053	22 187	22 582	22 907	23 216	24 258	24 364
Japan	35 377	*36 236*	*37 094*	37 953	38 157	37 921	37 512	37 547	37 804	38 202	38 932
Korea	14 517	15 113	15 500	15 854	16 380	16 708	16 944	17 113	17 462	17 666	17 978
Luxembourg	155	168	170	170	177	180	179	181	185	184	196
Mexico	16 000	18 471	*20 705*	22 938	*23 410*	23 883	23 654	24 860	25 038	25 885	26 514
Netherlands	5 850	6 685	6 757	6 823	6 905	7 000	7 000	7 075	7 000	7 113	7 175
New Zealand	1 145	1 395	1 413	1 431	1 454	1 480	1 501	1 520	1 537	1 555	1 572
Norway	1 582	1 980	1 990	1 992	1 961	1 958	1 961	2 010	2 037	2 100	2 128
Poland	11 996	9 026	8 917	8 902	8 780	8 805	8 605	7 745	7 488	12 699	12 959
Portugal	3 191	3 503	3 561	3 532	3 561	3 547	3 547	3 820	3 829	3 865	3 899
Slovak Republic	1 742	1 858	1 881	1 883	1 869	1 879	1 881	1 885	1 938	1 702	1 745
Slovenia	..	..	..	..	..	..	..	..	..	*738*	738
Spain	11 683	12 961	13 805	*13 962*	14 120	1 473	14 774	15 792	16 033	16 700	17 076
Sweden	3 368	4 219	4 232	4 261	4 316	4 319	4 268	4 352	4 376	4 095	4 105
Switzerland	2 435	2 661	2 702	2 760	2 778	2 658	2 682	2 693	2 717	3 127	3 127
Turkey	11 500	13 770	14 257	..	14 690	15 700	16 700	17 640	17 640	17 955	17 955
United Kingdom	20 736	24 100	24 300	24 500	24 700	24 600	24 900	25 300	25 600	25 500	25 500
United States	95 300	102 200	104 400	106 700	108 400	109 600	110 200	111 400	112 800	113 400	114 500

Note: Data in italics are estimates.

Source: OECD, ITU, European Audiovisual Observatory and Screen Digest

StatLink http://dx.doi.org/10.1787/888932398499

Table 6.2. **Average household TV viewing time**

Hours per day

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	3.22	3.23	3.18	3.22	3.30	3.28	3.18	3.12	3.18	3.23	3.18	3.13	3.08
Austria	2.37	2.43	2.45	2.47	2.53	2.70	2.68	2.73	2.77	2.72	2.62	2.47	2.42
Belgium (French community)	..	..	..	..	..	..	..	..	..	3.42	3.32	3.28	3.30
Belgium (Flemish community)	..	..	..	..	..	..	..	..	..	2.77	2.83	2.73	2.67
Canada	..	..	..	..	..	..	..	..	3.73	3.84	3.83	3.83	3.79
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	..	..	..	3.07	3.18	3.63	3.40	3.42	3.43	3.27	3.07	3.13	3.17
Denmark	..	..	..	2.52	2.53	2.60	2.63	2.68	2.55	2.52	2.47	2.78	3.15
Estonia	..	..	..	..	..	..	..	..	3.70	3.85	3.87	3.90	3.90
Finland	2.48	2.48	2.68	2.80	2.78	2.85	2.88	2.78	2.82	2.82	2.77	2.83	2.83
France	..	..	..	3.22	3.28	3.33	3.37	3.40	3.43	3.40	3.45	3.40	3.42
Germany	3.05	3.13	3.08	3.17	3.20	3.35	3.38	3.50	3.50	3.95	3.40	3.45	3.53
Greece	..	..	..	3.18	4.05	3.73	3.88	4.07	4.08	4.20	4.13	4.20	4.40
Hungary	..	..	..	..	..	..	..	..	..	4.38	4.32	4.33	4.42
Iceland	..	..	..	..	..	..	..	..	..	..	..	..	..
Ireland	..	..	..	3.02	2.97	3.07	2.97	2.95	3.00	3.03	3.02	3.10	3.08
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..
Italy	..	..	..	..	..	..	3.83	4.00	4.10	3.03	3.02	3.10	3.08
Japan	3.57	3.70	3.58	3.75	3.85	3.62	3.70	3.92	3.72	3.72	3.86	3.83	3.90
Korea	3.05	..	..	..	..	..	..	3.17	..	3.01	3.08	3.02	3.09
Luxembourg	..	..	..	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..
Netherlands	..	..	2.72	2.72	2.77	2.87	3.12	3.20	3.25	3.28	3.10	3.07	3.07
New Zealand	2.77	2.83	2.77	2.80	2.80	2.85	2.88	2.88	2.78	2.93	2.88	3.13	3.28
Norway	2.40	2.50	2.50	2.70	2.60	2.60	2.70	2.80	2.70	2.60	2.60	2.75	2.90
Poland	..	..	3.57	3.53	3.78	3.85	3.92	3.93	4.02	4.00	4.02	3.87	4.00
Portugal	..	..	3.37	3.23	3.13	3.05	3.27	3.34	3.32	3.30	3.30	3.35	3.29
Slovak Republic	..	..	4.03	4.00	4.13	4.20	4.17	3.92	3.35	3.17	3.10	2.98	3.15
Slovenia	..	..	..	..	..	..	..	..	..	2.95	3.03	2.98	3.02
Spain	..	..	3.57	3.50	3.47	3.52	3.55	3.63	3.62	3.62	3.72	3.78	3.76
Sweden	..	..	..	..	..	..	..	..	2.43	2.57	2.62	2.67	2.75
Switzerland	2.20	2.30	2.40	2.40	2.43	2.47	2.47	2.47	2.45	2.45	2.39	..	..
Turkey	..	..	..	..	..	3.73	3.92	3.55	3.60	3.60	3.60	4.00	3.80
United Kingdom	..	..	..	..	..	..	..	3.70	3.65	3.60	3.63	3.74	3.75
United States	7.20	7.25	7.38	7.52	7.65	7.70	7.92	8.02	8.18	8.23	8.23	8.35	8.35

Source: OECD, ITU, European Audiovisual Observatory and Screen Digest

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Table 6.3. **Television households by platform**

Thousands

	Terrestrial		Cable			DBS		
	2000	2008	2000	2008	2009	2000	2008	2009
Australia	4 556	..	1 340	..	..	1 282	2 334	2 409
Austria	568	350	1 248	1 343	1 344	1 369	1 705	1 860
Belgium	167	374	3 789	3 692	3 626	220	440	469
Canada	2 625	2 198	7 983	8 183	8 235	967	2 652	2 750
Chile	..	..	..	1 461	1 664	..	570	661
Czech Republic	..	2 302	955	842	858	..	1 055	1 325
Denmark	508	421	1 041	1 588	1 631	800	430	430
Estonia	..	..	..	258	253	..	90	90
Finland	1 109	852	806	1 350	1 370	245	180	175
France	17 252	15 602	2 915	3 891	3 896	2 413	6 571	7 686
Germany	3 510	691	20 380	19 700	19 700	12 900	17 021	17 196
Greece	..	..	..	..	..	190	475	488
Hungary	..	782	1 607	2 204	2 185	..	739	847
Iceland	..	70	1	47	..	..	..	..
Ireland	384	384	670	537	505	150	625	648
Israel	..	..	..	..	..	2 350	560	..
Italy	7 522	16 585	0	0	0	13 068	7 250	7 302
Japan	..		18 705	31 302	32 642	..	13 423	..
Korea	12 027	486	3 086	15 013	15 054	0	2 167	2 272
Luxembourg	..	2	124	133	136	668	50	50
Mexico	15 859	16 876	2 283	3 757	..	330	5 252*	..
Netherlands	268	590	6 200	5 686	5 512	217	825	920
New Zealand	844	690	21	60	..	530	805	890
Norway	..	318	824	931	936	2 500	807	788
Poland	5 355	2 791	3 539	4 440	4 485	132	5 508	6 812
Portugal	1 958	1 698	925	1 475	1 438	620	692	746
Slovak Republic	..	247	659	758	745	..	654	740
Slovenia	..	..	0	295	280	..	93	94
Spain	10 978	13 206	298	1 459	1 440	1 685	2 035	1 846
Sweden	..	1 039	2 200	2 600	2 435	295	680	850
Switzerland	..	..	2 629	2 890	2 879	1 836	484	484
Turkey	8 261	7 547	885	1 261	1 266	4 624	8 400	8 841
United Kingdom	4 900	12 145	3 600	3 630	3 703	4 624	9 376	10 107
United States	17 700	14 600	66 600	63 700	..	15 600	31 300	..

Notes: Data in italics are estimates. (*) Data for Mexico's DBS are for 2005 instead of 2008.

Source: OECD, European Audiovisual Observatory and Screen Digest

StatLink http://dx.doi.org/10.1787/888932398537

Table 6.4. **Digital TV-DSL (IPTV)**

Thousands

	2004	2005	2006	2007	2008	2009
Australia	..	..	..	..	..	..
Austria	..	..	4	21	64	104
Belgium	..	33	140	305	441	652
Canada	..	..	..	174	212	300
Chile	..	..	..	..	..	..
Czech Republic	..	..	16	84	147	171
Denmark	..	2	8	35	84	193
Estonia	..	..	26	54	75	97
Finland	1	2	3	6	15	29
France	826	1 784	3 156	5 202	6 552	8 454
Germany	10	48	104	190	435	864
Greece	..	..	..	27	80	160
Hungary	..	..	1	6	33	74
Iceland	..	..	..	..	..	..
Ireland	..	1	10	12	13	17
Israel	..	..	..	..	..	..
Italy	169	192	213	263	587	675
Japan	..	..	..	..	*764*	*779*
Korea	..	..	..	..	..	2 523
Luxembourg	..	..	..	..	1	9
Mexico	..	..	..	..	..	..
Netherlands	..	32	58	111	154	227
New Zealand	..	..	..	..	..	..
Norway	16	45	77	107	151	205
Poland	..	..	5	47	87	151
Portugal	..	..	1	30	225	383
Slovak Republic	..	..	1	17	50	89
Slovenia	..	..	29	71	136	162
Spain	6	207	397	569	703	794
Sweden	3	28	81	355	383	469
Switzerland	..	..	10	60	120	236
Turkey	..	..	..	0	0	2
United Kingdom	14	40	54	172	463	526
United States	..	..	..	..	3 100	..

Note: Data in italics are estimates.

Source: OECD, European Audiovisual Observatory and Screen Digest

StatLink http://dx.doi.org/10.1787/888932398556

Table 6.5. **Digital television households by platform**

Thousand of TV households

	Cable		Satellite (DTH)		DTT	DSL (IPTV)	Total Digital HH		Share of TV HH (%)
	2008	2009	2008	2009	2009	2009	2008	2009	2008 or 2009
Australia	..	..	2 409	..	5 024	..	5 024	..	62.8
Austria	440	570	1 325	1 711	2 000	104	1 926	3 466	100
Belgium	898	1 271	73	100	73	652	1 476	2 096	46.5
Canada	3 933	4 562	..	2 800	10 540	300	..	..	..
Chile	892	..	..	..	5 024	..	..	..	..
Czech Republic	310	418	494	515	900	171	1 541	2 004	47.2
Denmark	167	590	410	410	565	107	1 316	1 668	68.4
Estonia	15	19	..	48	80	97	..	244	45.8
Finland	1 350	1 370	84	70	1 316	29	2 379	2 408	100
France	1 641	1 928	4 859	5 734	1 700	8 454	17 070	20 900	79.5
Germany	3 326	3 820	11 673	12 300	4 370	864	21 608	22 879	61.2
Greece	0	0	400	319	400	160	925	879	20.6
Hungary	182	365	596	718	160	74	821	1 317	35.8
Iceland	12	..	11	..	0	0	70	..	59.8
Ireland	316	351	573	601	0	17	912	969	65.8
Israel	..	..		..	..	..	..	..	..
Italy	0	0	4 700	4 740	15 291	675	13 387	20 706	85.0
Japan	..	..		..	..	764	..	..	..
Korea	39	..	1 743	..	..	..	..	..	..
Luxembourg	131	134	..	..	118	9	184	190	96.9
Mexico	..	..	..	..	5 252	..	..	..	..
Netherlands	1 979	2 491	800	895	879	154	3 273	4 419	61.6
New Zealand	60	65	..	..	50	..	..	..	..
Norway	519	535	792	695	450	205	1 893	1 885	88.6
Poland	492	772	4 754	5 928	100	151	5 353	6 951	53.6
Portugal	570	787	560	586	176	383	1 308	1 932	49.6
Slovak Republic	50	98	412	358	5	89	518	550	31.5
Slovenia	39	56	16	16	85	162	253	319	43.2
Spain	1 112	1 169	2 035	1 846	12 153	798	11 062	15 966	93.5
Sweden	707	884	681	666	2 320	469	3 936	3 936	95.9
Switzerland	510	603	472	484	164	236	1 266	1 487	47.6
Turkey	0	38	3 400	2 656	0	2.0	..	2 696	15.0
United Kingdom	3 478	3 665	8 665	10 107	18 600	526	23 117	24 968	97.9
United States	40 400	..	31 300	..	6 900	3 100	..	..	..

Source: OECD, European Audiovisual Observatory and Screen Digest

StatLink http://dx.doi.org/10.1787/888932398575

Table 6.6. **The digital switchover**

	Target date for switch-off	Criteria for switch-off
Australia	End of 2013 for the completion of analogue switch-off. A comprehensive switchover timetable based on a phased, region-by-region approach is under development.	No specific criteria. The objective of the digital television switchover framework is the same level of coverage and potential reception quality as achieved by analogue services.
Austria	End of 2010	According to the Private Television Act, analogue TV licence holders that broadcast in a coverage area via a multiplex platform and reach more than 70% of the population in the coverage area shall discontinue the use of the analogue transmission capacities assigned to them for this coverage area upon request by the regulatory authority within a period to be fixed by the regulatory authority. If a licence holder does not comply with the request of the regulatory authority within the period fixed by the authority, the regulatory authority shall withdraw the licence for the use of the transmission capacity from the licence holder.
Canada	31 August 2011	31 August 2011 is a hard date, no other criteria applicable. Exceptions will exist for remote communities.
Chile	End of 2017	
Czech Republic	11 November 2011. The only exceptions are the regions of Jesenik and Zlin for which the date is 30 June 2012. Territory and population penetration are set separately for individual networks.	The technical plan for the Transition (TPP) has been effective since 15 May 2008 and specifies the rules for the transition to digital terrestrial broadcasting, particularly dates, conditions and milestones in the development of electronic communication networks that will provide digital terrestrial TV broadcasting. Calendar and further conditions for analogue switch-off are also included.
Denmark	31 October 2009	..
Finland	Terrestrial: 31 August 2008 Cable: 29 February 2008	..
France	30 November 2011	The CSA has the responsibility to fix, nine months in advance and for each geographic area, service by service, transmitter by transmitter, and issuer by issuer, a date to cease analogue broadcasting, being careful to ensure that differences in the dates for ending services in the same geographic area are limited to technical or operational requirements, as well as taking into account the availability in households of reception equipment for digital signals and the availability of digital television services, as well as specificities in border areas and mountainous areas. Furthermore, Article 100 of the Act establishes a public interest group (GIP), formed between the state and editors of analogue television services to "implement measures to allow the termination of the distribution of television services via terrestrial analogue mode and continuity of receiving them by viewers".
Germany	Completed June 2009	..
Hungary	31 December 2011	According to Act 74 of 2007, the digital switchover shall be implemented in the entire territory of Hungary by 31 December 2011, to an extent such that at least 94% of the population is reached by public service programmes via free-to-air digital broadcasting service and the devices suitable for receiving digital broadcasting service are available to them.
Ireland	2012	..
Israel	End of 2010	..
Italy	The target date for analogue switch-off is end of 2012	The digitalization process will be performed on the basis of a gradual all-digital area process, according to a calendar established through a Ministerial Decree in September 2008. The first all digital area was Sardinia in October 2008, and the switch over was on the proposed schedule for the end of 2010.
Japan	24 July 2011	
Korea	The target date is expected to be in December 2012	According to "Special Act for Digitalization", the KCC is trying to improve digital TV penetration to the extent possible by December 2012.
Luxembourg	The diffusion of analogue broadcasting virtually ceased in 2007	...
Mexico	Set for end of 2021, but advanced to 2015	The Digital Terrestrial Television Transition Policy could be reviewed, and if necessary, adjusted according to the evolution of the transition process. The Consultant Committee for Broadcasting Digital Technologies will evaluate the process and make recommendations, if necessary. Based on the Committee's recommendations, the Secretary will determinate whether it is necessary to continue analogue transmissions of a specific station.

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Table 6.6. **The digital switchover** *(cont.)*

	Target date for switch-off	Criteria for switch-off
Netherlands	Analogue terrestrial was switched off on 10-11 December 2006.	..
New Zealand	November 2013	By region
Norway	DTH switched over in 2001. The last ATT region will switch off in November 2009. The government has not set a target date for analogue switch-off on CATV.	Based on reports from the DTT operator and public broadcaster the NRK, the Ministry of Culture and Church Affairs decides whether ATT switch-off can take place for each individual region (on a region-to-region basis).
Poland	July 2013	Analogue TV service can be switched off after coverage has reached the same level as analogue coverage.
Portugal	April 2012	..
Slovak Republic	December 2012	..
Slovenia	End of 2010	..
Spain	Completed April 2010.	..
Sweden	Completed October 2007.	..
Switzerland	Analogue terrestrial transmission stopped November 2007.	The switchover occurred in steps according to language regions.
Turkey	2012	..
United Kingdom	End of 2012	Implementing by region.
United States	June 2009	..

StatLink http://dx.doi.org/10.1787/888932398594

Table 6.7. **Hulu and YouTube video revenue profiles in the United States, July 2010**

	Hulu	Google Sites (YouTube)	Total US Internet audience
Unique monthly views (millions)	28.5	143.2	178.1
Monthly viewing sessions (millions)	153.8	1 884.5	5 234.7
Minutes per viewer	158	282.7	882
Monthly video advertisements (millions)	783.3	219.3	3559.9
Percentage of videos advertising-supported	100%	15%	..
In-stream advertising spots per video	3 to 7	1	..
Frequency (advertisements per viewer)	27.9	4.6	26.8
Video advertising CPM (USD)	30 to 60	10 to 15	8 to 30

Source: IDATE.

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Table 6.8. **Channel availability, end 2009**

	Nationwide channel (with terrestrial licences)		Other nationwide channel (Cable, satellite, IPTV, mobile)		Regional or territorial channels		Local stations and open channels (terr. or cable)	Windows	Channels targeting foreign countries	Total channels established in your country (windows not included)	Number of channels available in your country	
	Public	Private	Public	Private	Public	Private					Total	Foreign
Australia	7	9		150	..	..	..	..	..	**..**	..	..
Austria	3	3	2	61	0	5	63	10	5	**142**	349	212
Belgium	7	0	0	72	13	10	0	0	49	**151**	1 159	1 057
Canada	..	..	5	208	..	..	165	..	..	**..**	704	..
Chile	..	..	..	..	..	..	..	..	..	**..**	..	..
Czech Republic	4	9	1	29	0	49	38	0	47	**177**	330	200
Denmark	15	1	0	11	0	0	170	47	2	**199**	411	214
Estonia	..	..	..	..	..	..	..	..	..	**..**	..	..
Finland	5	20	1	6	0	6	32	0	0	**70**	254	184
France	7	20	3	184	2	57	115	22	88	**476**	713	325
Germany	6	15	11	177	10	37	89	48	28	**373**	563	218
Greece	8	7	2	24	0	47	92	0	10	**190**	285	105
Hungary	2	4	0	25	0	0	500	6	4	**538**	715	181
Iceland	1	9	2	3	0	0	1	0	1	**17**	558	542
Ireland	3	1	1	4	0	3	4	0	1	**17**	558	542
Israel	..	..	..	..	..	..	..	..	..	**..**	..	..
Italy	14	72	9	302	1	95	505	0	50	**1 048**	1 099	101
Japan	3	5	4	330	..	..	2	..	2	**346**	346	2
Korea	..	4	..	..	..	..	..	..		**..**	..	..
Luxembourg	0	3	1	4	0	0	4	0	30	**42**	264	252
Mexico	..	..	..	..	..	..	..	..	..	**..**	..	..
Netherlands	3	8	17	87	15	1	435	20	61	**627**	842	276
New Zealand	6	6		80	0	15		..	..	**80**	..	..
Norway	4	8	0	5	0	0	25	12	0	**42**	..	..
Poland	3	4	5	51	0	1	202	16	3	**269**	476	210
Portugal	2	2	7	27	2	0	0	1	4	**39**	246	193
Slovak Republic	3	3	0	19	0	13	67	0	0	**105**	266	161
Slovenia	3	5	0	25	2	19	18	0	0	**72**	193	121
Spain	5	15	13	142	33	22	930	17	22	**1 185**	1 263	100
Sweden	4	20	3	43	0	6	73	27	85	**234**	328	179
Switzerland	5	0	7	13	0	0	25	0	7	**57**	..	..
Turkey	6	20	1	82	1	19	198	0	5	**332**	404	77
United Kingdom	21	54	8	492	0	15	23	40	487	**1 100**	669	56
United States	..	..	..	..	..	..	..	..	..	..	..	..

Source: OECD, ITU, European Audiovisual Observatory and Screen Digest

StatLink http://dx.doi.org/10.1787/888932398632

Table 6.9. **Broadcaster revenues in European OECD countries**

EUR millions

	2004	2005	2006	2007	2008	2009
Total broadcaster revenues	63 887	79 354	83 311	86 847	86 843	85 045
TV Advertising	24 349	30 113	31 103	32 448	31 580	28 287
Radio Advertising	3 246	5 039	5 191	5 413	5 144	4 634
Pay TV	18 970	21 940	23 606	25 923	27 203	28 331
Public funding	17 322	22 262	23 411	23 064	22 916	23 793

Source: OECD, European Audiovisual Observatory and Screen Digest

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Chapter 7

Main Trends in Pricing

Prices for broadband and mobile communications have declined over the past two years, while services have expanded. Broadband speeds have increased between 15 and 20% whereas the downward trend in prices has been more marked for mobile services. Triple-play offers are now being commonly offered in most OECD countries and quadruple play (triple-play plus mobile voice) is starting to gain presence. While recognising some of the positive implications of bundles, this trend makes it increasingly difficult to map offers to prices and to compare them across providers.

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.

Introduction

Competition in broadband and mobile voice markets has resulted in a fall in prices over the past two years. Fixed PSTN telephony services have remained stable, or have increased slightly in cost, over the same period. Nevertheless, this conclusion may sometimes be misleading, as fixed voice services are commonly offered as an element of a broader bundle of communication services. Generally, prices have fallen and services have expanded, more markedly for broadband and mobile services, while these latter have also experienced a revolution triggered by mobile broadband and smartphone uptake.

Benchmarking prices and mapping them to services is becoming increasingly difficult due to the rising use of bundled services. Operators have typically tied broadband either to fixed voice services (most commonly DSL providers) or to cable television (usually cable operators) in order to advertise double-play offers (Table 7.1). Moreover, triple-play offers that include voice, television and broadband access have been popular in some countries. Bundled services such as these may have positive outcomes for consumers as well some drawbacks, including increased difficulty in comparing offers.

Naked DSL unbundling has enabled alternative operators to offer Voice over Internet Protocol (VoIP) services without the need for a fixed public switched telephone network (PSTN) line. Fixed voice PSTN prices have remained stable or increased slightly over the last two years. The average prices of OECD PSTN residential baskets increased by between 0.5% and 4% between 2008 and 2010. On the other hand, mobile prices fell significantly. The average prices of mobile baskets across the OECD fell by 6% for low usage, and over 20% for medium and high usage.

Broadband prices also declined during the same period. Between 2008 and 2010, the cost of a standard broadband subscription from incumbent DSL providers and cable companies, selected in OECD countries, declined by an average of 2% per year for DSL and 5% for cable. Over the same period advertised speeds increased between 15% and 20%.

Longer durations for mobile contracts have been introduced in many countries. The plans associated with these contracts enable operators to recover the cost of offering consumers lower initial prices for handsets. This also enables operators to offer high-end handsets and smartphones for a reduced one-off payment. In exchange, customers commit to a certain timeframe, typically one or two years, although sometimes with a higher monthly fee. Smartphone uptake has increased over the last two years, stimulated by the advent of more predictable plans for data services.

Mobile broadband services have become increasingly popular in OECD countries. Smartphone uptake has been fuelled by inexpensive, flat-rate mobile data plans, driven by competition between operators. There may also have been greater influence from manufacturers of the most popular devices, aiming to stimulate sales for applications through the use of pricing structures. In 2010, in countries such as France, Italy and the United States, the share of smartphones within the overall handset market was approximately 30%. Mobile data services were among the fastest growing revenue streams in communication markets, where growth was still expected, unlike mature markets such as fixed or mobile voice communications.

In some countries, the success of smartphone services has created challenges for mobile network operators and their users. Increased data traffic on mobile networks may reduce network performance if the capacity to support these services is strained by the level of simultaneous use. Operators then face a choice between investing more to upgrade networks (for example, by deploying commercial LTE services) and endeavouring to better match demand with prices. A number of operators have scaled back unlimited data offers, such as AT&T in the United States – the sole US iPhone vendor until 2011. In some countries the changes were more cosmetic with offers previously advertised as unlimited (though actually having relatively low caps compared with AT&T's offer) being withdrawn from the market. In countries, where effective competition exists, other operators frequently step in to offer their own unlimited data services, as occurred in a number of countries during 2010.

Service bundling

Previous OECD work[1] has shown that broadband services are frequently sold as mixed bundles, allowing users to choose among stand-alone offers or bundled services. Broadband bundles are typically sold with a significant reduction to the sum of stand-alone prices. The ability to choose between stand-alone and bundled services may, but need not, benefit consumers and increase consumer surplus. Bundling may help "shift" the consumer surplus from a high-valued element to another less valued element, and may also provide additional benefits, such as unified billing, integrated services and customer assistance.

The complexity of some bundled offers has made them increasingly hard to interpret. Difficulties encountered in trying to compare prices and map services to charges presents a challenge as regards transparency for end-users attempting to make informed choices. Bundled offers may also limit users' ability to switch providers.

In 2009, a review of over 2 000 offers across the OECD area showed that 77% of the 91 operators surveyed allowed users to buy a stand-alone broadband service. However, 17% of operators required customers to take fixed-line voice service and 4% required customers to purchase a television package. Only 2% of offers surveyed required subscribers to take a triple-play service to buy broadband. An example of this unavailability of stand-alone service was Free (Iliad) in France, which offered an inexpensive triple-play plan for USD 42. That being said, even within bundles, prices are sometimes structured to provide core and optional services. In Free's case, unlimited telephony to fixed lines across France and more than 100 countries around the world is included in the monthly price. Calls to mobile phones, however, were charged. At the same time, a bundle of more than 200 television stations was provided with other stations being made available on an *à la carte* basis.

Stand-alone broadband services were used for the data reported for 2010, regardless of operators tying voice or television to broadband services. Where it has not been possible to separate different services, for the small number of cases where no stand-alone broadband is available to customers, the overall price for the bundle has been included for comparison. The use of stand-alone pricing in this report means that caution should be exercised when analysing this data. Stand-alone prices do not always adequately reflect the savings associated with bundles. For example, cable companies' bundles focus on their core video services, with discounts provided for additional services such as broadband. The consumer never encounters a stand-alone broadband price, as this is always presented as one service in a menu of bundled prices. This has been discussed in other OECD work, referenced below, which provides a measure of evidence capturing the effect of bundling on user purchase decisions. More work to explain the effect of bundling on customer purchasing decisions is planned for the future.

Some operators are beginning to offer quadruple-play offers to customers, which involve adding mobile services to triple-play bundles. This type of bundling is especially challenging for comparative purposes. Whereas fixed-broadband, television and fixed-voice services are usually marketed to households, mobile services are more frequently aimed at individuals. This may be the reason why the addition of mobile services to triple-play has occurred only recently. Another reason, particularly for new entrants (who often disrupt traditional prices) is the need for a mobile subsidiary or an agreement with a mobile network provider. At the same time, some integrated providers see quadruple-play offers as a way to defend particular market segments against aggressive entrants. Irrespective of the reasons, these offers are becoming more common. Bouygues Telecom and Orange in France, Virgin in the United Kingdom, cable operators in Austria, Germany and the Netherlands, and Verizon in the United States, among others, now offer quadruple-play under a single subscription.

In September 2010, 48 of the 686 broadband plans surveyed included some type of national calls on fixed numbers. These were, in turn, bundled with telephone service. Only 12 offers in three countries (France, Mexico and Portugal) included calls to certain international destinations in broadband bundles, without additional charges per call.

Flat rate vs. *usage charging*

The share of fixed charges paid by customers through telecommunication bills has increased in recent years, while usage-based charges have decreased. This trend may be the result of a number of contributory factors. First, fixed-voice services are increasingly viewed as a commodity complementing existing valued communication services such as broadband. Second, operators have succeeded in increasing usage, as a result of changes in rate structure and reductions in rate levels, with a relatively high fixed monthly fee, but low usage charges. The attraction for many consumers is predictability of charges, particularly in cases where the customer may not be the direct user (*e.g.* parents). In some countries like Canada, New Zealand and the United States, flat-rate telephone service for local calls with no usage charges have been available for many years. Uncharged calls from fixed to mobile services have also been available in countries such as the United States, due to the availability of low termination charges. These are now being introduced as an optional part of broadband bundles in other countries, such as France.

The introduction of regulatory tools, such as local loop unbundling, has played a key role in the shift towards flat-rate telephony pricing, particularly as these have been introduced in combination with fixed wholesale pricing. Over-the-top VoIP services, whether provided by new entrants using naked DSL or entities such as Skype, make the market for usage charges much more competitive, with prices aligned more with marginal costs. In markets where termination charges are competitive, as is the case for most fixed markets across the OECD area, costs for operators are related much less to usage. The reduction of mobile termination rates in countries with calling party pays has undoubtedly favoured this trend, and operators are now less constrained in offering flat-rate calling plans. This was most evident in countries with mobile party pays, where plans with large buckets of minutes or unlimited services are more frequent.

Mobile operators have implemented pricing strategies in order to increase the attractiveness of their services. Many have offered "free" or inexpensive calls to selected numbers, which are chosen by the customer in advance. Mobile broadband services were usually marketed as flat-rate offers, albeit with data caps. Usage-based prices or reduced capacity have generally been applied for usage levels that exceed the prescribed plan. Unlimited data packages have been offered in the most competitive markets, as one option for consumers. The popularity of smartphones has reportedly placed strains on some networks in the most-used regions of certain countries. Some operators have responded by reducing caps or eliminating unlimited plans, while others have responded by introducing such plans. Previously, operators set tariff structures; today, the dynamics are more complex. Not only do operators need to take into account demand from consumers, they may also have to offer pricing structures attractive to the suppliers of the most popular smartphones, who are keen to stimulate the application market. Whether mobile operators succeed in implementing price discrimination by use, and how this will affect the flat-rate user experience – appreciated by many smartphone customers – will shape mobile pricing patterns in the coming years.

Price basket methodologies

The measurement of communication prices is inherently complex. Schemes may become extremely complicated as users are charged connection fees, usage fees, fixed monthly fees and so forth. Other offers include a certain number of calls, minutes or texts, be used during a specific period in time, typically a month. Some voice plans have flat-rate charging schemes, and billing units differ across countries, which undoubtedly has an impact on the final bill charged to consumers.

The OECD has developed a methodology[2] that enables the comparison of communications charges: the "basket" methodology. The basket rationale does not work from a single national consumption pattern, but instead builds a standard basket of monthly consumption and then compares how much the same service would cost across countries. This is done by selecting the least-cost plan, given the demand profile, among all surveyed service plans. The data in different periods of this collection process (*e.g.* data from the previous year) are not always comparable, given that the benchmark formulas have been revised over time.

The baskets were reviewed in 2009. The OECD fixed-line and mobile baskets, following the revision, are presented here (Box 7.1). There are four residential and two business PSTN baskets, and six mobile baskets. The residential PSTN baskets have been modified to provide for lower and higher usage profiles.

Box 7.1. **OECD fixed-line and mobile baskets**

PSTN BASKETS

	Business		Residential			
Calls per month	100 calls, single user	260 calls, single user	20 calls	60 calls	140 calls	420 calls
Calls per year	1 200 calls, single user	3 120 calls, single user	240 calls	720 calls	1 680 calls	5 040 calls

MOBILE BASKETS

Per month	30 calls	100 calls	300 calls	900 calls	40 calls prepaid	400 messages
Per year	360 calls	1200 calls	3 600 calls	10 800 calls	480 calls prepaid	4 800 messages

Some changes were incorporated to the PSTN and mobile baskets. For example, a formula was developed to account for different billing units in voice services. The new system for capturing different billing systems essentially calculates the price of a call based on the actual number of seconds stipulated by the basket, and then adds an additional adjustment reflecting the average "overbilling" of calls corresponding to the billing system. The methodology for residential, fixed pricing is based on incumbent operators' prices only. Even though some less-expensive offers may be available from new entrants as a result of this choice, the methodology is believed to provide a reasonable compromise between complexity, market share covered and other factors that may bear on comparability.

For each one of the baskets, a distribution of calls between fixed-to-fixed-local, fixed-to-fixed-national, fixed-to-mobile and international has been derived from the available information. Furthermore, a time-of-day distribution represents different calling patterns and prices, with calls during the day, the evening and the weekend. Call durations also differ depending on the type of call and time of day, but typically range from one to eight minutes per call (*e.g.* the duration of a fixed to fixed local call in the 140 calls baskets is 4.8 minutes in the evening). Further information can be found in the price basket methodology documentation.

For the mobile baskets, two or more operators are covered in order to reach at least 50% of market share in every OECD country, while non-recurring charges are distributed over three years. A new feature, incorporated in the 2009 revision, is the calculation of selective discounts. Selective discount plans typically allow users to specify one, two, three or up to ten or more numbers to which calls and/or messages are free or discounted. It is worth noting that there will normally be an overall traffic increase if selective discounts are used.

In the United States, the two market leaders (the two mobile operators with the largest combined subscriber market share) charge a premium for mobile-calling services relative to their smaller rivals. Therefore, the requirement that the operators covered reach at least 50% of the market results in basket estimates that overstate the least-cost option available to consumers for achieving the usage profile in a given basket. This distortion will be greater in mobile markets characterised by a greater degree of premium charge.[3] This may reflect the willingness of consumers to pay higher prices for preferred handset and data offerings, or other positive perception of these two operators.

Previous baskets provided 14 discrete distances for national fixed-line calls. As pricing patterns have been simplified in recent years, and most countries now only use local and national calling areas, a method has been developed in the new baskets to take into account the different sizes of local calling areas across the OECD area.

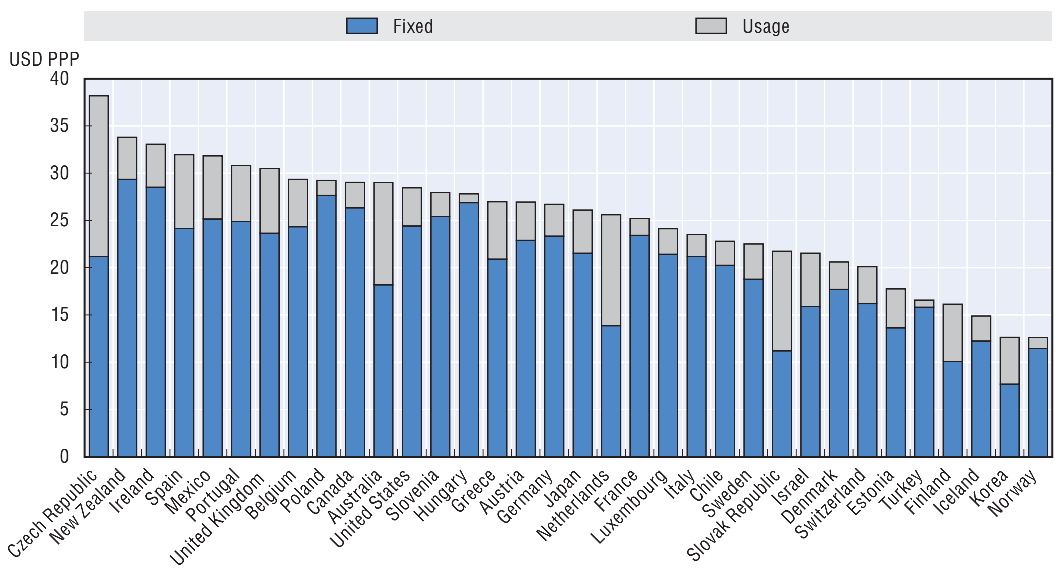
Residential fixed lines

The average monthly price for the OECD 20 calls basket was USD 25 in Purchasing Power Parity terms – PPP (or USD 300 per annum), of which an average of 81% was fixed-subscription cost (Table 7.3, Figure 7.1). The baskets in Iceland, Korea and Norway were the least expensive, while the most expensive were found in the Czech Republic, New Zealand and Ireland. The Czech Republic basket was three times more expensive than that of Norway. The OECD average price per call for this basket was USD 1.25. Turkey had the greatest proportion of fixed cost for this basket (up to 95%, only USD 0.75 out of USD 16.57), while the share in the Slovak Republic was almost 52%.

Data for the OECD 60 calls basket includes telephone service and 60 calls every month (Figure 7.2, Table 7.4). This amounts to three times more calls than the previous basket. The average price for this basket in the OECD area was USD 36.72/month PPP (USD 440.6 per year), which represents 46% more. Moving from 20 calls to 60 calls per months triples the number of calls for a charge of USD 0.29 per call.

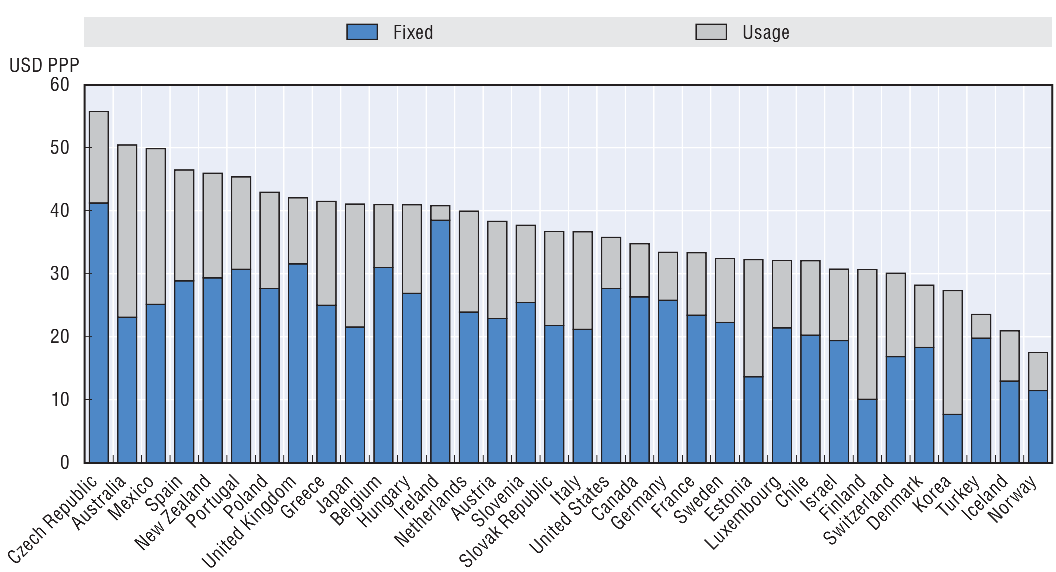
The most expensive 60 calls baskets were found in Australia, the Czech Republic and Mexico, while the least expensive were in Iceland, Norway and Turkey. There was a slighter higher than threefold price difference between the most (Czech Republic) and the least expensive country (Norway). Fixed subscription fees for this basket were on

Figure 7.1. **OECD 20 calls basket, August 2010, per month, VAT included**



StatLink http://dx.doi.org/10.1787/888932395839

Figure 7.2. **OECD 60 calls basket, August 2010, per month, VAT included**

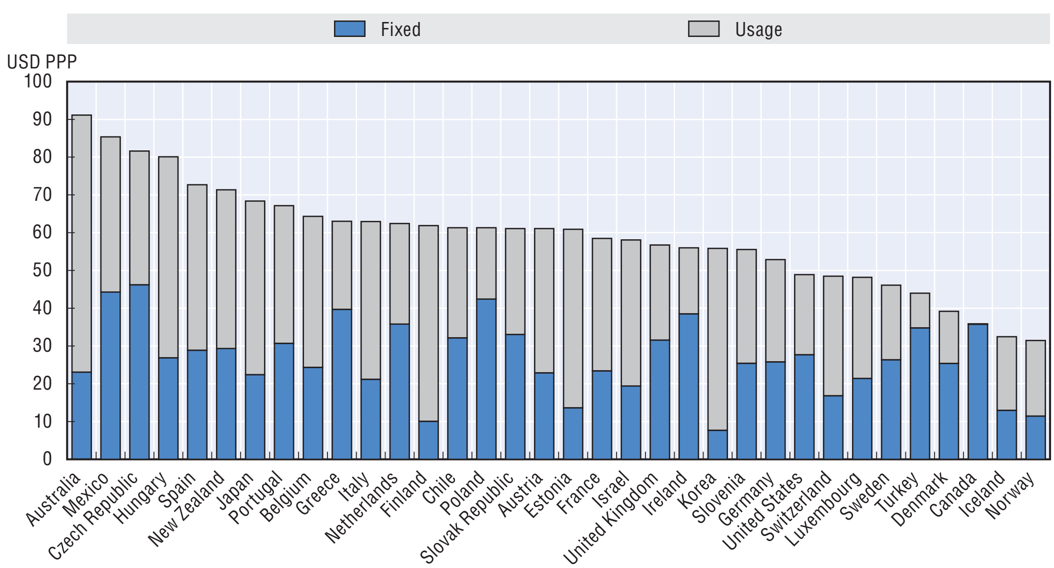


StatLink http://dx.doi.org/10.1787/888932395858

average 64% of total charges, although, in some countries, such as Ireland, Turkey and the United States, fixed charges accounted for more than 75% of charges (94% in the case of Ireland), while they accounted for as little as 28% in Korea.

The OECD 140 calls basket is closest to the previous fixed-line medium basket (which included 1 200 calls per annum). The average price for the 140 calls basket was USD 59.01 PPP, or USD 708.12 per year, which represented USD 0.42 per call (Figure 7.3, Table 7.5). Surprisingly, the average price for an additional call was nearly the same when upgrading from the 20 calls to the 60 calls baskets, as was the upgrade from the 60 to the 140 calls basket, namely USD 0.28 per additional call, being the overall price of this basket 60% higher. The most expensive 140 calls basket offers were found in Australia (USD 91 per month), Mexico (USD 85) and the Czech Republic (USD 81), while the least expensive countries were Norway (USD 31.5), Iceland (USD 32.5) and Canada (USD 36). Again, the ratio between the most and the least expensive countries was approximately 3:1. The fixed-line subscription accounted for an average of 45% of the total price, between the ranges of 16% (Finland) and almost 100% (Canada).

Figure 7.3. **OECD 140 calls basket, August 2010, per month, VAT included**

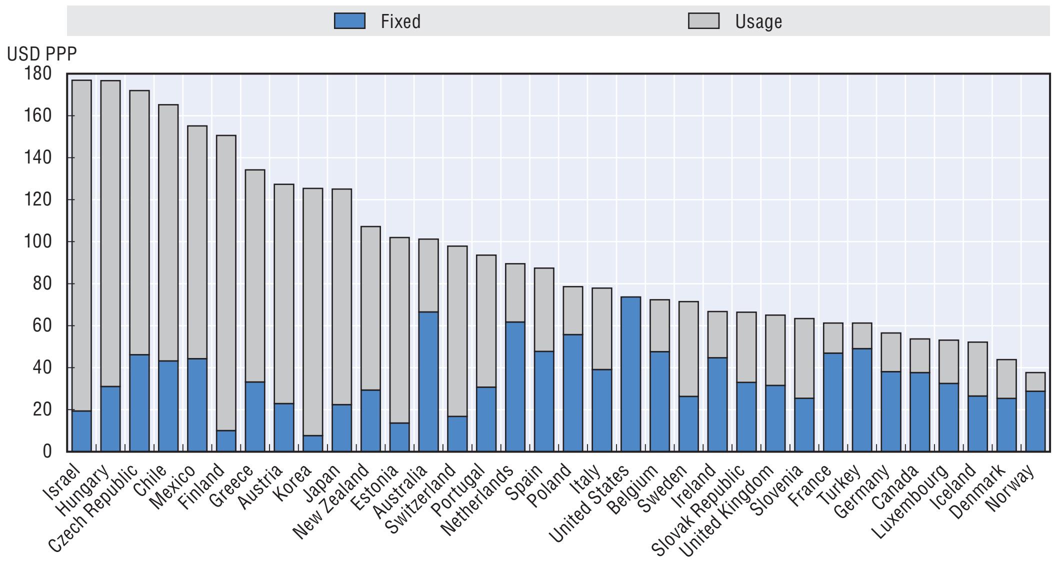


StatLink http://dx.doi.org/10.1787/888932395877

The OECD 420 calls basket, after the revision, is the highest-use residential basket for PSTN voice service (Figure 7.4, Table 7.6). The amount of calls is 3.5 times higher than any other residential basket. The average price for the 420 calls basket was 62% higher than for the 140 calls basket, resulting in an average price per additional call of USD 0.13 PPP.

The average cost across OECD countries for this basket was USD 95.35 PPP per month (USD 1 144.2 per year), but differences across countries were found to be larger than for preceding baskets. As such, the difference between the most expensive country (Israel, USD 176.86) and the least expensive (Norway, USD 37.65), was close to five times. This was much larger than for any other fixed residential basket. As expected, the average price per call dropped to USD 0.23, while the price of each additional call was USD 0.13, when compared with the 140 basket. It is noteworthy that this basket has 21 times more calls than the 20 call basket and was on average four times more expensive.

Figure 7.4. **OECD 420 calls basket, August 2010, per month, VAT included**



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The fixed-line subscription comprised an average of 37% of the total basket price. Estonia, Finland and Korea had subscription fees as low as 6% to 7% of the total price; in the United States the subscription was covered by fixed costs only, while in France, Norway and Turkey the fixed subscription price accounted for a share of over 75%.

If an estimated average of the previous results is calculated by averaging the ranking across these four residential fixed baskets, a perspective can be provided on how countries perform overall. The findings show that Iceland, Norway and Turkey were the best performers with the cheapest fixed-line residential calling plans. By way of contrast, Australia, the Czech Republic, Mexico and New Zealand have the most expensive prices across the four fixed-line residential baskets.

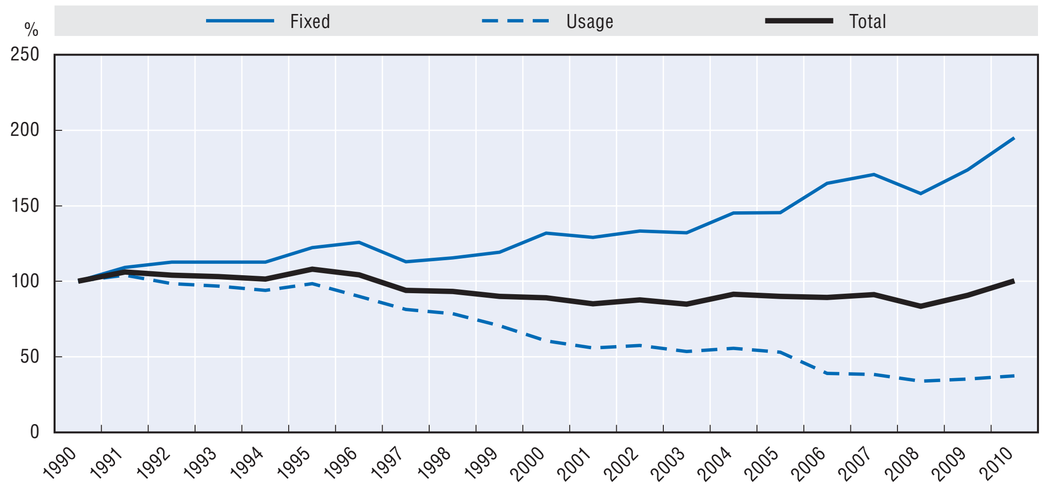
The total price of residential fixed-line telephony has remained relatively stable over the last 20 years (Figure 7.5, Table 7.2). In 2010, the price level was the same as in 1990, after having steadily increased from 2008, up from 84% of the 1990 level. Nonetheless, the composition of charges has evolved over time. Residential customers now pay comparatively more for subscription and less for calls. Fixed charges in 2010 were almost twice as much as in 1990. Usage charges in 2010 only accounted for 37% of the 1990 level. This is in line with previous findings, as operators have increased the amount of minutes included in the monthly subscription fee.

Business fixed-line basket

The OECD business baskets for fixed-line PSTN telephone service have also been redefined. There are now two different profiles: 100 calls per single-user per month and 260 calls. Unlike previous versions, these two baskets refer to business single users only, and do not intend to address the communication costs of an SME.

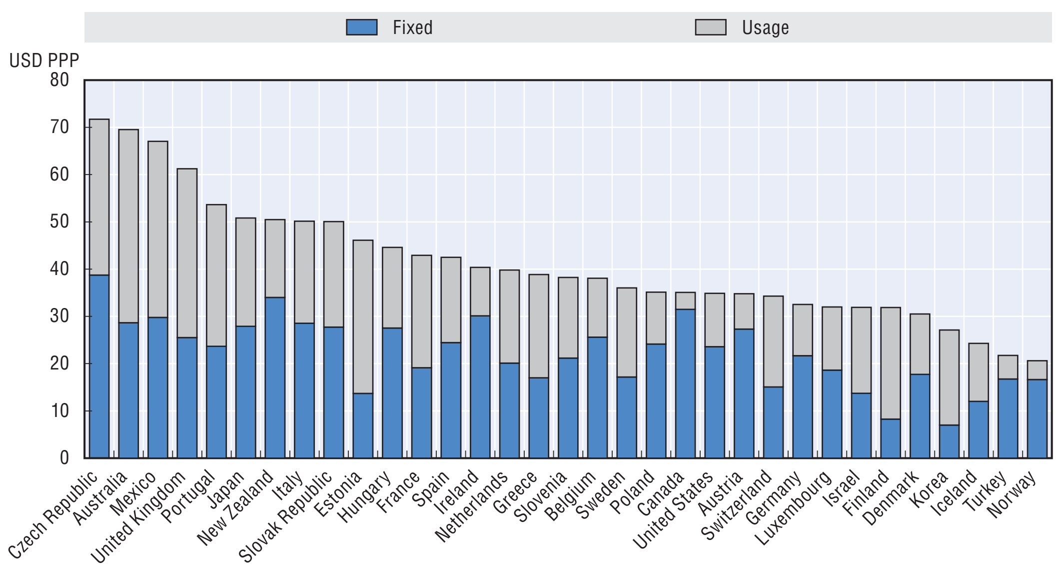
The 100 calls business basket costs on average USD 41.18 PPP per month (USD 494.16 per year), with prices ranging from USD 20.61 in Norway to USD 71.72 in the Czech Republic (Figure 7.6, Table 7.7). These differences are significant, as a business user in the Czech Republic would pay more than three times as much as a user in Norway with a similar

Figure 7.5. **Time series for residential phone charges, 1990-2010, OECD average**



StatLink http://dx.doi.org/10.1787/888932395915

Figure 7.6. **OECD 100 calls business basket, August 2010, per month, VAT excluded**



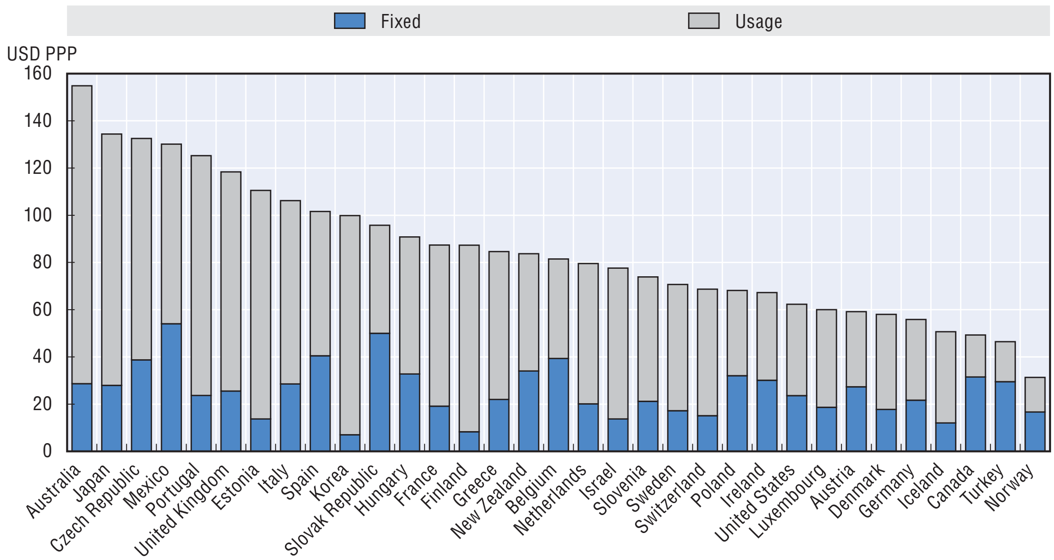
StatLink http://dx.doi.org/10.1787/888932395934

usage pattern. Australia, the Czech Republic and Mexico lay at the most-expensive end of OECD countries, and Iceland and Turkey were among the least expensive, all of which had prices lower than USD 25 PPP per month.

The average proportion of fixed-subscription costs for this basket was 54%, with Estonia (31%), Finland (26%) and Korea (26%) having a lower share of fixed costs. Fixed costs were highest in Canada (85%), Norway (81%) and Turkey (75%).

A second fixed-line business basket addresses a higher usage pattern, with 260 calls per month (3 120 calls per year). The average price for this basket was USD 84.95 PPP per month (USD 1019.40 per annum). Norway again had the least-expensive price (USD 31.29), followed by Turkey, Canada and Iceland (Figure 7.7, Table 7.8). The most expensive basket prices were found in Australia, the Czech Republic and Japan. The range of prices was

Figure 7.7. **OECD 260 calls business basket, August 2010, per month, VAT excluded**



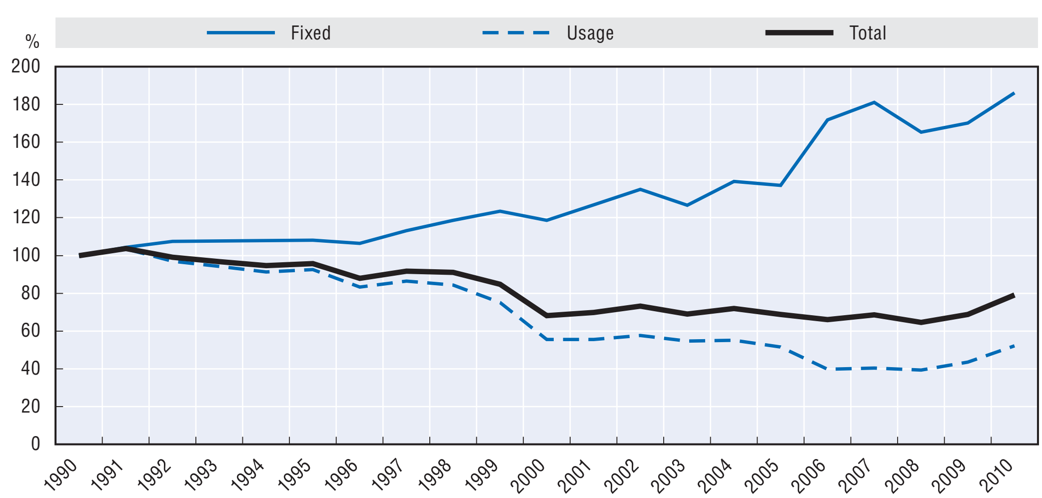
StatLink http://dx.doi.org/10.1787/888932395953

larger for this basket than for the previous one, as an Australian user would pay as much as five times more than a Norwegian user for the same basket. A similar trend, for Australia, was noticed for high-use residential baskets.

The fixed component of the basket cost accounted for only 30% of the total price, which is also in line with previous findings, as higher usage baskets usually have a lower share of fixed costs. Those were, however, relatively high in Turkey (63%), Norway (54%), Canada (58%) and the Slovak Republic (52%), while in Estonia and Finland, fixed costs accounted for less than 13% of the total cost.

Like residential fixed telephony, the price of business fixed telephony has increased since 2008, reaching approximately 80% of the 1990 cost (Figure 7.8, Table 7.2). Both subscription charges and usage charges have increased since 2008. Subscription charges

Figure 7.8. **Time series for business telephone charges, 1990 base year, OECD average**



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increased steadily until 2007 up to 80% more than in 1990, and usage charges dropped by 35%. In 2010, fixed subscriptions were 86% more expensive than in 1990, and usage fees were approximately half of the price in that year.

Mobile pricing trends

In 2010, mobile price baskets were revised to reflect changing trends in usage, expanding from three to six baskets to capture a broader range of usage patterns. The lowest usage basket accounts for as little as 30 calls per month (and includes some SMS). Another basket represents heavy usage patterns, with 900 calls per month. In the medium range, the new basket methodology includes a 100 call and a 300 call basket. In order to reflect two specific aspects of mobile usage, the revision also includes a low-use prepaid basket (with 40 calls) and an SMS-only (400 texts), targeted at users who communicate most frequently via SMS services.

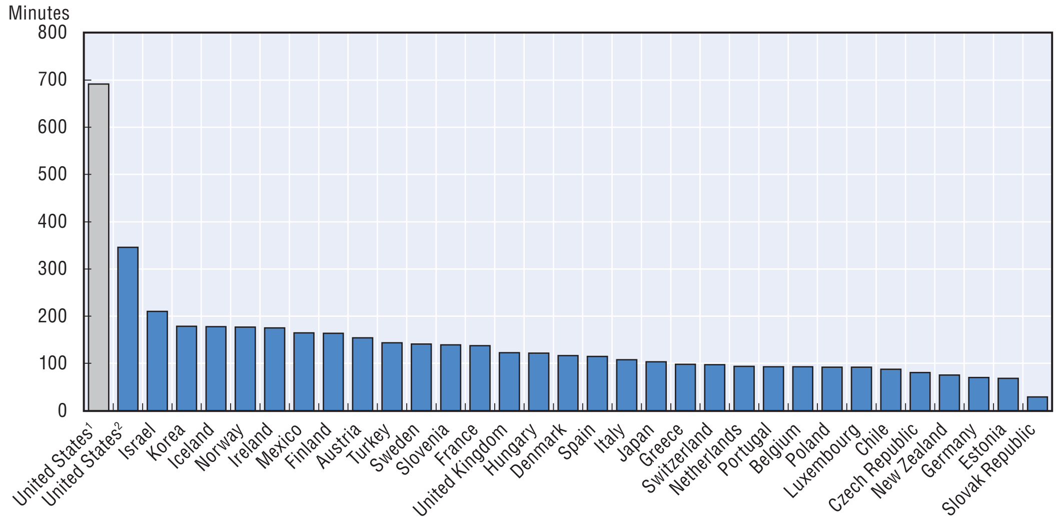
The mobile baskets distribute traffic according to different calling patterns. It is worth noting that these calling patterns may significantly differ from those in certain OECD countries. A basket provides the exact cost of buying a particular usage profile, rather than what is considered a typical bundle in a particular domestic market. For example, some countries may be relatively expensive in some baskets, while having less expensive rates in others that are probably more adapted to their average national traffic patterns. Average monthly mobile traffic per mobile subscriber per year is examined in Chapter 3 (Table 3.14), which also notes that some countries have a far larger average use of mobile telephony due to greater widespread use of unlimited voice service or large buckets of minutes. Tariffs in many countries may include a "subsidised" handset (*i.e.* lower upfront fee), which is excluded from the analysis. In some cases, this could have an impact on prices. The methodology also excludes quality of mobile services, which may be an important element in deciding price level.

Using different proportions for each one of the baskets, mobile calls are broken down into mobile-to-fixed line calls, on-net mobile calls, off-net calls and voice-mail calls, each basket including a fixed number of SMS per month (*e.g.* the 30 calls basket includes 100 SMS). Voice calls are distributed between day, evening and weekend, and SMS between peak, off-peak, on-net and off-net, while an average call duration has been empirically derived from the industry's input data. Since 2010, the mobile baskets now also include selective discounts, that is, discounted or free calls to a limited number of selected numbers, following the widespread use of "friends and family" offers by many operators.

In mobile communications there are significant differences between the levels of use made by users in some OECD countries. In the United States, for example, the average use of mobile voice services is much higher than in other OECD countries. Users in the United States on average made 691 minutes of calls per month (incoming and outgoing, designated as United States 1 in the graph). If we divide this figure by two to make it comparable with other countries which report outgoing calls only (346 minutes, designated as United States 2), this is 65% higher than the next closest country, Israel, with 210 minutes per month. Strikingly, there are 13 countries with an average of less than 100 minutes per month (see Figure 7.9).

Such differences are one reason why the OECD has a range of usage patterns across its mobile baskets. This allows policy makers to assess prices relative to typical usage levels in their countries and assess comparative developments in market segments that may not be among the largest ones in that country. If a usage pattern for any single country was chosen

Figure 7.9. **Cellular mobile traffic per subscription per year**



1. The data for the United States includes both incoming and outgoing calls. Data for other countries are for outgoing calls only.
2. This data represents the United States cellular billed minutes, obtained by dividing by 2 the incoming and outgoing calls.

StatLink http://dx.doi.org/10.1787/888932402223

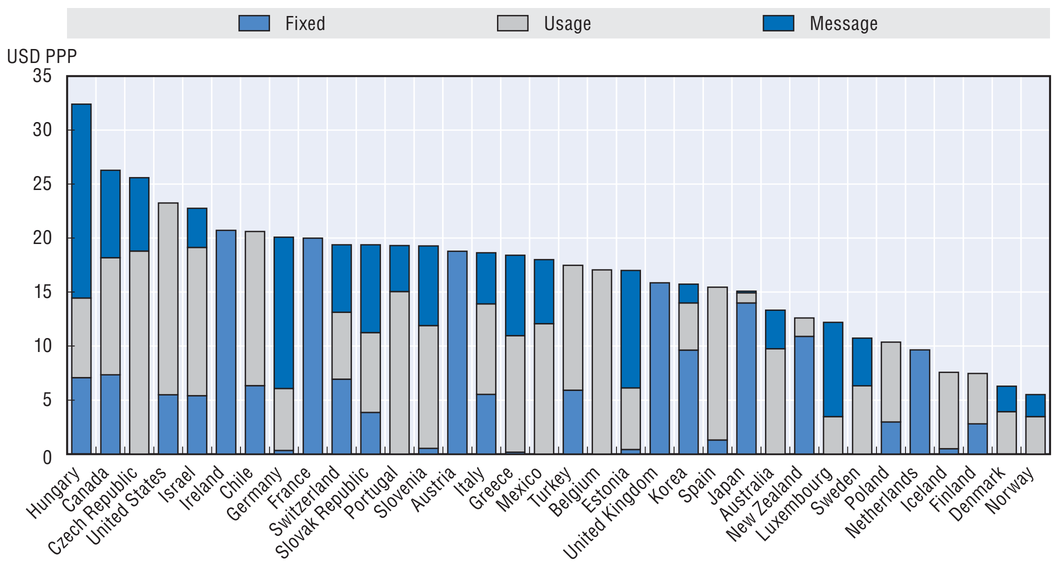
to represent all other countries it would be expected that such a comparison would be relatively favourable to that country. For example, countries with higher average usage tend to perform better in those baskets with a greater number of calls as, in a competitive market, operators will tailor packages to meet that demand. By way of contrast, for those countries that make less or little use of pre-paid cards, as opposed to post-paid services, prices are typically higher for the baskets with lower usage levels. This does not necessarily mean that better deals may not be available, in these countries, but rather that the largest operators focus their efforts on the largest market segments. They may still be active in lower usage segments, through subsidiaries or by supporting MVNOs over their infrastructure, while retaining their premium brands for the largest market segments. In addition, as the dynamics of a competitive market change this gets picked up by having a range of baskets.

In short, the largest basket most resembles the United States usage pattern and better reflects the prices paid by the typical consumer in the United States. In contrast, other countries perform better in baskets that are more closely aligned to their usage patterns.

To continue with the example of the United States, the pricing of the largest players has in the past been predominately focused on the post-paid market. In recent years smaller players have begun to win market share through an increase in popularity of pre-paid services. As might be expected the larger players have reacted to this development. In October 2010, AT&T reduced the price of calls under its “Simple Rate Plan” to USD 0.10 per minute to compete with pre-existing similarly priced services offered by numerous mobile operators, other than AT&T or Verizon. As a result the prices for services were reduced by 35-45% from what is shown in Tables 7.10, 7.11 and 7.14, which record prices for August 2010. In subsequent comparisons for November 2010 this reduced the ranking of the United States from 31st to 12th for the 30 calls basket (with similar improvements for the other two baskets), reflecting the value of increased competition in those market segments.

The first mobile basket includes 30 calls and 100 SMS per month. The average monthly price for this basket was USD 16.83 PPP per month across the OECD (Figure 7.10, Table 7.9). The least expensive 30-call offers were in Denmark, Finland and Norway (between USD 5.5 and USD 7.5 per month). Hungary (USD 32.40), Canada (USD 26.28) and the Czech Republic (25.59) had the most expensive 30 calls basket offer in the OECD area. Voice use accounted on average for 46% of the cost, the subscription for 32%, and SMS for the remaining 22%.

Figure 7.10. **OECD 30 calls mobile basket, August 2010, per month, VAT included**

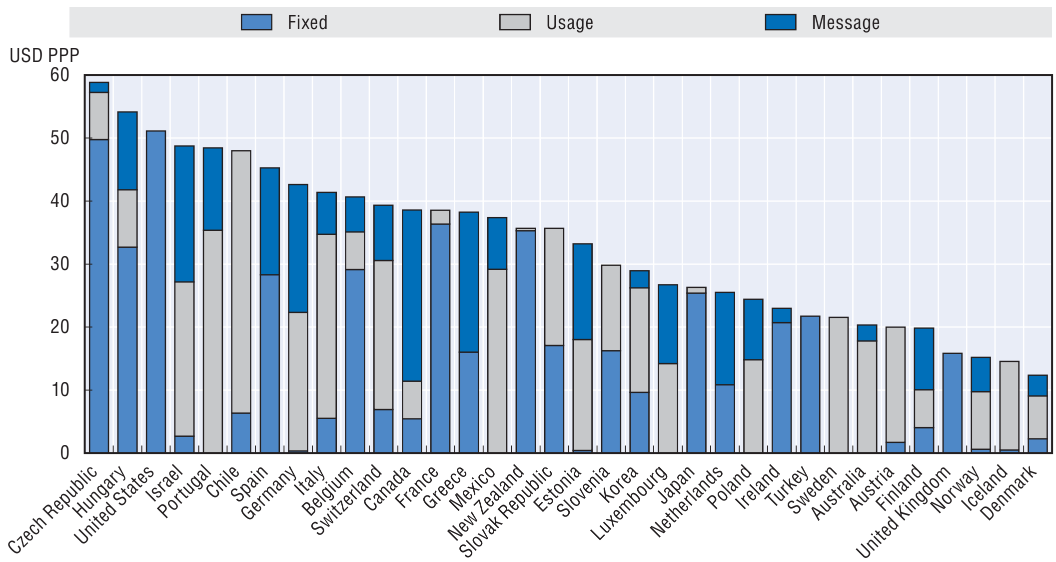


StatLink http://dx.doi.org/10.1787/888932395991

The 100 call mobile basket (including 140 SMS) cost on average USD 33 PPP across the OECD area. The Czech Republic (USD 58.81) and Hungary (USD 54.14) were the most expensive countries (Figure 7.11, Table 7.10). By way of contrast, the cheapest 100 call basket offers were found in Iceland (USD 14.56) and Denmark (USD 12.37). Even in nominal terms, the Czech Republic was still more than twice as expensive as Denmark for this usage profile. Subscription fees represented 40% of the average cost of this basket, voice use accounted for 38%, and SMS use for 22% of the final basket price.

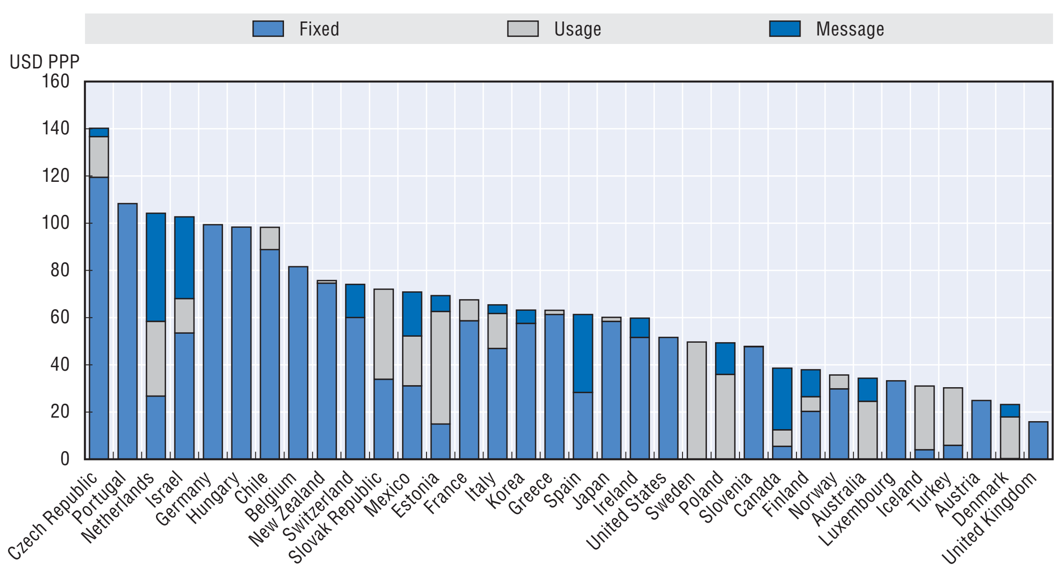
The next mobile basket includes 300 calls per month and 225 SMS, for an average price of USD 64.32 PPP per month in the OECD area (Figure 7.12, Table 7.11). The most expensive countries were the Czech Republic, Portugal and the Netherlands (between USD 104 and USD 140 per month). The United Kingdom had the least expensive offer for this mobile basket (USD 15.85 per month), followed by Denmark and Austria. Contrary to what would be expected, fixed-subscription fees represented a higher share of costs (72%) than for previous baskets. This is due to a higher presence of fixed-fee monthly plans adapted to this usage pattern. In fact, in 10 countries, this usage pattern was captured by a plan with a fixed monthly fee only, with no extra usage charge. SMS and voice use accounted on average for 10% and 18% of total costs across the OECD area.

Figure 7.11. **OECD 100 calls mobile basket, August 2010, per month, VAT included**



StatLink http://dx.doi.org/10.1787/888932396010

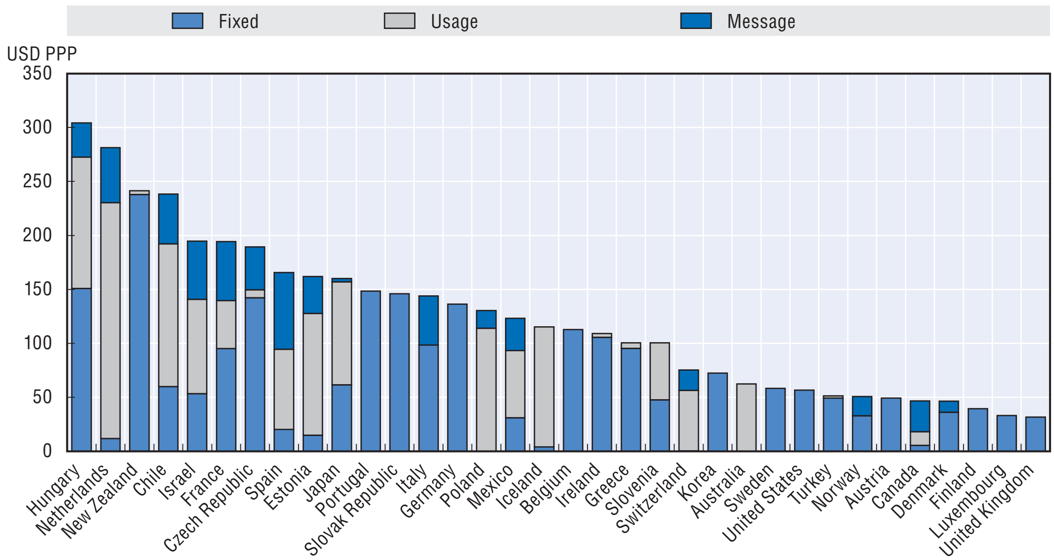
Figure 7.12. **OECD 300 calls mobile basket, August 2010, per month, VAT included**



StatLink http://dx.doi.org/10.1787/888932396029

The highest usage mobile basket includes 900 calls and 350 SMS for an average price of USD 122.71 PPP per month (Figure 7.13, Table 7.12). Finland, Luxembourg and the United Kingdom had the least expensive offers, all below USD 40 per month. In contrast, Hungary's 900 calls basket cost over USD 300, followed by the Netherlands (USD 281.24) and New Zealand (USD 241.35). The share of fixed subscription fees was lower than for the 300 calls basket (54%). Voice use accounted for 33% and SMS use for 13% of the cost.

Figure 7.13. **OECD 900 calls mobile basket, August 2010, per month, VAT included**



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In addition, two additional baskets were included in the methodology to account for prepaid low usage (40 calls prepaid) and heavy usage of SMS, since such profiles were found to be relevant during the last revision of the baskets.

The average price of the 40 calls mobile prepaid basket was USD 21.74 PPP, of which only 7% on average is fixed cost, while 71% of the cost was associated to voice use, and 22% to SMS use, in line with a prepaid basket, where most of the costs are expected to be based on usage (Figure 7.14, Table 7.13). The countries with the most expensive 40 calls prepaid basket were Japan and New Zealand, there being a high price differential between Japan (USD 65.20) and the following countries (the second most expensive, was New Zealand at USD 34.27). On the other hand, Denmark and Iceland had the least expensive basket, all under USD 10 PPP.

The 400 messages mobile basket includes 400 messages and only 8 calls, for an average price in the OECD area of USD 22.84 PPP (Figure 7.15, Table 7.14). Israel (USD 66.15) Germany (USD 60.56) and Hungary (USD 60.19) had the most expensive basket, while Iceland (USD 7.57), Denmark (USD 9.09) and Norway (USD 9.68) were the least expensive countries. The subscription fee represented, on average, 30% of the cost, with SMS use around 52%. While in four countries (France, the Netherlands, the Slovak Republic and the United Kingdom) the subscription price covered all services included in the basket, other countries had a very large share of variable costs, especially in SMS use. For example, in Estonia, Germany and Greece, the SMS use price share was higher than 90% of the total price.

Compared to fixed-line residential baskets, mobile baskets provided for a much larger range of prices. The price ratio of the least and most expensive country in the fixed-PSTN baskets was around three times for three of the baskets, and nearly five times for the higher use basket. In contrast, the same price ratio for the mobile baskets went from five times (100 calls baskets) to 7.5 times (30 calls basket), and even 9.5 and 11 times (900 calls and 40 calls prepaid basket, respectively). Even in nominal terms, the price ratio between Hungary and the United Kingdom was almost seven times in the 900 calls basket.

Figure 7.14. **OECD 40 calls mobile prepaid basket, August 2010, per month, VAT included**

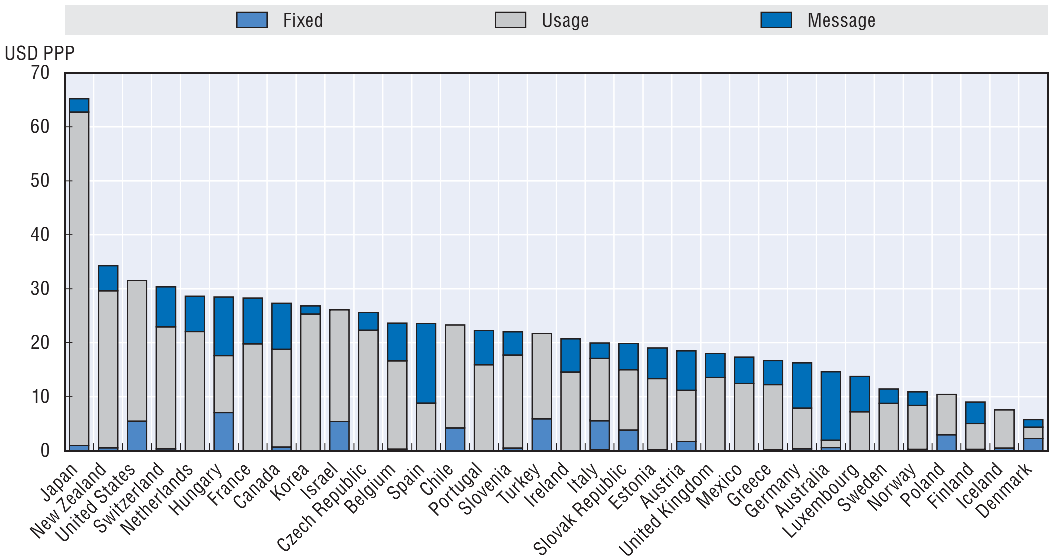

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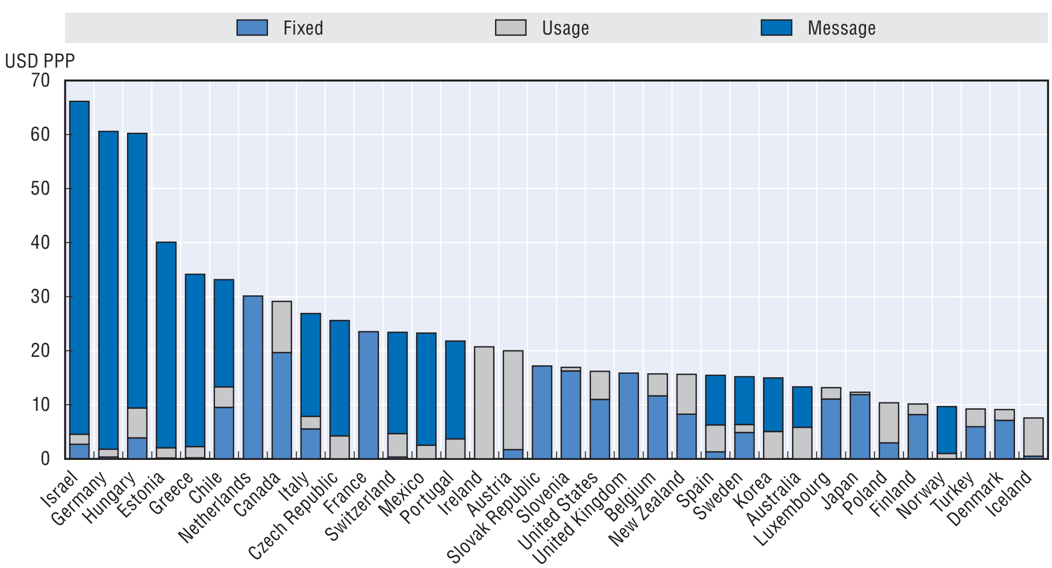
Figure 7.15. **OECD 400 messages mobile basket, August 2010, per month, VAT included**



StatLink http://dx.doi.org/10.1787/888932396086

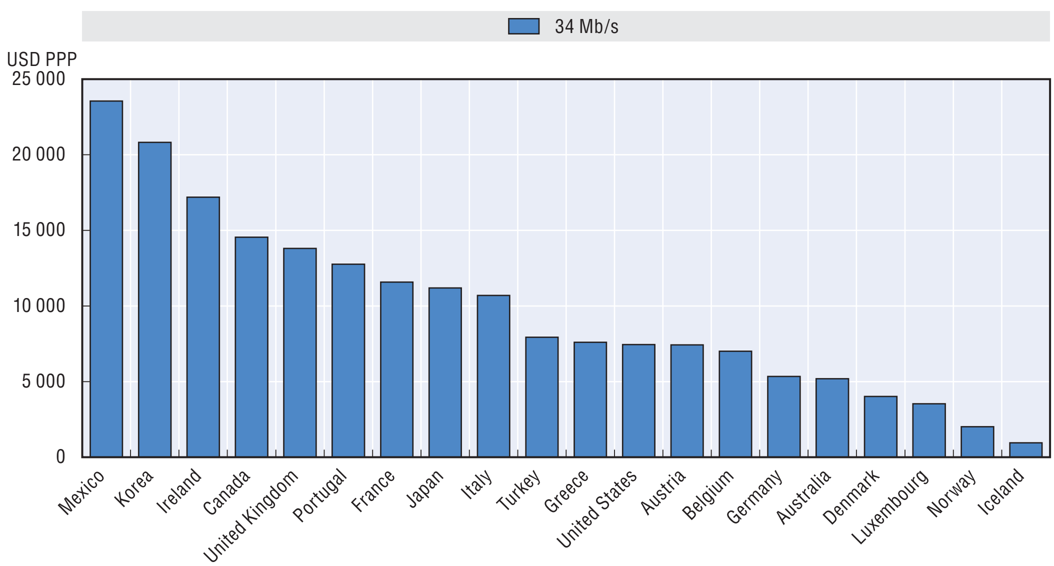
It is possible to derive an average price for an SMS from analysis of the costs associated to SMS use across the basket: USD 0.05 in the 100 calls and 900 calls basket; USD 0.04 in the 30 calls and 900 calls basket; USD 0.03 in the 300 calls basket; and USD 0.08 in the 40 calls prepaid basket. The 400 message basket had an average of USD 0.03. The amount corresponding to SMS included in the basket is often bundled with the subscription fee. This means that the previous findings only apply to the part of the price related to SMS use.

Leased lines

Leased lines provide symmetrical point-to-point connectivity between several locations. They are commonly used by businesses as a way to connect offices and branches or to link them back to a telecommunication provider, with a quality of service stipulated in the contract. DSL connections with certain guaranteed levels of service are increasingly replacing leased lines, which has contributed to the fall in prices over the past decade.

The price of a 34 mbps leased line across OECD countries in USD per month, excluding VAT, is shown here (Figure 7.16, Table 7.15) as a weighted average of the prices for distances of 2, 20, 50, 100, 200 and 500 km for a given country. Across countries where information was found, a 34 mbps leased was most expensive in PPP terms in Mexico (USD 23 553) and Korea (USD 20 818), and least expensive in Norway (USD 2 016) and Iceland (USD 954).

Figure 7.16. **National OECD Leased lines basket, 34 mbps, August 2010, per month, VAT excluded**



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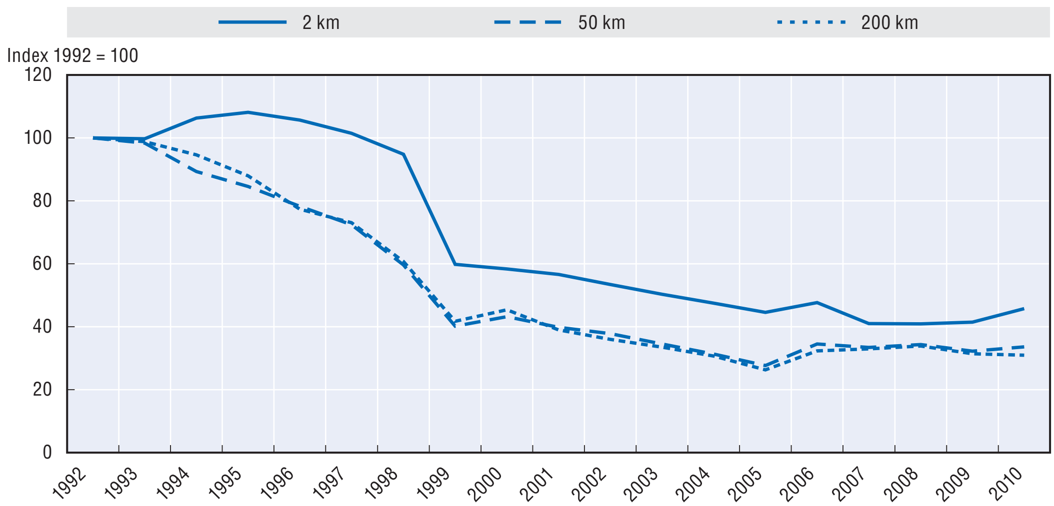
Unlike residential and business fixed-telephony charges, leased-line prices have declined since 1992 (Figure 7.17, Table 7.16). Prices in August 2010 were 55% less expensive for a 2 km, 2 mbps line than in 1992. Prices have fallen even more markedly for lines over longer distances, down to approximately one-third of their original price in 1992.

Broadband pricing trends

Broadband prices have been continuously declining over the past decade across the OECD area, while connection speeds have increased. Most OECD countries have at least one operator actively offering fibre-based, high-speed broadband connections, although these may be limited to particular geographical areas of the country. Fibre-to-the-home (FTTH) and fibre-to-the-building (FTTB) also enable symmetrical upload and download speeds, which permit new functionalities and an improved user experience in a range of

Figure 7.17. **Trends in leased line pricing over different distances, 2 Mbit/s line, 1992-2010**



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online activities, such as sharing pictures, video-conferencing or uploading content onto social-networking websites. A survey sample of 686 stand-alone broadband offers from 102 operators across the 34 OECD countries has been undertaken for this *Communications Outlook*: three operators have been selected per country, including DSL, cable and fibre networks.

Some of the operators sampled in Austria, Denmark, France, Korea, Norway and Portugal offered at least 100 mbps upload speeds. Zon in Portugal and T2 in Slovenia offered 1 Gbps symmetrical upload and download speeds in some geographic regions. Orange in France charged USD 28 to upgrade upload speed to 100 mbps (to be symmetrical with download speeds). Among the operators surveyed, the unweighted average of advertised download speeds was higher than 50 mbps in six OECD countries. In Japan, Portugal and Sweden, advertised download speeds were higher than 75 mbps on average in areas where fibre is available. Some countries may well have higher speeds offered by operators not covered in the survey, or only deployed in very limited areas of a country or outside their main markets. For example, Bell Aliant in Canada provides a 170 mbps download speed service in limited portions of Eastern Canada. Furthermore, the data presented do not weight results by the number of subscribers by offer, as this data is typically not available.

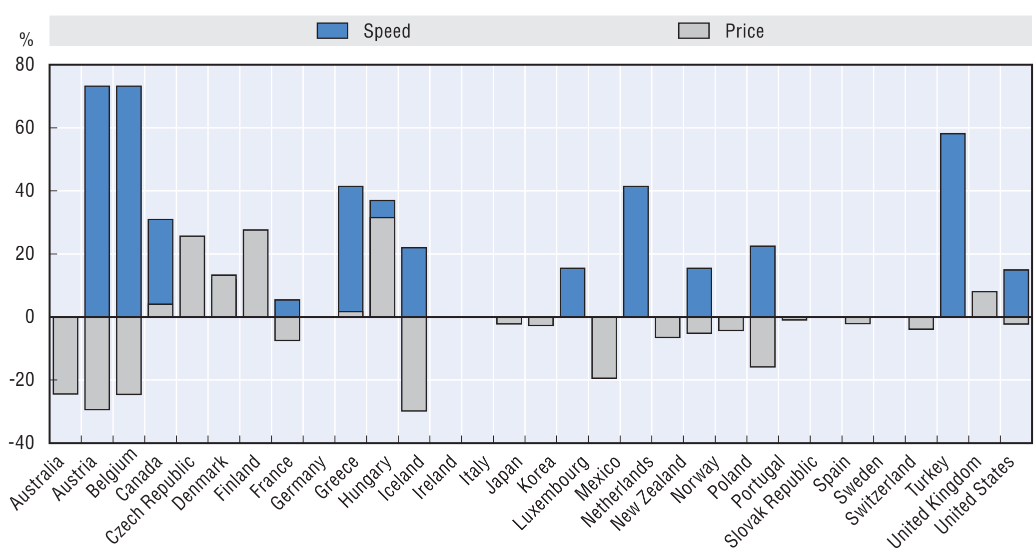
Some operators have rapidly increased their advertised upload speeds. In Slovenia, the average advertised upload speed is approximately 54 mbps; in Japan the average is 40 mbps, and in France, Korea, Norway, Portugal and the Slovak Republic average upload speeds are higher than 30 mbps.

If all 686 offers included in the benchmarking exercise are considered, the average download speed was 36 mbps and the average upload speed 16 mbps. This was a remarkable increase from the equivalent figures in 2008 (17 mbps and 5 mbps). These numbers dropped to 31 mbps and 11 mbps, in 2010, if average speeds per country and the average across countries are considered.

Customer commitment in terms of length of contract differs widely across countries. While Korean operators tend to offer large discounts to customers who commit for periods as long as three or four years, other operators do not have such commitments. Free (Iliad), in France, has no minimum contract duration and TDC in Denmark only requests a six-month commitment. Longer commitments make more sense in mature broadband markets, where operators no longer target customers purchasing broadband services for the first time, but instead compete to gain each other's market share. Against these market dynamics, inexpensive offers were normally associated with longer commitment periods.

DSL prices have been falling as speeds have increased across the OECD area. The price of a DSL (Figure 7.18, Table 7.17) and cable subscription (Figure 7.19, Table 7.18) over time are shown for each OECD country. If this speed tier continues to be offered over time, its price change is shown. If a speed tier is phased out, the following speed tier is then chosen, and a speed increase recorded. This does not preclude additional speed tiers being added on top of the selected one, which would not have an impact on this chart if the original speed tier is not phased out. Should this happen, no speed increase would be recorded. Following this procedure, between September 2008 and September 2010, the price of this selected connection fell by an average of 2% year-on-year across the OECD, while the average download speeds of offers increased 15% per year. OECD cable offers followed an even more favourable trend: speeds increased 20% year-on-year while prices fell by 5%.

Figure 7.18. **Incumbent broadband price and speed changes, ADSL or fibre, September 2008-September 2010**



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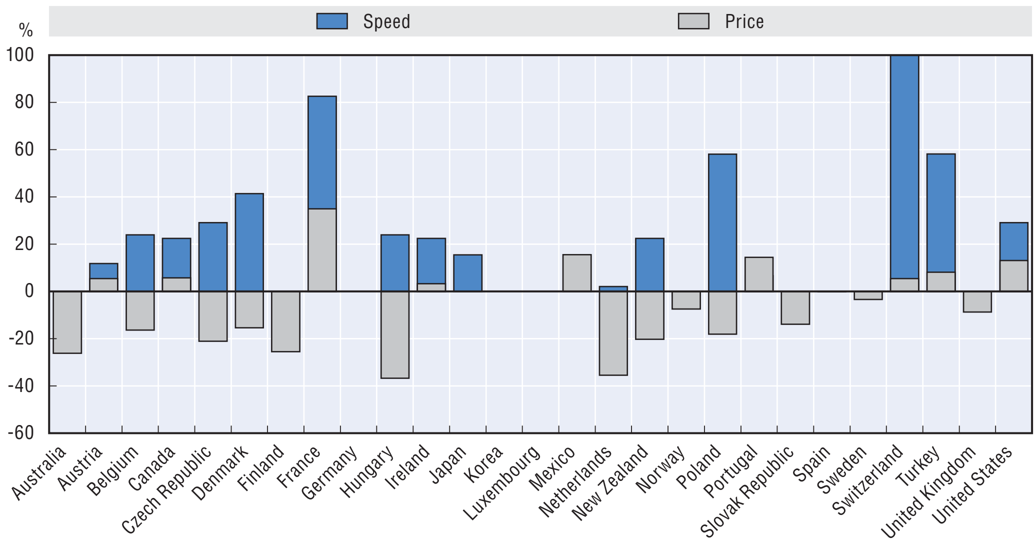
This trend was clearly underpinned by continuing infrastructure upgrades, based on fibre and DOCSIS 3.0 deployments, which have allowed operators to upgrade customers who wish to do so from lower to higher speeds. Most cable operators have aimed at maintaining revenue streams by providing a speed upgrade with limited price reductions.

Figure 7.19. **Cable broadband price and speed changes, September 2008-September 2010**



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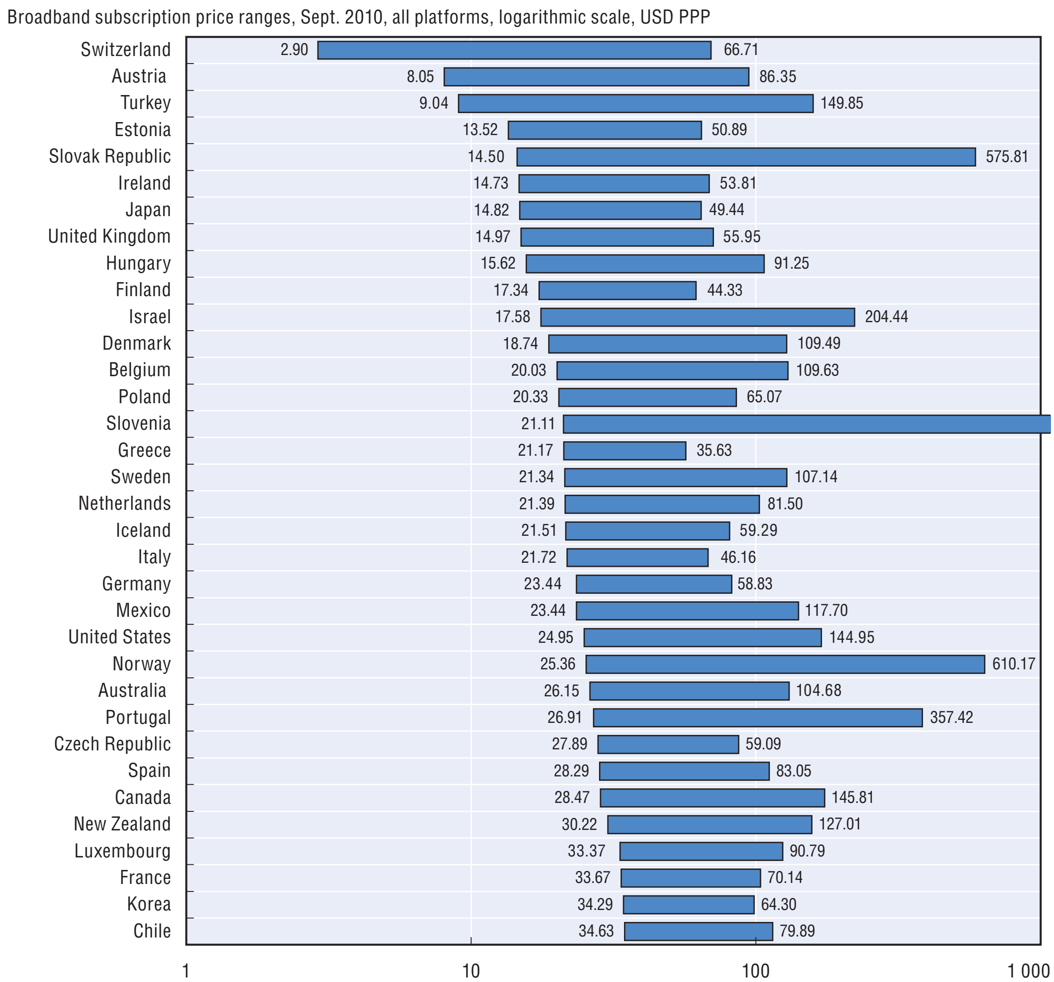
Prices for DSL in Australia, Austria, Belgium and Iceland fell by more than 20%. Cable prices dropped 37% in Hungary, 35% in the Netherlands and over 20% in Australia, the Czech Republic, Finland and New Zealand. Nonetheless, in many countries, prices and speeds remained stable. Examples of this include Germany, Ireland, Italy and Spain, where operators kept the same offer in the market at a similar price. This meant that any speed upgrade was also associated with a price increase. Operators have sometimes added additional speed tiers on top of existing ones (*e.g.* Spain). However, as the original offer has been maintained, this does not have an impact on the previous charts. In some cases, such as France, Turkey and the United States for cable, and Hungary for DSL, prices and speeds increased to a similar extent. Only in the Czech Republic, Finland and the United States (DSL) and Mexico and Portugal (cable), did operators increase the price of the benchmarked offer without a speed upgrade.

There has been a remarkable increase of high-speed offers in many OECD countries, as a result of operators deploying FTTH and FTTB infrastructure. Out of the operators included in the survey, four countries (Portugal, Slovak Republic, Slovenia and Sweden) offered a download speed of 1 Gbps; Norway had a maximum advertised speed of 400 mbps, and Finland and Japan, 200 mbps. In only 12 of the 34 countries included in the data collection were there no available download speeds of at least 100 mbps among the operators surveyed. Concerning entry-level speeds, Portugal and Sweden had available offers of an advertised speed of 256 Kbps.

The list of advertised offers used to calculate broadband prices, in September 2010, is shown (Table 7.19), and the range of prices for these offers in USD PPPs, considering line charges, is displayed (Figure 7.21). An equivalent that does not include line charges is also shown (Figure 7.20). These price ranges consider stand-alone broadband only and do not include bundles. However, some operators did not offer stand-alone broadband (*e.g.* Free in France, STV in Estonia or Cablecom in Switzerland). For those cases, the price of the whole bundle has been considered in the following graph.

Figure 7.20. **Range of broadband prices for a monthly subscription – no line charge, September 2010, USD PPP**



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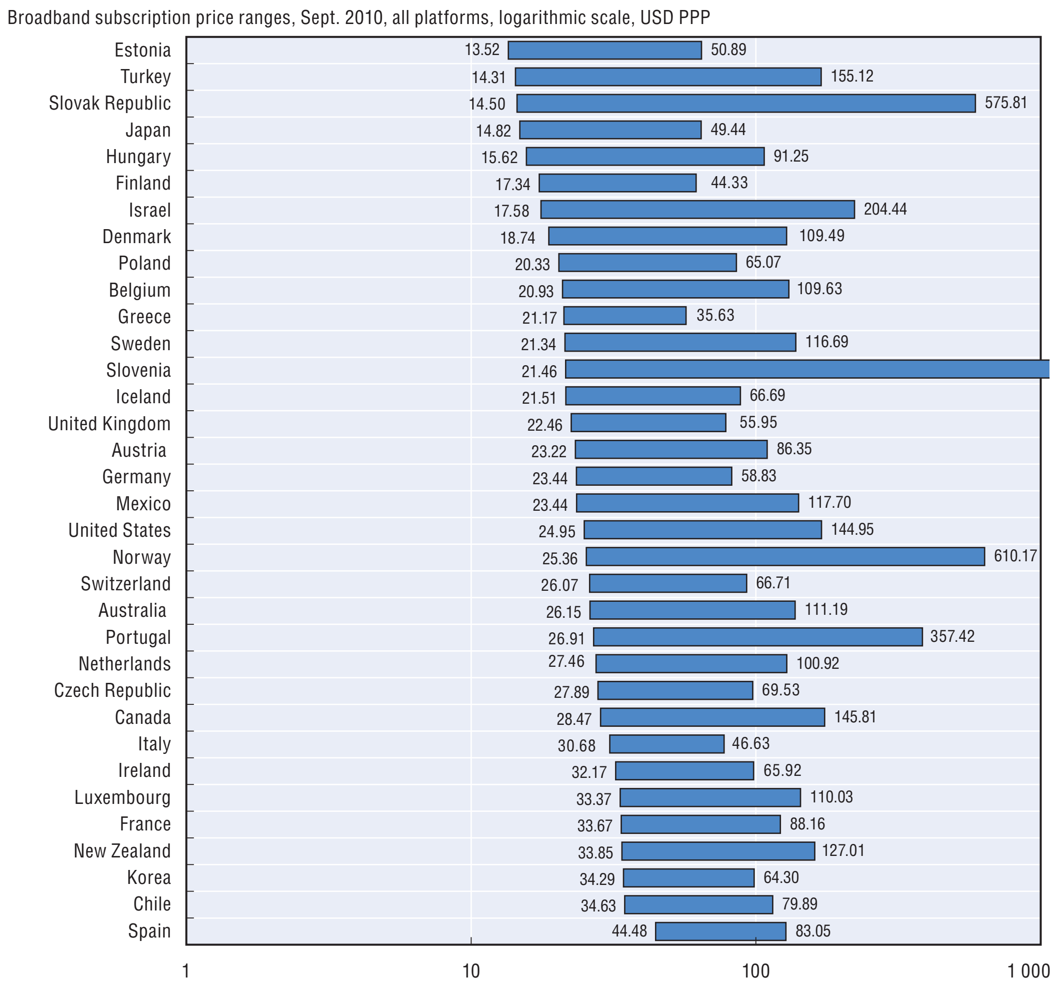
The main difference between the graphs (Figures 7.20 and 7.21) is the inclusion, or not, of line charges. Customers are frequently required to have a telephone line or a cable-television subscription in order to take broadband services – from the operator of that service. While it can be argued that this charge should be associated to another service (*i.e.* cable television or telephone service), it can be viewed as an extra charge when purchasing broadband. Therefore, both broadband price ranges are displayed. This represents an addition to past editions of the *Communications Outlook* and the OECD Broadband Portal, providing an additional perspective on the prices subscribers must pay for telecommunication services.

For some countries, there is a considerable difference in broadband entry prices depending on whether line charges are included. For example, Spain's broadband entry price was USD 28.29 PPP without the line charge and USD 44.48 with the line charge. Spain's broadband prices were the most expensive in the OECD area if line charges are considered, whereas they were the seventh-most expensive without line charges. A similar example was found in Italy (USD 21.72 *vs.* USD 30.68).

Figure 7.21. **Range of broadband prices for a monthly subscription – including line charge, September 2010, USD PPP**



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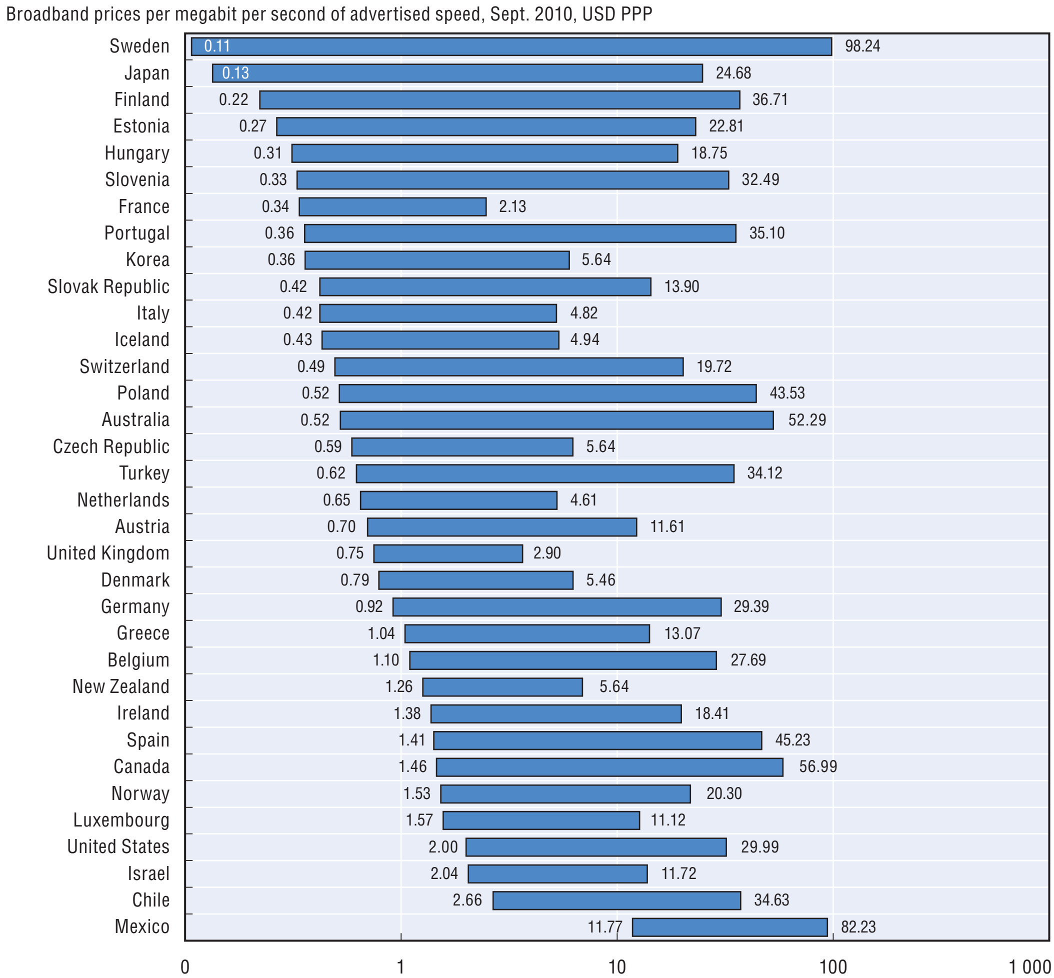
Chile, Korea, New Zealand and Spain had the most expensive broadband entry prices, while Estonia, Japan, the Slovak Republic and Turkey had the most affordable. Some countries boasted a wide range of broadband prices. Prices in Slovenia started at USD 21 up to over USD 1 000 per month for a 1 Gpbs offer. On the other hand, prices in Greece only varied from USD 21 to USD 35 per month.

Another way to analyse broadband prices is by examining prices per advertised mbps. The difference between advertised and actual speeds may vary from country to country. This provides an idea of prices paid by subscribers in relation to advertised speeds (Figures 7.22 and 7.23). As expected, countries offering higher speeds tended to have a lower price per mbps. Sweden (USD 0.12), Japan (USD 0.13) and Finland (USD 0.22) had the lowest price per mbps. Mexico had the most expensive entry-level available bandwidth in terms of price per mbps, with prices beginning at USD 11.77 per month.

Figure 7.22. **Range of broadband prices per megabit per second of advertised speed, no line charge, September 2010, USD PPP**



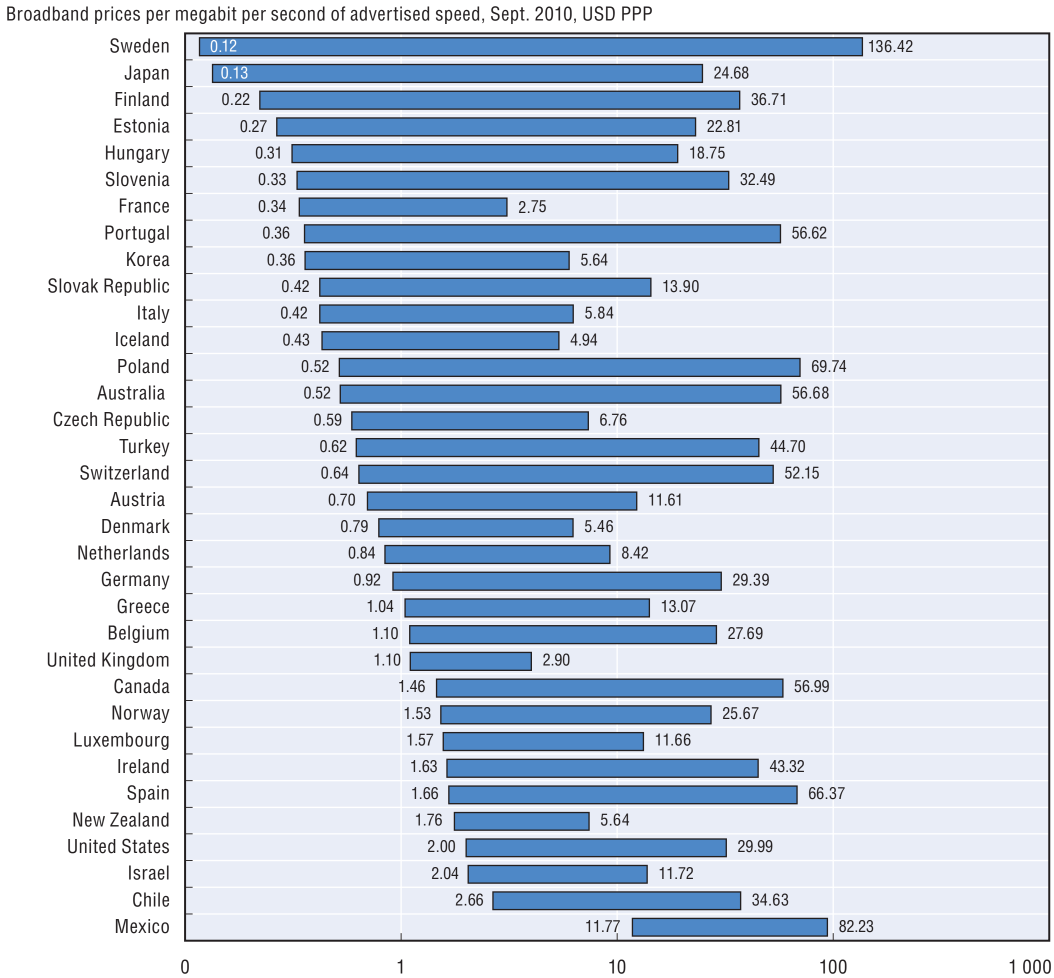
StatLink http://dx.doi.org/10.1787/888932396219

Operators normally tailor their offers in terms of speed intervals or ranges, which users associate with certain services. The OECD fixed-broadband basket breaks down offers by speeds and amount of data transferred, using identical download speed ranges to group offers and map them to prices. There are five different intervals: below 2.5 mbps, between 2.5 and 15 mbps, between 15 and 30 mbps, between 30 and 45 mbps, and 45 mbps and above.

Two offers in Portugal and two more in Italy bill customers by connection time. These four offers have not been included in the comparison, because of the inherent challenge of comparison with offers based on traffic and recurrent charges. They correspond to entry-level offers with low advertised download speeds (640 Kbps in Italy and 256/512 Kbps in Portugal).

Out of 34 countries, 24 advertised an offer within the lowest speed range (below 2.5 mbps). Among the remaining countries, 20 mbps was the minimum advertised download speed in France, 15 mbps in New Zealand and 12 mbps in Iceland.

Figure 7.23. **Range of broadband prices per megabit per second of advertised speed with line charge, September 2010, USD PPP**



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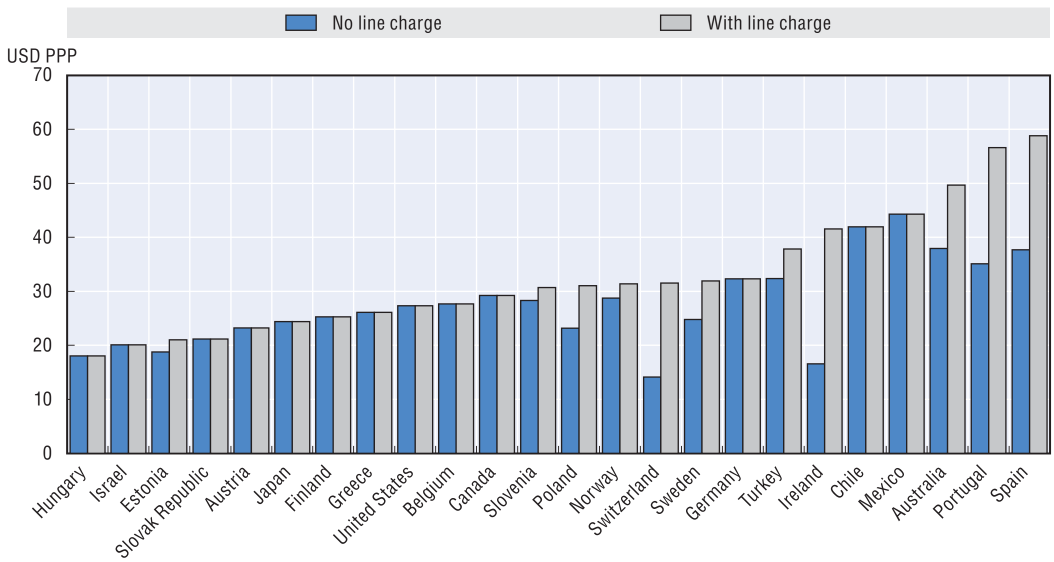
The most expensive countries for this speed range were Australia, Portugal and Spain. Average prices in Spain were as high as USD 59 PPP per month (Figure 7.24). In Chile, Movistar also had specific offers for two regions with lower speeds and higher prices (400 Kbps, 600 Kbps, over USD 100 per month, not considered for the comparison). Those were adapted to remote areas, where the provision of the service is technically challenging. Estonia, Hungary and Israel had the lowest average price for this speed range (around USD 18-21 per month). Overall, the average price was USD 33 PPP.

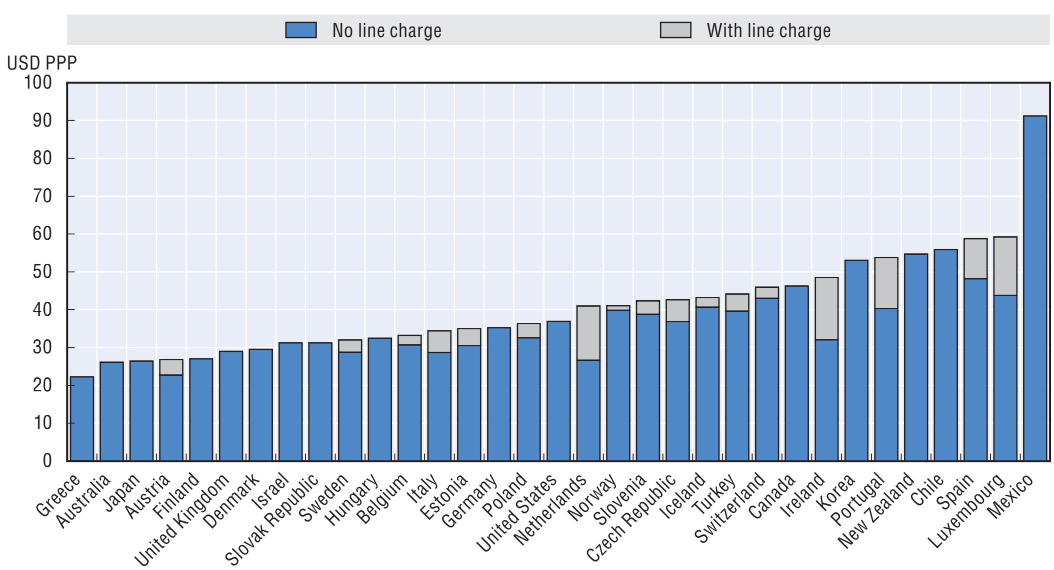
The next group of connections had an advertised download speed range of between 2.5 mbps and 15 mbps. Only France had no offers targeting this speed range. Prices in Mexico were by far the highest (over USD 90), followed by Luxembourg and Spain (around USD 60), considering line charges (Figure 7.25). The least expensive countries were Greece, Australia and Japan (all below USD 27). The average price for this speed range was USD 40.8, USD 8 more expensive than the previous range.

Figure 7.24. **Average monthly subscription price for speeds below 2.5 mbps, September 2010, USD PPP**



StatLink http://dx.doi.org/10.1787/888932396257

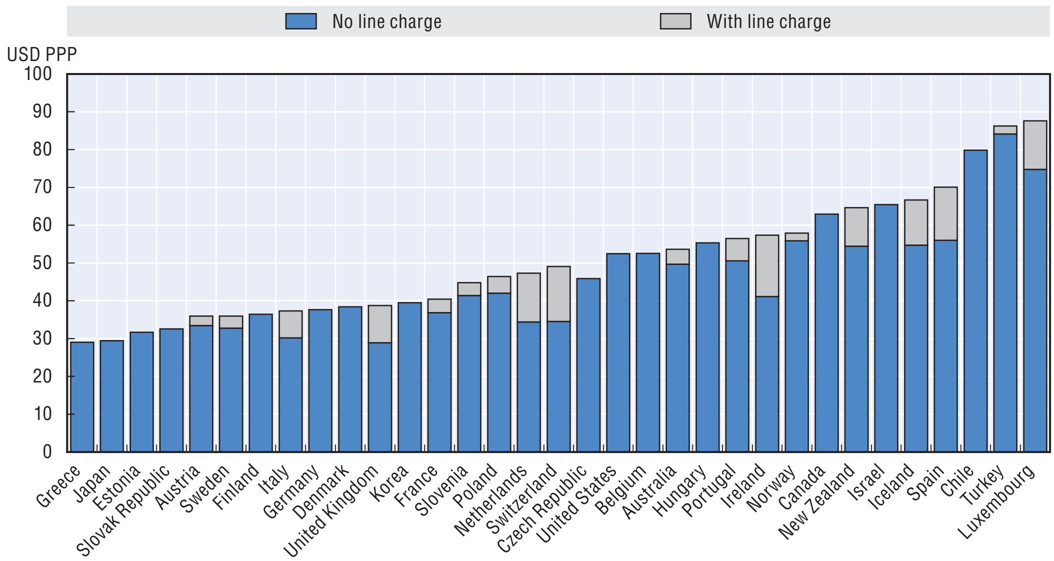
Figure 7.25. **Average monthly subscription for speeds between 2.5 and 15 mbps, USD PPP**



StatLink http://dx.doi.org/10.1787/888932396276

Only two countries, Mexico and Israel, had no offer within the 15-30 mbps speed range (Figure 7.26). The average price across countries in the OECD area was USD 51. The most expensive countries were Turkey (USD 86.25), Luxembourg (USD 87.59) and Chile (USD 79.89), considering the average price including line charges. The least expensive countries in PPP terms were Estonia, Greece and Japan.

Figure 7.26. **Average monthly subscription for speeds between 15 and 30 mbps, USD PPP**



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Surprisingly, only nine OECD countries had offers between 30 and 45 mbps (Figure 7.27), while as many as 27 had offers for above 45 mbps (Figure 7.28). This may be explained on the grounds of operators having deployed FTTH/B, capable of delivering higher speeds. For the 30-45 mbps range, Turkey had the most expensive price (USD 103.76), while Germany had the lowest price of the nine countries (USD 29.32).

Figure 7.27. **Average monthly subscription for speeds between 30 and 45 mbps, USD PPP**

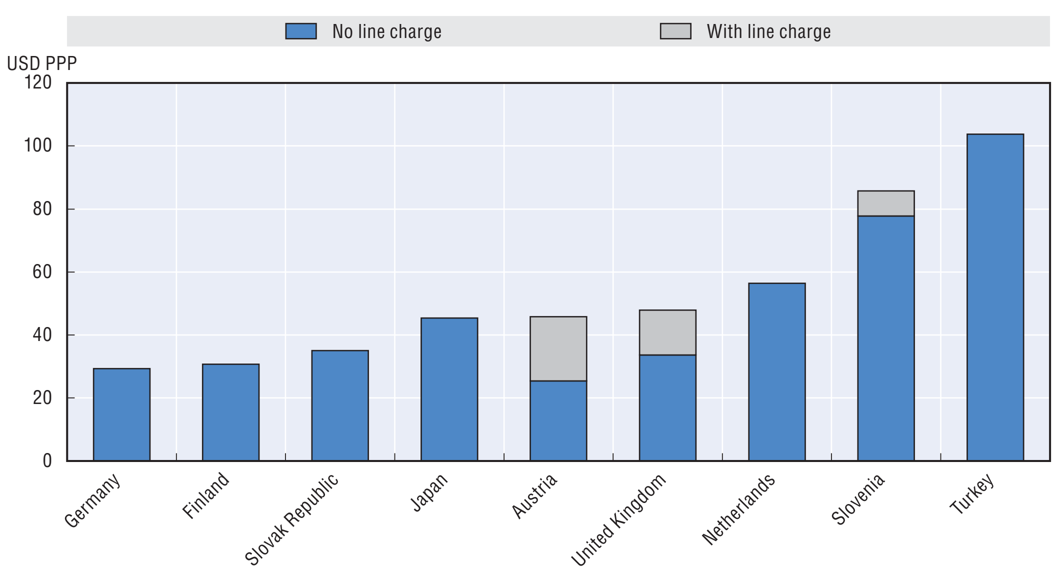

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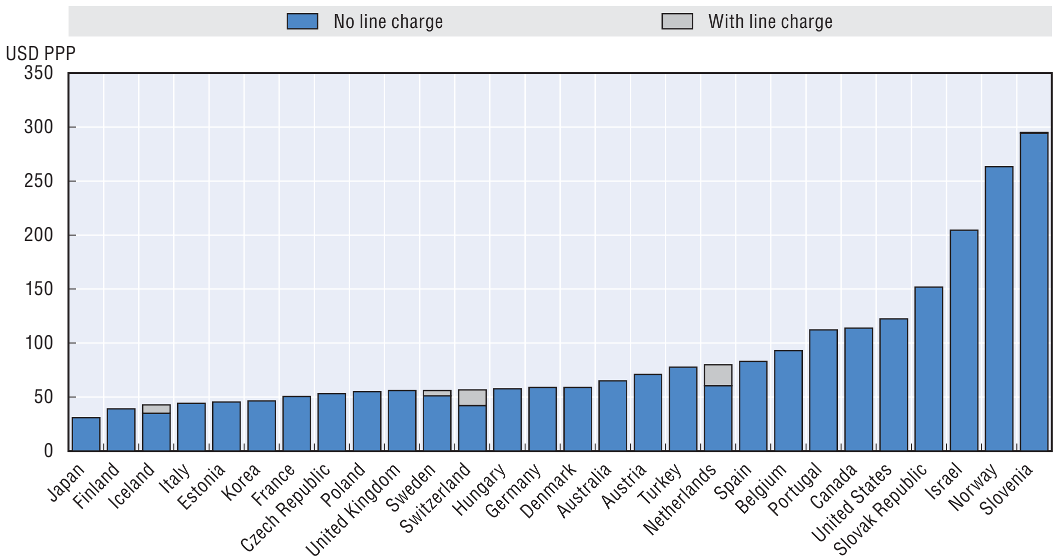
Figure 7.28. **Average monthly subscription for speeds above 45 mbps, USD PPP**



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Lastly, the highest speed range accounted for offers above 45 mbps, which are mainly based on fibre to the premises (FTTP), although some cable (DOCSIS 3.0) or VDSL offers do reach speeds close to 50 mbps. Slovenia and Norway had average prices for this speed range far above the OECD average. This is due to high-speed, expensive offers by some operators. Lyse in Norway charged from USD 200 to USD 600 for speeds between 100 mbps and 400 mbps. T2 in Slovenia charged USD 1 500 for 1 Gbps symmetrical connectivity. Often the fastest offers available in a country are limited to a small geographic area. The average price for a connection above 45 mbps was USD 88, although some countries such as Finland, Iceland and Japan, had average prices lower than USD 50 in PPP terms.

There remained an enormous difference in the highest advertised available broadband speeds across countries (Figure 7.29). In Mexico, the highest available download speed was 10 mbps, and 25 mbps in Greece and New Zealand. Portugal, Slovenia, the Slovak Republic and Sweden had available 1 Gbps offers although, as explained before, these may have been fairly expensive or limited to certain geographic areas. As many as 23 OECD countries had at least one advertised offer of 100 mbps or faster.

Large differences still remain across the OECD in relation to bitcaps. In some countries, operators do not mention them at all, or they do not form part of the variables considered by consumers – although a "reasonable use" clause may exist as part of the general contractual clause. In others, most offers are capped and the bit cap amount constitutes a pricing criterion. Existing bitcaps per country are shown here (Figure 7.30). Only 13 OECD countries advertised offers with a data cap restriction.

Figure 7.29. **Maximum available advertised download speeds per country (Kbps)**

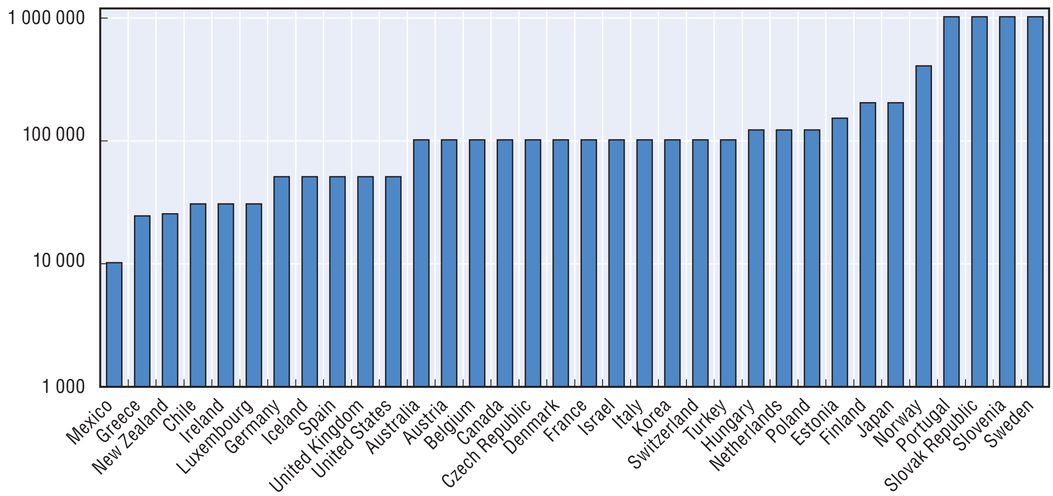

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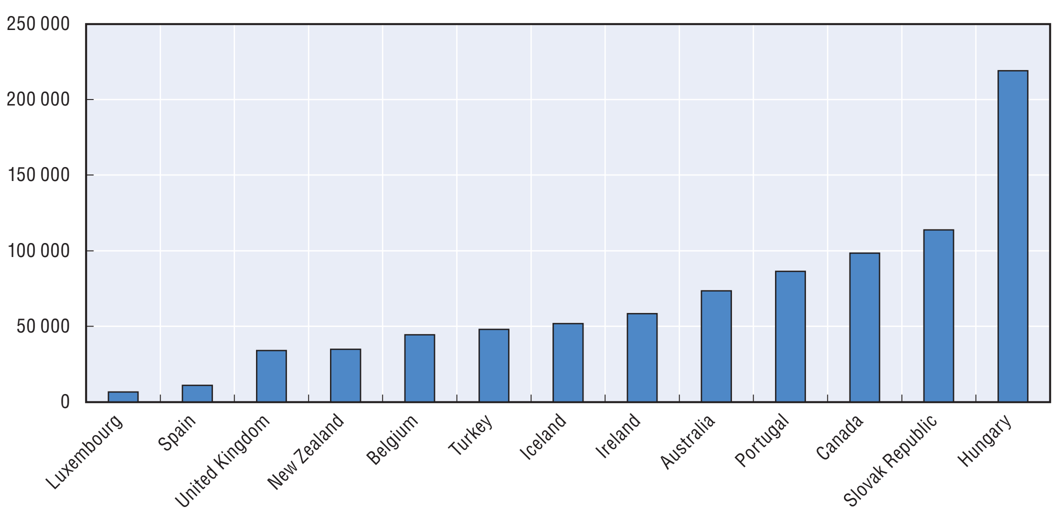
Figure 7.30. **Average data caps by country (MB)**



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Overall, data caps, where they exist, go from 1 GB or 2 GB per month to several hundred. A benchmark of average data caps per country, where they existed, is provided here (Figure 7.29). The highest are found in Hungary (over 200 GB) and the Slovak Republic (over 100 GB), and the lowest in Luxembourg (below 10 GB). Considering these figures alone may be misleading, however, as a means to understanding the pricing structure. In four countries (Australia, Canada, Iceland and New Zealand), all advertised broadband offers had a data cap limitation. Conversely, 20 OECD countries had no data caps at all among their broadband offers. One of the countries with the lowest data caps, Spain, had a limit on only two out of 12 of the broadband offers included in the comparison.

Although a general trend in mobile broadband services, data caps were only present in a minority of fixed-broadband offers. Only 203 out of 686 offers (29%) had data caps, down from 36% in September 2008. Data caps are increasingly present for mobile broadband offers, where use by smartphones is starting to challenge the overall network capacity. Fixed broadband networks are following the opposite trend. Entry-level data allowances have increased in Australia and New Zealand, where data caps of several hundreds megabits are no longer present (the lowest available data caps were 2 GB in Australia and 3 GB in New Zealand in September 2010).

Notes

1. DSTI/ICCP/CISP(2010)2/FINAL, "Broadband bundling: trends and policy implications".
2. DSTI/ICCP/CISP(2009)14/FINAL, "Revision of the methodology for constructing telecommunication price baskets".
3. Federal Communications Commission, *14th Annual Mobile Wireless Competition Report*, para. 92 and Table 10, 20 May, 2010.

Table 7.1. **Pricing structures for residential users in the OECD, 2009-2010**

	Local telephony, fixed lines	DSL pricing structure	Cable Internet pricing structure	Bitcaps	Telephony from cable operators	National flat-rate fixed calling
Australia	Unmetered (flat rate)	Data controlled	Data controlled	Yes	Yes	Yes
Austria	Metered (options for unmetered weekends and evenings)	Flat rate	Flat rate	No	Yes	No
Belgium	Metered, unmetered	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	Yes
Canada	Unmetered	Data controlled	Data controlled	Yes	Yes	Yes
Chile	Metered	Flat rate	Flat rate	No	Yes	No
Czech Republic	Metered (options for unmetered weekends and offpeak)	Flat rate	Flat rate	No	Yes	No
Denmark	Metered	Flat rate	Flat rate, data controlled	Yes	Yes	Yes
Estonia	Metered	Flat rate	Flat rate	No	Yes	No
Finland	Metered	Flat rate	Flat rate	No	Yes	Yes
France	Metered/Unmetered	Flat rate	Flat rate	No	Yes	Yes
Germany	Metered/Unmetered	Flat rate	Flat rate	No	Yes	Yes
Greece	Metered	Flat rate	NA	No	NA	No
Hungary	Metered	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	No
Iceland	Metered	Data controlled	NA	Yes	NA	No
Ireland	Metered	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	Yes
Israel	Metered	Flat rate	Flat rate	No	Yes	No
Italy	Metered	Flat rate, timed	NA	No	NA	Yes
Japan	Metered	Flat rate	Flat rate	No	Yes	No
Korea	Metered	Flat rate	Flat rate	No	No	No
Luxembourg	Metered	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	Yes
Mexico	Unmetered (first 100 calls free, then flat rate)	Flat rate	Flat rate	No	No	No
Netherlands	Metered	Flat rate	Flat rate	No	Yes	No
New Zealand	Unmetered	Data controlled	Data controlled	Yes	Yes	No
Norway	Metered	Flat rate	Flat rate	No	Yes	Yes
Poland	Metered	Flat rate	Flat rate	No	Yes	No
Portugal	Metered/Unmetered	Flat rate, data controlled, timed	Flat rate, data controlled, timed	Yes	Yes	No
Slovak Republic	Metered	Flat rate, data controlled	Flat rate	Yes	Yes	No
Slovenia	Metered	Flat rate	Flat rate	No	Yes	No
Spain	Metered	Flat rate, data controlled	Flat rate	Yes	Yes	Yes
Sweden	Metered	Flat rate	Flat rate	No	Yes	No
Switzerland	Metered	Flat rate	Flat rate	No	Yes	Yes
Turkey	Metered	Flat rate, data controlled	Flat rate, data controlled	Yes	No	No
United Kingdom	Metered	Flat rate, data controlled	Flat rate	Yes	Yes	Yes
United States	Metered/flat rate/unmetered	Flat rate	Flat rate	No	Yes	Yes

Note: The pricing structure for local telephony is for the incumbent telecommunications operator.

StatLink http://dx.doi.org/10.1787/888932398670

Table 7.2. **OECD time series for telephone charges**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Residential																					
Fixed	100	109.2	112.7	112.8	112.8	122.4	125.9	113.0	115.5	119.3	132.0	129.1	133.3	132.2	145.2	145.6	165.0	170.8	158.1	173.8	195.0
Usage	100	104.2	98.4	96.8	94.1	98.6	90.1	81.3	78.7	70.5	60.6	55.8	57.5	53.5	55.7	53.2	39.0	38.3	33.9	35.4	37.3
Total	100	106.2	104.1	103.2	101.6	108.1	104.4	94.0	93.4	90.0	89.2	85.1	87.8	85.0	91.5	90.1	89.4	91.3	83.6	90.7	100.4
Business																					
Fixed	100	104.3	107.4	107.6	108.0	108.1	106.4	113.1	118.7	123.4	118.6	126.9	135.0	126.5	139.1	137.2	171.8	181.1	165.3	170.2	186.1
Usage	100	103.5	96.9	94.2	91.3	92.5	83.3	86.5	84.3	75.2	55.5	55.5	57.7	54.6	55.2	51.6	39.7	40.4	39.3	43.6	52.3
Total	100	103.7	99.0	96.9	94.6	95.6	87.9	91.8	91.2	84.8	68.1	69.8	73.2	69.0	72.0	68.8	66.1	68.5	64.5	68.9	79.1

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398689

Table 7.3. **OECD basket of residential telephone charges, 20 calls, VAT included, August 2010**

	Fixed		Usage		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	23.46	18.19	13.97	10.83	37.43	29.02
Austria	24.50	22.89	4.34	4.06	28.84	26.95
Belgium	27.27	24.34	5.61	5.00	32.87	29.35
Canada	31.08	26.34	3.17	2.69	34.25	29.03
Chile	14.99	20.26	1.89	2.55	16.88	22.81
Czech Republic	15.67	21.18	12.59	17.01	28.26	38.19
Denmark	26.22	17.72	4.28	2.89	30.50	20.61
Estonia	9.41	13.64	2.83	4.11	12.25	17.75
Finland	12.99	10.07	7.82	6.06	20.81	16.13
France	26.00	23.43	1.98	1.78	27.98	25.21
Germany	24.74	23.34	3.57	3.37	28.31	26.71
Greece	20.70	20.91	6.01	6.07	26.71	26.98
Hungary	18.82	26.88	0.66	0.94	19.48	27.82
Iceland	13.35	12.24	2.89	2.65	16.23	14.89
Ireland	35.94	28.52	5.71	4.53	41.65	33.06
Israel	15.58	15.90	5.52	5.63	21.10	21.53
Italy	23.08	21.18	2.53	2.32	25.62	23.50
Japan	30.38	21.54	6.43	4.56	36.80	26.10
Korea	5.76	7.68	3.72	4.95	9.48	12.63
Luxembourg	25.27	21.42	3.21	2.72	28.48	24.14
Mexico	16.60	25.15	4.41	6.68	21.01	31.83
Netherlands	14.84	13.87	12.56	11.74	27.40	25.61
New Zealand	33.16	29.35	5.04	4.46	38.20	33.81
Norway	17.40	11.45	1.78	1.17	19.18	12.62
Poland	18.25	27.65	1.05	1.59	19.30	29.24
Portugal	21.89	24.88	5.24	5.95	27.13	30.83
Slovak Republic	8.74	11.21	8.22	10.54	16.96	21.75
Slovenia	21.10	25.42	2.10	2.53	23.20	27.95
Spain	23.67	24.15	7.66	7.81	31.32	31.96
Sweden	22.35	18.78	4.45	3.74	26.80	22.52
Switzerland	24.96	16.21	6.01	3.90	30.97	20.11
Turkey	13.29	15.82	0.63	0.75	13.92	16.57
United Kingdom	23.42	23.66	6.79	6.85	30.21	30.51
United States	24.42	24.42	4.03	4.03	28.45	28.45
OECD average	20.86	20.28	4.96	4.90	25.82	25.18

Note: The OECD basket of residential telephone charges includes fixed access and 20 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-month period. USD purchasing power parities (PPP) are used to aid in international comparisons.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398708

Table 7.4. **OECD basket of residential telephone charges, 60 calls, VAT included, August 2010**

	Fixed		Usage		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	29.79	23.10	35.29	27.35	65.08	50.45
Austria	24.50	22.89	16.51	15.43	41.00	38.32
Belgium	34.71	30.99	11.19	9.99	45.90	40.98
Canada	31.08	26.34	9.93	8.42	41.02	34.76
Chile	14.99	20.26	8.74	11.81	23.73	32.07
Czech Republic	30.51	41.23	10.74	14.51	41.25	55.74
Denmark	27.10	18.31	14.63	9.88	41.72	28.19
Estonia	9.41	13.64	12.84	18.60	22.25	32.25
Finland	12.99	10.07	26.60	20.62	39.59	30.69
France	26.00	23.43	11.00	9.91	37.00	33.33
Germany	27.35	25.80	8.05	7.60	35.40	33.40
Greece	24.75	25.00	16.33	16.50	41.08	41.49
Hungary	18.82	26.88	9.84	14.06	28.66	40.95
Iceland	14.12	12.96	8.69	7.97	22.82	20.93
Ireland	48.52	38.50	2.91	2.31	51.42	40.81
Israel	19.00	19.39	11.12	11.35	30.12	30.74
Italy	23.08	21.18	16.88	15.48	39.96	36.66
Japan	30.38	21.54	27.53	19.53	57.91	41.07
Korea	5.76	7.68	14.74	19.65	20.50	27.33
Luxembourg	25.27	21.42	12.61	10.69	37.89	32.11
Mexico	16.60	25.15	16.30	24.70	32.90	49.85
Netherlands	25.60	23.92	17.14	16.02	42.74	39.95
New Zealand	33.16	29.35	18.77	16.61	51.93	45.96
Norway	17.40	11.45	9.22	6.07	26.62	17.51
Poland	18.25	27.65	10.09	15.29	28.34	42.94
Portugal	27.02	30.71	12.90	14.66	39.93	45.37
Slovak Republic	16.98	21.77	11.65	14.94	28.63	36.71
Slovenia	21.10	25.42	10.19	12.27	31.29	37.70
Spain	28.29	28.87	17.26	17.61	45.55	46.48
Sweden	26.51	22.28	12.09	10.16	38.60	32.44
Switzerland	25.92	16.83	20.39	13.24	46.32	30.08
Turkey	16.61	19.77	3.18	3.79	19.79	23.56
United Kingdom	31.25	31.57	10.38	10.48	41.63	42.05
United States	27.68	27.68	8.10	8.10	35.77	35.77
OECD average	23.84	23.32	13.64	13.40	37.48	36.72

Note: The OECD basket of residential telephone charges includes fixed access and 60 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-month period. USD purchasing power parities (PPP) are used to aid in international comparisons.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398727

Table 7.5. **OECD basket of residential telephone charges, 140 calls, VAT included, August 2010**

	Fixed		Usage		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	29.79	23.10	87.76	68.03	117.55	91.13
Austria	24.50	22.89	40.85	38.18	65.35	61.07
Belgium	27.27	24.34	44.78	39.98	72.04	64.32
Canada	42.20	35.76	0.15	0.12	42.35	35.89
Chile	23.79	32.16	21.59	29.17	45.38	61.32
Czech Republic	34.19	46.20	26.20	35.41	60.39	81.61
Denmark	37.60	25.40	20.41	13.79	58.00	39.19
Estonia	9.41	13.64	32.61	47.27	42.03	60.91
Finland	12.99	10.07	66.84	51.82	79.84	61.89
France	26.00	23.43	38.91	35.06	64.91	58.48
Germany	27.35	25.80	28.70	27.07	56.05	52.88
Greece	39.32	39.72	23.05	23.29	62.38	63.01
Hungary	18.82	26.88	37.24	53.20	56.06	80.09
Iceland	14.12	12.96	21.26	19.51	35.38	32.46
Ireland	48.52	38.50	22.05	17.50	70.57	56.00
Israel	19.00	19.39	37.92	38.70	56.92	58.08
Italy	23.08	21.18	45.54	41.78	68.62	62.95
Japan	31.59	22.41	64.81	45.97	96.40	68.37
Korea	5.76	7.68	36.14	48.18	41.90	55.86
Luxembourg	25.27	21.42	31.56	26.75	56.84	48.17
Mexico	29.23	44.28	29.02	43.97	56.36	85.39
Netherlands	38.31	35.81	28.49	26.63	66.81	62.44
New Zealand	33.16	29.35	47.45	41.99	80.61	71.34
Norway	17.40	11.45	30.43	20.02	47.83	31.47
Poland	28.01	42.44	12.45	18.87	40.46	61.31
Portugal	27.02	30.71	32.08	36.45	59.10	67.16
Slovak Republic	25.77	33.04	21.89	28.06	47.66	61.10
Slovenia	21.10	25.42	25.00	30.12	46.10	55.54
Spain	28.29	28.87	42.94	43.82	71.23	72.68
Sweden	31.36	26.35	23.53	19.77	54.88	46.12
Switzerland	25.92	16.83	48.74	31.65	74.66	48.48
Turkey	29.21	34.78	7.74	9.22	36.96	44.00
United Kingdom	31.25	31.57	24.93	25.18	56.18	56.74
United States	27.68	27.68	21.22	21.22	48.89	48.89
OECD average	26.89	26.81	33.07	32.29	59.90	59.01

Note: The OECD basket of residential telephone charges includes fixed access and 140 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-month period. USD purchasing power parities (PPP) are used to aid in international comparisons.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398746

Table 7.6. **OECD basket of residential telephone charges, 420 calls, VAT included, August 2010**

	Fixed		Usage		Discount		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	85.84	66.54	44.70	34.65			130.54	101.19
Austria	24.50	22.89	111.73	104.42			136.23	127.31
Belgium	53.31	47.60	27.73	24.76			81.04	72.36
Canada	44.43	37.65	18.94	16.05			63.37	53.70
Chile	31.99	43.23	90.28	122.00			122.27	165.23
Czech Republic	34.19	46.20	93.06	125.76			127.25	171.96
Denmark	37.60	25.40	27.32	18.46			64.91	43.86
Estonia	9.41	13.64	60.95	88.33			70.36	101.98
Finland	12.99	10.07	181.29	140.53			194.28	150.60
France	52.12	46.95	15.85	14.28			67.97	61.23
Germany	40.41	38.12	19.53	18.42			59.94	56.54
Greece	32.84	33.17	99.99	101.00			132.83	134.17
Hungary	21.75	31.08	101.90	145.57			123.65	176.65
Iceland	28.92	26.54	27.93	25.62			56.85	52.16
Ireland	56.35	44.72	27.76	22.03			84.11	66.76
Israel	19.00	19.39	154.33	157.48			173.33	176.86
Italy	42.67	39.14	42.22	38.74			84.89	77.88
Japan	31.59	22.41	144.76	102.66			176.35	125.07
Korea	5.76	7.68	88.25	117.66			94.01	125.34
Luxembourg	38.34	32.49	24.37	20.65			62.70	53.14
Mexico	29.23	44.28	85.16	129.03	- 8.49	- 18.22	105.90	155.09
Netherlands	66.07	61.75	29.69	27.74			95.76	89.49
New Zealand	33.16	29.35	87.97	77.85			121.13	107.19
Norway	43.78	28.80	13.45	8.85			57.23	37.65
Poland	36.79	55.74	15.06	22.82			51.85	78.56
Portugal	27.02	30.71	55.34	62.89			82.37	93.60
Slovak Republic	25.77	33.04	26.01	33.35			51.78	66.39
Slovenia	21.10	25.42	31.49	37.94			52.59	63.36
Spain	46.78	47.73	38.86	39.65			85.63	87.38
Sweden	31.36	26.35	53.68	45.11			85.04	71.46
Switzerland	25.92	16.83	124.77	81.02			150.69	97.85
Turkey	41.23	49.08	10.20	12.14			51.42	61.22
United Kingdom	31.25	31.57	33.15	33.49			64.40	65.06
United States	73.70	73.70	0.00	0.00			73.70	73.70
OECD average	36.39	35.57	59.05	60.32			95.19	95.35

Note: The OECD basket of residential telephone charges includes fixed access and 420 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-month period. USD purchasing power parities (PPP) are used to aid in international comparisons.
Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398765

Table 7.7. **OECD basket of business telephone charges, 100 calls, VAT excluded, August 2010**

	Fixed		Usage		Discount		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	36.96	28.65	52.73	40.87			89.68	69.52
Austria	29.22	27.31	8.00	7.48			37.22	34.79
Belgium	28.68	25.61	13.94	12.45			42.62	38.06
Canada	37.16	31.49	4.21	3.57			41.38	35.07
Chile								
Czech Rep.	28.67	38.74	24.41	32.98			53.07	71.72
Denmark	26.23	17.72	18.93	12.79			45.16	30.51
Estonia	9.44	13.69	22.37	32.41			31.81	46.10
Finland	10.65	8.25	30.47	23.62			41.12	31.87
France	21.24	19.13	26.41	23.79			47.65	42.93
Germany	22.98	21.68	11.47	10.82			34.46	32.51
Greece	16.83	17.00	21.64	21.86			38.47	38.85
Hungary	19.27	27.52	11.96	17.08			31.22	44.61
Iceland	13.09	12.01	13.37	12.27			26.47	24.28
Ireland	37.93	30.10	12.92	10.25			50.84	40.35
Israel	13.43	13.71	17.84	18.21			31.28	31.92
Italy	31.12	28.55	23.54	21.60			54.66	50.14
Japan	39.34	27.90	32.30	22.91			71.65	50.81
Korea	5.24	6.98	15.10	20.13			20.33	27.11
Luxembourg	21.98	18.63	15.76	13.35			37.74	31.98
Mexico	19.64	29.76	26.74	40.52	-2.13	-3.23	44.26	67.05
Netherlands	21.51	20.10	21.08	19.70			42.59	39.81
New Zealand	38.41	33.99	18.63	16.49			57.04	50.48
Norway	25.28	16.63	6.05	3.98			31.33	20.61
Poland	15.94	24.15	7.24	10.97			23.18	35.12
Portugal	20.82	23.66	26.39	29.99			47.21	53.65
Slovak Rep.	21.64	27.74	17.40	22.31			39.04	50.05
Slovenia	17.58	21.19	14.16	17.06			31.74	38.24
Spain	23.97	24.46	17.69	18.05			41.66	42.51
Sweden	20.44	17.18	22.43	18.85			42.87	36.03
Switzerland	23.20	15.06	29.60	19.22			52.80	34.29
Turkey	14.07	16.75	4.18	4.98			18.25	21.73
United Kingdom	25.27	25.52	35.35	35.71			60.62	61.23
United States	23.57	23.57	11.29	11.29			34.86	34.86
OECD average	23.05	22.26	19.26	19.02			42.25	41.18

Note: The OECD basket of business telephone charges includes fixed access and 100 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-month period. USD purchasing power parities (PPP) are used to aid in international comparisons.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398784

Table 7.8. **OECD basket of business telephone charges, 260 calls, VAT excluded, August 2010**

	Fixed		Usage		Discount		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	36.96	28.65	162.80	126.20			199.76	154.85
Austria	29.22	27.31	34.11	31.87			63.32	59.18
Belgium	44.06	39.34	47.17	42.11			91.23	81.45
Canada	37.16	31.49	20.96	17.76			58.12	49.25
Chile								
Czech Republic	28.67	38.74	69.41	93.80			98.08	132.54
Denmark	26.23	17.72	59.67	40.32			85.90	58.04
Estonia	9.44	13.69	66.80	96.81			76.24	110.49
Finland	10.65	8.25	102.00	79.07			112.65	87.32
France	21.24	19.13	75.72	68.22			96.96	87.35
Germany	22.98	21.68	36.22	34.17			59.20	55.85
Greece	21.77	21.99	61.97	62.59			83.73	84.58
Hungary	22.94	32.76	40.65	58.07			63.58	90.84
Iceland	13.09	12.01	42.12	38.64			55.21	50.65
Ireland	37.93	30.10	46.81	37.15			84.74	67.25
Israel	13.43	13.71	62.62	63.90			76.06	77.61
Italy	31.12	28.55	84.62	77.63			115.74	106.18
Japan	39.34	27.90	150.17	106.51			189.52	134.41
Korea	5.24	6.98	69.65	92.87			74.89	99.86
Luxembourg	21.98	18.63	48.81	41.36			70.79	59.99
Mexico	35.64	54.01	54.23	82.16	-4.01	-6.08	85.86	130.09
Netherlands	21.51	20.10	63.59	59.43			85.10	79.54
New Zealand	38.41	33.99	56.17	49.70			94.58	83.70
Norway	25.28	16.63	22.28	14.66			47.56	31.29
Poland	21.14	32.04	23.83	36.10			44.97	68.14
Portugal	20.82	23.66	89.39	101.58			110.21	125.24
Slovak Republic	38.98	49.97	35.71	45.78			74.69	95.75
Slovenia	17.58	21.19	43.71	52.67			61.30	73.85
Spain	39.64	40.45	59.92	61.14			99.56	101.59
Sweden	20.44	17.18	63.69	53.52			84.14	70.70
Switzerland	23.20	15.06	82.61	53.64			105.80	68.70
Turkey	24.76	29.47	14.27	16.98			39.02	46.46
United Kingdom	25.27	25.52	91.93	92.86			117.20	118.38
United States	23.57	23.57	38.72	38.72			62.29	62.29
OECD average	25.75	25.50	61.28	59.64			86.91	84.95

Note: The OECD basket of business telephone charges includes fixed access and 260 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-month period. USD purchasing power parities (PPP) are used to aid in international comparisons.
Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398803

Table 7.9. **OECD basket of mobile telephone charges, 30 calls, VAT included, August 2010**

		Fixed		Usage		Messages		Grand total		Contract type*
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	
Australia, Optus	BYO Cap Plan $19 - Bonus Value 12m SIM-Only	0.00	0.00	12.58	9.75	4.61	3.57	17.19	13.33	
Austria, T-Mobile	HIT 300 SMS 100	20.09	18.77	0.00	0.00	0.00	0.00	20.09	18.77	
Belgium, Mobistar	Tempo Music €10	0.00	0.00	19.09	17.05	0.00	0.00	19.09	17.05	PP
Canada, Bell Mobility	So Low 20 + Message Centre Express	8.66	7.34	12.79	10.84	9.56	8.10	31.01	26.28	
Chile, Entel Movil	Raimundo Plan + Número favorito + SMS 140	4.69	6.34	10.56	14.27	0.00	0.00	15.25	20.61	PP / SD
Czech Rep., T-Mobile	Combi 300	0.00	0.00	13.91	18.79	5.03	6.80	18.94	25.59	PP
Denmark, Telenor	Selvhenter.dk	0.04	0.03	5.77	3.90	3.48	2.35	9.30	6.28	PP
Estonia, Tele2	Pro 49 Business tariff	0.29	0.42	3.94	5.72	7.50	10.87	11.73	17.01	
Finland, Sonera	TeleFinland - Perus + SMS 100	3.62	2.80	6.01	4.66	0.00	0.00	9.63	7.46	
France, Orange	Smart Zap 11-18 17 euro/24 months	22.20	20.00	0.00	0.00	0.00	0.00	22.20	20.00	SD
Germany, T-Mobile	Xtra Card	0.36	0.34	6.07	5.73	14.86	14.02	21.30	20.09	PP
Greece, Vodafone	Vodafone Prepaid Unlimited (min 10 euro/month)	0.18	0.18	10.68	10.79	7.37	7.44	18.23	18.42	PP / SD
Hungary, T-Mobile	Domino Aktív + Domino Friends	4.95	7.08	5.16	7.37	12.57	17.96	22.68	32.40	PP / SD
Iceland, Vodafone	Frelsi Eitt verð on-net calls & SMS	0.54	0.50	7.71	7.07	0.00	0.00	8.25	7.57	PP
Ireland, O2	O2 Simplicity 100 30-day SIM Only	26.11	20.72	0.00	0.00	0.00	0.00	26.11	20.72	
Israel, Cellcom	Prepaid - Stockmann Basic + SMS	5.30	5.40	13.46	13.73	3.55	3.62	22.30	22.76	PP
Italy, TIM	TIM 4	6.02	5.52	9.13	8.38	5.16	4.73	20.31	18.63	PP
Japan, KDDI au	Plan S Simple + Everybody Discount with 24 Month Contract	19.74	14.00	1.32	0.94	0.22	0.15	21.28	15.09	
Korea, KTF	Show slim+KT Family discount(50%) 2 year contract	7.22	9.63	3.28	4.37	1.30	1.73	11.80	15.74	
Luxembourg, Tango	Knock-out + Tango Family (disc calcs for on-net only)	0.00	0.00	4.09	3.47	10.31	8.74	14.41	12.21	SD
Mexico, Telcel	Amigo Fidelidad $300 - Unltd SMS to 3 nos	0.00	0.00	7.97	12.08	3.91	5.93	11.88	18.00	PP / SD
Netherlands, Vodafone	SIM only Scherp 110 + Scherp SMS 100 - 2 year	10.31	9.64	0.00	0.00	0.00	0.00	10.31	9.64	
New Zealand, Vodafone	Easy 20 - 12 months	12.32	10.90	1.92	1.70	0.00	0.00	14.23	12.60	
Norway, Telenor	djuce SIMply	0.00	0.00	5.27	3.46	3.10	2.04	8.37	5.50	
Poland, Polkomtel	Taryfa Twój Profil - on-net allowance + SMS 600	1.97	2.98	4.88	7.39	0.00	0.00	6.84	10.37	PP
Portugal, TMN	VIP SMS	0.00	0.00	13.24	15.05	3.74	4.25	16.99	19.30	PP / SD
Slovak Rep., Orange	Prima + Variant Extra 30 Days	3.01	3.86	5.77	7.39	6.34	8.13	15.11	19.37	PP
Slovenia, Si.mobil	Paket SIMPL na kartice SMS Top-Up €10 / Month	0.44	0.52	9.44	11.37	6.13	7.39	16.00	19.28	PP
Spain, Vodafone	A mi Aire Mensajes Gratis + Qtal	1.28	1.31	13.87	14.15	0.00	0.00	15.15	15.46	SD
Sweden, Tele 2 Comviq	Comviq Kontant Poppis SEK 85 Top-up	0.00	0.00	7.52	6.32	5.27	4.43	12.78	10.74	PP
Switzerland, Sunrise	Flat Basic Without Mobile	10.68	6.94	9.55	6.20	9.61	6.24	29.85	19.38	
Turkey, Vodafone	Hesabini Bilen + 500 SMS	4.98	5.93	9.71	11.55	0	0	14.68	17.48	PP
UK, O2	Pay Monthly 50 - 24 month	15.69	15.85	0.00	0.00	0	0	15.69	15.85	
USA, AT&T	Pay As You Go Simple Rate Plan + 200 txt	5.49	5.49	17.76	17.76	0	0	23.25	23.25	PP
OECD average		5.77	5.37	7.42	7.68	3.64	3.78	16.83	16.83	

Note: The OECD basket of mobile telephone charges includes subscription and usage (30 voice calls and 100 SMS messages, distributed between peak and off-peak hours and based on an average call duration) over a one-month period. Calling patterns were all determined through extensive discussions with carriers across the OECD. USD purchasing power parities (PPP) are used to aid international comparisons. (*) Contact type : PP = Pre-paid plan ; SD = Including selective discounts.

Source: OECD and Teligen.

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Table 7.10. **OECD basket of mobile telephone charges, 100 calls, VAT included, August 2010**

		Fixed		Usage		Messages		Grand total		Contract type*
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	
Australia, Optus	BYO Cap Plan $29 - Bonus Value 12m SIM-Only	0.00	0.00	22.98	17.82	3.25	2.52	26.24	20.34	
Austria, Mobilkom	A1 Xcite Zero	1.81	1.69	19.58	18.30	0.00	0.00	21.39	19.99	
Belgium, Mobistar	MyFriends My25	32.64	29.14	6.69	5.98	6.22	5.55	45.55	40.67	
Canada, Bell Mobility	Solo Unlimited Talk + Message Centre Express	6.42	5.44	7.06	5.98	32.05	27.16	45.53	38.59	PP
Chile, Entel Movil	Pablo Plan Top-up $10000 + Número favorito + SMS 140	4.69	6.34	30.82	41.65	0.00	0.00	35.52	48.00	PP / SD
Czech Rep., T-Mobile	Pratele 700	36.82	49.76	5.52	7.46	1.18	1.59	43.52	58.81	SD
Denmark, Telenor	Selvhenter.dk + Mine 10 Naermeste	3.37	2.28	10.05	6.79	4.89	3.30	18.30	12.37	PP / SD
Estonia, Tele2	Pro 200 Business tariff	0.29	0.42	12.14	17.59	10.50	15.22	22.93	33.23	
Finland, Elisa	Saunalahti Tikka + 12 months	5.23	4.06	7.76	6.01	12.61	9.78	25.60	19.85	
France, Orange	Forfait Click 3h - SIM-Only 24 months	40.34	36.35	2.43	2.19	0.00	0.00	42.77	38.54	
Germany, T-Mobile	Xtra Card	0.36	0.34	23.32	22.00	21.50	20.29	45.19	42.63	PP
Greece, Vodafone	Vodafone Prepaid + Super Voice 150	15.85	16.01	0.00	0.00	22.01	22.23	37.86	38.24	PP / SD
Hungary, Telenor	MobilKvartett 150	22.89	32.70	6.36	9.09	8.65	12.35	37.90	54.14	
Iceland, Vodafone	Frelsi Eitt verð on-net calls & SMS	0.54	0.50	15.33	14.07	0.00	0.00	15.87	14.56	PP
Ireland, Vodafone	Simply 100 30 day SIM only	26.11	20.72	0.00	0.00	2.81	2.23	28.93	22.96	
Israel, Cellcom	It Pays to Choose - 320 Mins	2.65	2.70	23.99	24.48	21.13	21.56	47.77	48.75	
Italy, TIM	TIM 4	6.02	5.52	31.82	29.19	7.28	6.68	45.11	41.39	PP
Japan, KDDI au	Plan M Simple + Everybody Discount with 24 Month Contract + C	35.80	25.39	1.27	0.90	0.00	0.00	37.07	26.29	SD
Korea, KTF	Show slim+KT Family discount(50%) 2 year contract	7.22	9.63	12.44	16.58	2.04	2.73	21.70	28.94	
Luxembourg, Tango	Knock-out + Tango Family (disc calcs for on-net only)	0.00	0.00	16.77	14.21	14.77	12.52	31.54	26.73	SD
Mexico, Telcel	Amigo Fidelidad $500 - Unltd Calls to 3 nos	0.00	0.00	19.24	29.15	5.42	8.21	24.66	37.37	PP / SD
Netherlands, Vodafone	SIM only Scherp 225 + Scherp SMS 100 - 2 year	11.62	10.86	0.00	0.00	15.67	14.64	27.29	25.50	
New Zealand, Vodafone	TXTer 90 + Your Time 100 - 12 months SIM-Only	39.89	35.30	0.44	0.39	0.00	0.00	40.33	35.69	SD
Norway, Telenor	FriHet + FriFamilie	0.92	0.60	13.90	9.14	8.31	5.47	23.12	15.21	SD
Poland, Orange	Go 25 (Charge up Zl 25)	0.00	0.00	9.78	14.82	6.34	9.61	16.12	24.42	PP / SD
Portugal, TMN	UZO Minimum usage	0.00	0.00	31.11	35.35	11.52	13.09	42.63	48.44	PP
Slovak Rep., Orange	Paušál Volaj za 6 centov + SMS 15 Month SIM-Only	13.32	17.08	14.48	18.57	0.00	0.00	27.81	35.65	
Slovenia, Si.mobil	U ORTO NULO	13.49	16.25	11.24	13.54	0.00	0.00	24.73	29.80	
Spain, Vodafone	A mi Aire Super 90 x 1 24h + Bono 50 SMS	27.73	28.30	0.00	0.00	16.64	16.98	44.37	45.28	
Sweden, Tele 2 Comviq	Comviq Kontant Poppis SEK 185 Top-up	0.00	0.00	25.64	21.55	0.00	0.00	25.64	21.55	PP
Switzerland, Sunrise	Flat Basic Without Mobile	10.68	6.94	36.41	23.64	13.46	8.74	60.55	39.32	
Turkey, Vodafone	Cep Avantaj Mini Heryöne + 500 SMS	18.25	21.73	0.00	0.00	0.00	0.00	18.25	21.73	
UK, O2	Pay Monthly 300 - 12 Month SIM Only	15.69	15.85	0.00	0.00	0.00	0.00	15.69	15.85	
USA, AT&T	Nation 450 Messaging 200	51.13	51.13	0.00	0.00	0.00	0.00	51.13	51.13	
OECD average		13.29	13.32	12.31	12.54	7.30	7.13	32.90	33.00	

Note: The OECD basket of mobile telephone charges includes subscription and usage (100 voice calls and 140 SMS messages, distributed between peak and off-peak hours and based on an average call duration) over a one-month period. Calling patterns were all determined through extensive discussions with carriers across the OECD. USD purchasing power parities (PPP) are used to aid international comparisons. (*) Contact type : PP = Pre-paid plan ; SD = Including selective discounts.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398841

Table 7.11. **OECD basket of mobile telephone charges, 300 calls, VAT included, August 2010**

		Fixed		Usage		Messages		Grand total		Contract type*
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	
Australia, Optus	BYO Business Cap $49 - Bonus Value 12m SIM-Only	0.00	0.00	31.62	24.51	12.71	9.86	44.33	34.36	
Austria, T-Mobile	HIT 300 SMS 1000	26.62	24.87	0.00	0.00	0.00	0.00	26.62	24.87	
Belgium, Mobistar	MyComfort My70	91.39	81.60	0.00	0.00	0.00	0.00	91.39	81.60	
Canada, Bell Mobility	Solo Unlimited Talk + Message Centre Express	6.42	5.44	8.29	7.03	30.81	26.11	45.53	38.59	PP
Chile, Entel Movil	Todo Destino 500 + SMS 250	65.70	88.79	7.02	9.48	0.00	0.00	72.72	98.27	
Czech Rep., T-Mobile	Podnikatel 1400 - 24 Month SIM-Only	88.37	119.42	12.70	17.16	2.70	3.65	103.77	140.23	
Denmark, TDC Mobil	MobilTid - Top-up Kr 150 per mth	0.48	0.33	26.07	17.61	7.76	5.25	34.31	23.18	PP
Estonia, Tele2	Perepakett 450 + SMS 200	10.29	14.91	32.91	47.69	4.60	6.66	47.79	69.27	SD
Finland, Elisa	Saunalahti Joutsen 12 months	26.12	20.25	8.08	6.27	14.69	11.39	48.90	37.90	
France, Orange	Forfait Origami First 3h 24 months	65.15	58.69	9.82	8.85	0.00	0.00	74.97	67.54	
Germany, T-Mobile	Combi Relax 1200 SIM only	105.29	99.33	0.00	0.00	0.00	0.00	105.29	99.33	
Greece, Cosmote	Cosmote Unlimited 45	60.72	61.34	1.70	1.72	0.00	0.00	62.42	63.05	
Hungary, Telenor	MobilKvartett 3000	68.81	98.29	0.00	0.00	0.00	0.00	68.81	98.29	
Iceland, Vodafone	Frelsi Eitt verð 5 numbers + on-net calls & SMS	4.36	4.00	29.46	27.02	0.00	0.00	33.81	31.02	PP / SD
Ireland, O2	Clear 350 - Free on-net calls 18 month	65.01	51.59	0.00	0.00	10.28	8.16	75.29	59.75	
Israel, Orange Israel	Orange Special	52.43	53.50	14.25	14.54	33.96	34.65	100.64	102.69	
Italy, TIM	Tutto Compreso 500 + 200 SMS	51.13	46.91	16.20	14.87	3.92	3.59	71.25	65.37	
Japan, KDDI au	Plan LL Simple + Everybody Discount with 24 Month Contract	82.32	58.38	2.45	1.74	0.00	0.00	84.77	60.12	
Korea, SK Telecom	Voice Free 65 2 year contract	43.20	57.60	0.00	0.00	4.18	5.57	47.38	63.18	
Luxembourg, LuxGSM	Relax +Landlines+Tango+SMS	39.17	33.19	0.00	0.00	0.00	0.00	39.17	33.19	
Mexico, Telcel	Mas X Menos Por Segundo 1 - Unltd Calls & SMS to 4 nos	20.52	31.08	13.97	21.16	12.25	18.56	46.73	70.80	SD
Netherlands, Vodafone	SIM only Scherp 500 + Scherp SMS 100 - 2 year	28.59	26.72	33.94	31.72	48.96	45.76	111.49	104.19	
New Zealand, Vodafone	TXTer 375 + 3 BestMates - 12 months SIM-Only	84.25	74.56	1.31	1.16	0.00	0.00	85.56	75.71	SD
Norway, Telenor	djuce Combi M	45.35	29.83	8.96	5.90	0.00	0.00	54.31	35.73	
Poland, Orange	Go 100 (Charge up Zl 100)	0.00	0.00	23.72	35.94	8.81	13.34	32.53	49.29	PP / SD
Portugal, Vodafone	Plano Best 91 TOP	95.31	108.31	0.00	0.00	0.00	0.00	95.31	108.31	
Slovak Rep., T-Mobile	Podľa seba 3 Anynet + On-net e&wknd + SMS + Redu Chrg	26.46	33.92	29.69	38.07	0.00	0.00	56.15	71.99	
Slovenia, Si.mobil	Paket PODJETNI M Business tariff	39.60	47.71	0.00	0.00	0.00	0.00	39.60	47.71	
Spain, Vodafone	A mi Aire Super 90 x 1 24h + Bono 50 SMS	27.73	28.30	0.00	0.00	32.35	33.01	60.08	61.31	
Sweden, Tele 2 Comviq	Comviq Kontant Poppis SEK 285 Top-up	0.00	0.00	59.03	49.61	0.00	0.00	59.03	49.61	PP
Switzerland, Sunrise	Flat Relax Without Mobile	92.39	59.99	0.00	0.00	21.63	14.04	114.02	74.04	
Turkey, Vodafone	Vodafone Cebine Göre Tarife + 500 SMS	4.98	5.93	20.46	24.35	0.00	0.00	25.43	30.28	PP
UK, O2	Online 300 - Unlimited On-Net Calls - 12 Month SIM Only	15.69	15.85	0.00	0.00	0.00	0.00	15.69	15.85	
USA, Verizon	Talk 450 + 250 texts	51.61	51.61	0.00	0.00	0.00	0.00	51.61	51.61	
OECD average		43.69	43.89	11.52	11.95	7.34	7.05	62.55	62.89	

Note: The OECD basket of mobile telephone charges includes subscription and usage (300 voice calls and 225 SMS messages, distributed between peak and off-peak hours and based on an average call duration) over a one-month period. Calling patterns were all determined through extensive discussions with carriers across the OECD. USD purchasing power parities (PPP) are used to aid international comparisons. (*) Contact type : PP = Pre-paid plan ; SD = Including selective discounts.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398860

Table 7.12. **OECD basket of mobile telephone charges, 900 calls, VAT included, August 2010**

		Fixed		Usage		Messages		Grand total		Contract type*
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	
Australia, Optus	Timeless Extreme $89	0.00	0.00	80.52	62.42	0.00	0.00	80.52	62.42	PP / SD
Austria, Mobilkom	A1 Smart 2000+	52.73	49.28	0.00	0.00	0.00	0.00	52.73	49.28	
Belgium, Proximus	Bizz Mobile No Limit	126.38	112.84	0.00	0.00	0.00	0.00	126.38	112.84	
Canada, Bell Mobility	Solo Unlimited Talk + Message Centre Express	6.42	5.44	15.15	12.84	33.52	28.41	55.10	46.69	
Chile, Movistar	Comunidad - Ilimitado Movistar 150 + SMS 60	44.40	60.00	97.93	132.34	34.03	45.99	176.37	238.33	PP
Czech Rep., O2	Neon XL - 24 Month SIM-Only	105.34	142.35	5.43	7.33	29.46	39.81	140.22	189.49	
Denmark, Telenor	Tale XL	53.54	36.17	0.00	0.00	15.31	10.35	68.85	46.52	
Estonia, Tele2	Perepakett 950 + SMS 200	10.29	14.91	77.88	112.87	23.50	34.06	111.67	161.85	
Finland, Sonera	TeleFinland - Koko paketti	51.05	39.57	0.00	0.00	0.00	0.00	51.05	39.57	SD
France, SFR	Essentiel Pro 8H inc Calls to 3 SFR nos 24 months + Double Eve+Wknd	105.62	95.16	49.33	44.44	60.78	54.75	215.73	194.35	
Germany, T-Mobile	Combi Flat L SIM only	144.46	136.28	0.00	0.00	0.00	0.00	144.46	136.28	SD
Greece, Cosmote	Cosmote Unlimited 70	94.46	95.41	5.10	5.15	0.00	0.00	99.56	100.57	
Hungary, Telenor	Pannon 1200 + SMS 80	99.08	150.98	85.03	121.48	28.90	31.85	213.01	304.30	
Iceland, Vodafone	Frelsi Eitt verð 5 numbers + on-net calls & SMS	4.36	4.00	121.39	111.37	0.00	0.00	125.75	115.36	
Ireland, Vodafone	Perfect Choice 600 Unlimited on-net calls & SMS + Landline add-on	133.15	105.67	4.28	3.39	0.00	0.00	137.42	109.07	PP / SD
Israel, Orange Israel	Orange Special	52.43	53.50	85.53	87.28	52.83	53.91	190.79	194.69	
Italy, TIM	Tutto Compreso 1500 + TIMx2	107.27	98.41	0.00	0.00	49.69	45.59	156.96	144.00	
Japan, KDDI au	Plan LL Simple + Everybody Discount with 24 Month Contract + Call Designation	86.83	61.58	134.61	95.47	4.22	2.99	225.66	160.04	SD
Korea, SK Telecom	Number one (Double-Discount) + SMS Bundle 2 year contract	54.35	72.47	0.00	0.00	0.00	0.00	54.35	72.47	SD
Luxembourg, LuxGSM	Relax +Landlines+Tango+SMS	39.17	33.19	0.00	0.00	0.00	0.00	39.17	33.19	
Mexico, Telcel	Mas X Menos Por Segundo 1 - Unltd Calls & SMS to 4 nos	20.52	31.08	41.07	62.22	19.69	29.84	81.28	123.15	
Netherlands, KPN	Business Flexibel SIM-Only	12.74	11.90	233.81	218.52	54.38	50.82	300.93	281.24	SD
New Zealand, Vodafone	TXTer 1650 - 12 months SIM-Only	268.81	237.88	3.92	3.47	0.00	0.00	272.73	241.35	
Norway, Telenor	FriPrat + FriFamilie	50.22	33.04	0.00	0.00	26.81	17.64	77.03	50.68	SD
Poland, Orange	Go 100 (Charge up Zl 100)	0.00	0.00	75.32	114.12	10.82	16.39	86.14	130.51	SD
Portugal, TMN	TMN Unlimited 100	130.56	148.36	0.00	0.00	0.00	0.00	130.56	148.36	PP / SD
Slovak Rep., Orange	Bizniz 1000 + Nonstop 15 Month SIM-Only	113.86	145.97	0.00	0.00	0.00	0.00	113.86	145.97	
Slovenia, Si.mobil	Paket PODJETNI M Business tariff	39.60	47.71	43.81	52.78	0.00	0.00	83.41	100.50	
Spain, Vodafone	A mi Aire Super 90 x 1 24h + Qtal	19.77	20.17	72.99	74.48	69.50	70.92	162.27	165.58	
Sweden, Tele 2 Comviq	Maxi	69.54	58.44	0.00	0.00	0.00	0.00	69.54	58.44	SD
Switzerland, Swisscom	Easy BeFree	0.53	0.35	86.52	56.18	28.84	18.73	115.89	75.25	
Turkey, Vodafone	Cep Avantaj Her Yöne + 500 SMS	41.48	49.38	1.63	1.94	0.00	0.00	43.10	51.31	PP
UK, O2	Online 900 - Unlimited On-Net Calls - 12 Month SIM Only	31.39	31.70	0.00	0.00	0.00	0.00	31.39	31.70	
USA, AT&T	Nation 450 Messaging 1000	56.63	56.63	0.00	0.00	0.00	0.00	56.63	56.63	
OECD average		65.50	65.88	38.86	40.59	15.95	16.24	120.31	122.71	

Note: The OECD basket of mobile telephone charges includes subscription and usage (900 voice calls and 350 SMS messages, distributed between peak and off-peak hours and based on an average call duration) over a one-month period. Calling patterns were all determined through extensive discussions with carriers across the OECD. USD purchasing power parities (PPP) are used to aid international comparisons. (*) Contact type : PP = Pre-paid plan; SD = Including selective discounts.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/888932398879

Table 7.13. **OECD basket of mobile telephone charges, 40 calls pre-paid, VAT included, August 2010**

		Fixed		Usage		Messages		Grand total		Contract type*
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	
Australia, Telstra	Pre-Paid - Talk Time $40 top-up	0.75	0.58	1.80	1.39	16.30	12.63	18.85	14.61	PP
Austria, T-Mobile	Klax Nonstop	1.85	1.73	10.14	9.47	7.83	7.32	19.82	18.52	PP
Belgium, Mobistar	Simply Prepaid	0.36	0.32	18.28	16.32	7.83	6.99	26.47	23.64	PP
Canada, Rogers	Pay As You Go 1¢ Evening & Weekend	0.84	0.71	21.37	18.11	10.06	8.52	32.26	27.34	PP
Chile, Entel Movil	Raimundo Plan + Número favorito + SMS 80	3.13	4.23	14.12	19.08	0.00	0.00	17.25	23.31	PP / SD
Czech Rep., T-Mobile	Combi 300	0.00	0.00	16.53	22.33	2.41	3.26	18.94	25.59	PP
Denmark, Telenor	Selvhenter.dk + Mine 10 Naermeste	3.37	2.28	3.11	2.10	2.08	1.41	8.56	5.78	PP / SD
Estonia, Tele2	Smart kõnekaart Hinnaliider	0.10	0.15	9.11	13.21	3.92	5.68	13.14	19.04	PP
Finland, Elisa	Saunalahti Prepaid	0.36	0.28	6.11	4.74	5.17	4.01	11.64	9.03	PP
France, Orange	Mobicarte Plan + Bonus Appels EUR 20 Top-Up	0.00	0.00	21.99	19.81	9.40	8.47	31.39	28.28	PP
Germany, T-Mobile	Xtra Card	0.36	0.34	8.01	7.56	8.88	8.38	17.25	16.28	PP
Greece, Vodafone	Vodafone Prepaid Unlimited (min 10 euro/month)	0.18	0.18	11.95	12.07	4.41	4.46	16.54	16.71	PP / SD
Hungary, T-Mobile	Domino Aktív + Domino Friends	4.95	7.08	7.38	10.54	7.60	10.85	19.93	28.47	PP / SD
Iceland, Vodafone	Frelsi Eitt verð on-net calls & SMS	0.54	0.50	7.71	7.07	0.00	0.00	8.25	7.57	PP
Ireland, Vodafone	Advantage Plus + on-net calls & texts	0.00	0.00	18.37	14.58	7.74	6.14	26.11	20.72	PP
Israel, Cellcom	Prepaid - Stockmann Basic + SMS	5.30	5.40	20.27	20.68	0.00	0.00	25.56	26.08	PP
Italy, TIM	TIM 4	6.02	5.52	12.64	11.59	3.10	2.84	21.76	19.96	PP
Japan, KDDI au	au Prepaid (NO VOICEMAIL)	1.35	0.96	87.11	61.78	3.47	2.46	91.94	65.20	PP
Korea, SK Telecom	PPS General (No MMS)	0.00	0.00	19.00	25.34	1.11	1.49	20.12	26.82	PP
Luxembourg, Tango	Pronto + Tango Family (disc calcs for on-net only)	0.00	0.00	8.54	7.23	7.75	6.57	16.29	13.80	PP / SD
Mexico, Telcel	Amigo Fidelidad $200 - Unltd Calls to 3 nos	0.00	0.00	8.23	12.47	3.22	4.87	11.45	17.35	PP / SD
Netherlands, Vodafone	Vodafone Meerwaarderen Bonus Minutes with €20 Top-up	0.00	0.00	23.60	22.05	7.05	6.59	30.65	28.64	PP
New Zealand, Vodafone	Simply Prepay	0.60	0.53	32.88	29.10	5.23	4.63	38.72	34.27	PP
Norway, Telenor	djuce Easy	0.45	0.30	12.34	8.12	3.80	2.50	16.60	10.92	PP
Poland, Polkomtel	Taryfa Twój Profil - on-net allowance + SMS 600	1.97	2.98	4.92	7.45	0.00	0.00	6.88	10.43	PP
Portugal, TMN	UZO Minimum usage	0.00	0.00	14.01	15.92	5.58	6.34	19.58	22.25	PP
Slovak Rep., Orange	Prima + Variant Extra 30 Days	3.01	3.86	8.69	11.14	3.81	4.88	15.50	19.87	PP
Slovenia, Si.mobil	Paket SIMPL na kartice SMS Top-Up €10 / Month	0.44	0.52	14.28	17.21	3.55	4.28	18.27	22.02	PP
Spain, Vodafone	Tarjeta A mi Aire 90 x 1 24h	0.00	0.00	8.65	8.83	14.46	14.75	23.11	23.58	PP
Sweden, Tele 2 Comviq	Comviq Kontant Poppis SEK 85 Top-up	0.00	0.00	10.48	8.81	3.16	2.66	13.64	11.46	PP
Switzerland, Swisscom	Natal Easy Liberty Uno	0.53	0.35	34.82	22.61	11.40	7.41	46.75	30.36	PP
Turkey, Vodafone	Vodafone Cep1 Tarifesi + 500 SMS (TL 20 Card)	4.98	5.93	13.27	15.80	0.00	0.00	18.25	21.73	PP
UK, T-Mobile	Pay As You Go Mates Rates Top-Up £10 - Weekend Credit	0.00	0.00	13.47	13.61	4.37	4.41	17.83	18.01	PP
USA, AT&T	Pay As You Go Simple Rate Plan + 200 txt	5.49	5.49	26.07	26.07	0.00	0.00	31.56	31.56	PP
OECD average		1.38	1.48	16.15	15.42	5.14	4.85	22.67	21.74	

Note: The OECD basket of mobile telephone charges includes subscription and usage (40 pre-paid voice calls, distributed between peak and off-peak hours and based on an average call duration) over a one-month period. Calling patterns were all determined through extensive discussions with carriers across the OECD. USD purchasing power parities (PPP) are used to aid international comparisons. (*) Contact type : PP = Pre-paid plan ; SD = Including selective discounts.

Source: OECD and Teligen.

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Table 7.14. **OECD basket of mobile telephone charges, 400 messages, VAT included, August 2010**

		Fixed		Usage		Messages		Grand total		Contract type*
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	
Australia, Optus	BYO Cap Plan $19 - Bonus Text 12m SIM-Only	0.00	0.00	2.80	5.83	14.39	7.49	17.19	13.33	
Austria, Mobilkom	A1 Xcite Zero	1.81	1.69	19.58	18.30	0.00	0.00	21.39	19.99	
Belgium, Proximus	Generation MTV €10	13.06	11.66	4.54	4.05	0.00	0.00	17.59	15.71	
Canada, Rogers	Pay As You Go Socialite 20	23.18	19.65	11.17	9.47	0.00	0.00	34.36	29.12	PP
Chile, Entel Movil	Raimundo Plan + Número favorito + SMS 250	7.04	9.52	2.80	3.78	14.67	19.82	24.51	33.12	PP / SD
Czech Rep., T-Mobile	Combi 300	0.00	0.00	3.13	4.23	15.81	21.36	18.94	25.59	PP
Denmark, Telenor	Selvhenter.dk + SMS Pakke	10.54	7.12	2.92	1.97	0.00	0.00	13.46	9.09	PP
Estonia, Tele2	Smart kõnekaart Tasuta Pakett	0.10	0.15	1.31	1.89	26.24	38.02	27.65	40.07	PP
Finland, Sonera	TeleFinland - Tekstari	10.57	8.20	2.50	1.94	0.00	0.00	13.08	10.14	
France, Orange	Forfait M6 19.99€/24 months 24 months	26.10	23.51	0.00	0.00	0.00	0.00	26.10	23.51	
Germany, T-Mobile	Xtra Card	0.36	0.34	1.52	1.43	62.31	58.79	64.20	60.56	PP
Greece, Vodafone	Vodafone Prepaid Unlimited (min 10 euro/month)	0.18	0.18	2.03	2.05	31.58	31.90	33.80	34.14	PP / SD
Hungary, T-Mobile	Domino SMS + Domino Friends	2.71	3.87	3.87	5.53	35.56	50.80	42.13	60.19	PP / SD
Iceland, Vodafone	Frelsi Eitt verð on-net calls & SMS	0.54	0.50	7.71	7.07	0.00	0.00	8.25	7.57	PP
Ireland, Vodafone	Advantage Plus + any-net texts	0.00	0.00	26.11	20.72	0.00	0.00	26.11	20.72	PP
Israel, Cellcom	It Pays to Choose - 320 Mins	2.65	2.70	1.80	1.84	60.37	61.61	64.83	66.15	
Italy, TIM	TIM 4	6.02	5.52	2.53	2.32	20.73	19.02	29.28	26.86	PP
Japan, KDDI au	Plan SS Simple + Everybody Discount with 24 Month Contract + Call Designation	16.76	11.89	0.63	0.44	0.00	0.00	17.39	12.33	SD
Korea, SK Telecom	PPS General (No MMS)	0.00	0.00	3.78	5.05	7.43	9.91	11.22	14.96	PP
Luxembourg, LuxGSM	Relax Youz	13.06	11.06	2.47	2.09	0.00	0.00	15.52	13.15	
Mexico, Telcel	Amigo Fidelidad $300 - Unltd SMS to 3 nos	0.00	0.00	1.65	2.51	13.69	20.74	15.34	23.25	PP / SD
Netherlands, KPN	SIM-only Bellen + SMS 430 12 Month	32.24	30.13	0.00	0.00	0.00	0.00	32.24	30.13	
New Zealand, Telecom	OneRate Prepaid Txt 600	9.32	8.25	8.32	7.37	0.00	0.00	17.65	15.62	PP
Norway, Telenor	djuce SIMply	0.00	0.00	1.51	1.00	13.19	8.68	14.71	9.68	
Poland, Polkomtel	Easy SMS	1.95	2.96	4.88	7.39	0.00	0.00	6.83	10.35	PP
Portugal, TMN	VIP SMS	0.00	0.00	3.26	3.71	15.93	18.10	19.19	21.81	PP / SD
Slovak Rep., T-Mobile	Podľa seba 1 (Any net allowance + SMS allowance)	13.40	17.18	0.00	0.00	0.00	0.00	13.40	17.18	
Slovenia, Si.mobil	U ORTO NULO	13.49	16.25	0.55	0.66	0.00	0.00	14.04	16.92	
Spain, Vodafone	A mi Aire Mensajes Gratis + Qtal	1.28	1.31	4.85	4.95	9.02	9.20	15.15	15.46	SD
Sweden, Tele 2 Comviq	Snackis - 24 months	5.79	4.86	1.76	1.48	10.53	8.85	18.08	15.20	
Switzerland, Sunrise	Go Day Flat	0.53	0.35	6.65	4.32	28.84	18.73	36.02	23.39	PP
Turkey, Vodafone	Hesabini Bilen + 500 SMS	4.98	5.93	2.77	3.30	0.00	0.00	7.75	9.22	PP
UK, O2	Pay Monthly 50 - 24 month	15.69	15.85	0.00	0.00	0.00	0.00	15.69	15.85	
USA, AT&T	Pay As You Go Simple Rate Plan + 1000 txt	10.99	10.99	5.20	5.20	0.00	0.00	16.18	16.18	PP
OECD average		7.19	6.81	4.25	4.17	11.19	11.85	22.63	22.84	

Note: The OECD basket of mobile telephone charges includes subscription and usage (400 SMS messages, distributed between peak and off-peak hours and based on an average call duration) over a one-month period. Calling patterns were all determined through extensive discussions with carriers across the OECD. USD purchasing power parities (PPP) are used to aid international comparisons. (*) Contact type: PP = Pre-paid plan; SD = Including selective discounts.

Source: OECD and Teligen.

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Table 7.15. **OECD basket of national leased line charges, monthly price, August 2010, VAT excluded**

	2 Mbit/s		34 Mbit/s	
	USD	USD PPP	USD	USD PPP
Australia	3 675	2 848	6 688	5 184
Austria	1 172	1 096	7 950	7 430
Belgium	1 514	1 351	7 849	7 008
Canada	3 218	2 727	17 171	14 552
Czech Republic	4 059	5 486		
Denmark	376	254	5 940	4 014
Finland				
France	2 064	1 859	12 847	11 574
Germany	1 308	1 234	5 665	5 345
Greece	1 335	1 348	7 521	7 597
Hungary				
Iceland	290	266	1 040	954
Ireland	1 860	1 476	21 666	17 196
Italy	1 828	1 677	11 662	10 699
Japan	4 383	3 108	15 779	11 191
Korea	2 872	3 830	15 613	20 818
Luxembourg	987	836	4 167	3 531
Mexico	1 955	2 962	15 545	23 553
Netherlands	1 535	1 434		
New Zealand				
Norway	903	594	3 064	2 016
Poland	1 965	2 977		
Portugal	1 413	1 605	11 229	12 760
Slovak Republic	931	1 193		
Spain				
Sweden	552	464		
Switzerland				
Turkey	1 058	1 260	6 662	7 931
United Kingdom	2 005	2 025	13 670	13 808
United States	1 659	1 659	7 453	7 453

Source: OECD and Teligen.

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Table 7.16. **Trends in leased line pricing over different distances, 1992-2010**

OECD average	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
2 Mbit/s																			
2 km	100	99.7	106.3	108.1	105.6	101.5	94.8	59.8	58.3	56.6	53.4	50.3	47.4	44.5	47.7	41.0	40.9	41.4	45.7
50 km	100	98.3	89.3	84.5	78.2	72.3	59.6	40.1	43.2	39.8	37.8	34.5	31.3	27.6	34.5	33.4	34.3	32.2	33.6
200 km	100	98.8	94.6	87.9	77.3	73.1	60.7	41.7	45.4	38.9	35.9	33.5	30.7	26.3	32.3	32.9	33.9	31.4	30.9

Source: OECD/Teligen.

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Table 7.17. **Changes in DSL/fibre offerings, September 2008 to 2010**

DSL		Speed (kbit/s)						Price (local currency)						Bitcap (MB)						Compound annual growth rate (2008-2010)	
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009	2010	Speed	Price
Australia	Bigpond	1 536	1 536	1 536	1 536	1 536	1 536	129.40	109.95	69.95	69.95	79.95	39.95	10 000	10 000	12 000	12 000	12 000	2 000	0%	-24%
Austria	AON	2 048	2 048	2 048	2 048	2 048	6 144	54.90	54.90	59.90	39.90	39.90	19.90	12 000	15 000	20 000	-	-	-	73%	-29%
Belgium	Belgacom	4 096	4 096	4 096	4 096	4 096	12 288	54.95	54.95	57.05	57.05	31.55	32.50	30 000	30 000	30 000	60 000	4 000	50 000	73%	-25%
Canada	Bell Canada	5 120	5 120	7 168	7 168	12 288	12 288	50.00	46.95	49.95	47.96	51.95	51.95	-	-	60 000	60 000	50 000	50 000	31%	4%
Czech Republic	O2	1 024	2 048	2 048	8 192	8 192	8 192	3 568	713	475	475	500	750	-	8 000	10 000	-	-	-	0%	26%
Denmark	TDC	4 096	4 096	4 096	4 096	4 096	5 120	499	474	319	194	244	249	-	15 000	-	-	-	-	12%	13%
Finland	Sonera	24 000	24 000	24 576	24 576	24 576	24 576	68.9	59	49	24.5	49	39.9	-	-	-	-	-	-	0%	28%
France	France Telecom	18 432	18 432	18 432	18 432	18 432	20 480	39.90	34.90	34.90	34.90	29.90	29.90	-	-	-	-	-	-	5%	-7%
Germany	T-Com	6 144	6 144	6 144	6 144	6 144	6 144	34.94	34.98	28.58	39.95	39.95	39.95	-	-	-	-	-	-	0%	0%
Greece	OTE	1 024	1 024	1 024	1 024	2 048	2 048	32.90	28.50	21.50	16.50	16.50	17.06	-	-	-	-	-	-	41%	2%
Hungary	T-Com	2 048	2 048	4 096	8 192	15 360	15 360	22 188	15 600	6 900	3 990	6 150	6 900	-	-	-	-	-	-	37%	32%
Iceland	Simmin	6 144	8 192	8 192	8 192	8 192	12 188	5 790	5 990	5 990	6 190	4 400	3 050	-	-	-	80 000	-	1 000	22%	-30%
Ireland	Eircom	2 048	2 048	2 048	3 072	3 072	3 072	54.45	29.99	39.99	29.99	30.11	29.99	16 000	20 000	20 000	30 000	-	30 000	0%	0%
Italy	Alice	4 000	20 480	20 480	20 480	20 480	20 480	41.9	36.95	36.95	24.95	24.95	24.95	-	-	-	-	-	-	0%	0%
Japan	NTT	102 400	102 400	102 400	102 400	102 400	102 400	4 064	3 612	2 930	3 255	3 518	3 115	-	-	-	-	-	-	0%	-2%
Korea	KT	102 400	102 400	102 400	102 400	102 400	102 400	36 000	36 000	36 000	34 200	34 200	32 400	-	-	-	-	-	-	0%	-3%
Luxembourg	EPT	3 072	3 072	15 360	15 360	15 360	20 480	90.50	79.00	79.00	79.00	79.00	79.00	25 000	-	-	-	-	-	15%	0%
Mexico	Telmex	1 024	1 024	1 024	1 024	1 024	1 024	599.00	401.35	399.00	599.00	389.00	389.00	-	-	-	-	-	-	0%	-19%
Netherlands	KPN	8 192	6 144	6 144	20 480	20 480	40 960	74.95	49.95	50.00	50.00	50.00	50.00	-	-	-	-	-	-	41%	0%
New Zealand	TCNZ	2 048	2 048	24 576	24 576	24 576	24 576	69.95	39.95	69.95	79.95	69.95	69.95	1 000	1 000	10 000	15 000	20 000	20 000	0%	-6%
Norway	Telenor	4 096	6 144	6 144	6 144	8 192	8 192	549	499	499	499	449	449	-	-	-	-	-	-	15%	-5%
Poland	TP	6 144	6 144	6 144	6 144	6 144	6 144	291.58	156.00	156.00	109.00	124.00	99.90	50 000	-	-	-	-	-	0%	-4%
Portugal	Portugal Telecom	8 192	8 192	8 192	16 384	24 576	24 576	59.99	49.50	35.58	35.28	24.99	24.99	8 000	30 000	50 000	-	-	-	22%	-16%
Slovak Republic	Slovak Telecom/T-Com	1 024	1 024	1 536	2 048	2 048	2 048	52.74	26.52	8.26	13.24	13.95	12.99	-	-	1 000	2 000	2 000	2 000	0%	-1%
Spain	Telefonica	1 024	1 024	1 024	1 024	1 024	1 024	39.07	39.07	39.07	29.90	29.90	29.90	-	-	-	-	-	20 000	0%	0%
Sweden	TeliaSonera	24 576	24 576	24 576	24 576	24 576	24 576	419	399	379	359	359	344	-	-	-	-	-	-	0%	-2%
Switzerland	Swisscom	2 400	3 584	3 584	5 120	5 120	5 120	99.00	69.00	49.00	49.00	49.00	49.00	-	-	-	-	-	-	0%	0%
Turkey	Turk Telecom	2 048	2 048	2 048	2 048	2 048	2 048	238.00	166.60	69.00	69.00	63.81	63.81	-	-	-	-	-	-	0%	-4%
United Kingdom	BT	2 200	8 192	8 192	8 192	20 480	20 480	24.99	26.99	24.99	24.99	24.46	24.99	15 000	40 000	-	-	-	-	58%	0%
United States	AT&T	3 072	3 072	3 072	3 072	3 072	3 072	36.99	24.99	24.99	30.00	30.00	35.00	-	-	-	-	-	-	0%	8%

Note: The methodology used to collect all broadband offers is available at*www.oecd.org/sti/ict/broadband.* This data collection identified one DSL/fibre offer from each country (if available) in 2005. This offer was followed over time in terms of price, speed and bit cap. the speeds on offer were no longer available the next highest available speed was used.

Source: OECD and Teligen.

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Table 7.18. **Changes in cable offerings, September 2008 to 2010**

Cable		Speed (kbit/s)						Price (local currency)						Bitcap (MB)						Compound annual growth rate (2008-2010)	
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009	2010	Speed	Price
Australia	Optus	2 880	10 240	10 240	20 480	20 480	20 000	74.95	79.95	109.99	109.99	79.99	59.99	12 000	20 000	30 000	30 000	30 000	120 000	-1%	-26%
Austria	UPC	16 384	16 384	16 384	16 384	20 480	20 480	89.00	89.00	69.00	26.90	29.90	29.90	-	-	-	-	-	-	12%	5%
Belgium	Telenet	10 240	20 480	20 480	20 480	25 600	30 720	59.95	59.95	61.32	61.32	64.32	42.91	30 000	35 000	35 000	60 000	60 000	80 000	22%	-16%
Canada	Shaw	10 240	10 240	10 240	10 240	15 360	15 360	69.95	46.95	50.95	50.95	53.95	57.00	30 000	100 000	100 000	100 000	100 000	125 000	22%	6%
Czech Republic	UPC	4 096	4 096	5 120	6 144	10 240	10 240	1 996	1 457	779	794	245	494	-	50 000	40 000	-	-	-	29%	-21%
Denmark	Telia Stofa	4 096	4 096	4 096	4 096	4 096	8 192	499	459	339	239	159	171	-	-	-	-	-	150	41%	-15%
Finland	Welho	6 000	6 000	10 240	10 240	10 240	10 240	45.00	45.00	45.00	44.90	44.90	24.90	-	-	-	-	-	-	0%	-26%
France	Noos/Numericable	10 240	20 000	30 720	30 720	102 400	102 400	34.90	34.90	19.90	21.90	21.90	39.90	-	-	-	-	-	-	83%	35%
Germany	Kabel Deutschland	6 200	2 200	6 144	6 144	6 144	6 144	29.89	29.90	19.90	19.90	19.90	19.90	-	-	-	-	-	-	0%	0%
Hungary	UPC	5 120	6 144	5 120	10 240	15 360	15 360	29 990	28 790	5 990	7 500	4 750	3 000	60 000	-	-	-	-	-	22%	-37%
Ireland	ntl / UPC Ireland	3 072	3 072	3 072	10 240	10 240	15 360	45.00	29.99	29.99	30.00	32.00	32.00	40 000	30 000	30 000	-		120 000	22%	3%
Japan	J:COM	30 720	30 720	30 720	30 720	40 960	40 960	5 775	5 775	5 775	5 775	5 775	5 775	-	-	-	-	-	-	15%	0%
Korea	C&M	5 120	10 240	10 240	102 400	102 400	102 400	27 100	34 545	28 000	27 000	27 000	27 000	-	-	-	-	-	-	0%	0%
Luxembourg	Coditel / Numericable	4 096	6 144	20 480	30 720	30 720	30 720	67.00	34.90	32.90	39.90	39.90	39.90	20 000	25 000	30 000	-	-	-	0%	0%
Mexico	Megacable	1 024	1 024	2 048	2 048	2 048	2 048	1093	345	299	299	299	399	-	-	-	-	-	-	0%	16%
Netherlands	UPC	20 480	20 480	20 480	24 576	25 600	25 600	79.95	59.95	59.95	60.00	25.00	25.00	-	-	-	-	-	-	2%	-35%
New Zealand	TelstraClear	10 240	10 240	10 240	10 240	10 240	15 360	139.95	131.90	134.90	109.95	109.95	69.95	10 000	40 000	40 000	40 000	40 000	40 000	22%	-20%
Norway	Get	26 624	26 624	26 624	26 624	26 624	25 600	998	898	699	699	699	599	-	-	-	-	-	-	-2%	-7%
Poland	UPC	12 288	12 288	20 480	20 480	30 720	51 200	299.00	299.00	249.00	149.00	90.00	100.00	-	-	-	-	-	-	58%	-18%
Portugal	Zon	8 192	8 192	12 288	18 432	20 480	20 480	61.00	49.50	35.59	35.30	35.59	46.25	8 000	30 000	30 000	-	-	-	5%	14%
Slovak Republic	UPC	3 072	4 096	4 096	10 240	10 240	10 240	79.63	47.40	36.48	21.58	16.00	16.00	-	-	-	-	-	-	0%	-14%
Spain	Ono	2 048	4 096	4 096	6 144	6 144	6 144	42.00	35.00	35.00	40.00	49.90	39.90	-	-	-	-	-	-	0%	0%
Sweden	Com Hem	8 192	8 192	8 192	10 240	10 240	10 240	389.00	299.00	319.00	299.00	279.00	279.00	-	-	-	-	-	-	0%	-3%
Switzerland	Cablecom	2 048	3 072	3 584	5 120	10 240	20 480	75.00	22.30	45.00	45.00	49.00	50.00	-	-	-	-	-	-	100%	5%
Turkey	Topaz / Turksat	2 048	2 048	2 048	2 048	2 048	5 125	220.00	289.00	209.00	59.00	54.56	69.00	-	-	-	-	-	-	58%	8%
United Kingdom	Telewest/Virgin	4 096	4 096	4 096	10 240	10 240	10 240	50.00	25.00	25.00	24.00	20.00	20.00	-	-	-	-	-	-	0%	-9%
United States	Comcast	6 144	6 144	6 144	12 288	20 480	20 480	67.95	57.95	59.95	42.95	52.95	54.95	-	-	-	-	-	-	29%	13%

Note: The methodology used to collect all broadband offers is available at *www.oecd.org/sti/ict/broadband.* This data collection identified one cable offer from each country (if available) in 2005. This offer was followed over time in terms of price, speed and bit cap. If the speeds on offer were no longer available the next highest available speed was used.

Source: OECD and Teligen.

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010**

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Australia	Bigpond/Telstra	DSL	BigPond Turbo 2 GB	1 500	256	2 000	26.15	37.37	17.43	24.91	26.15	37.37
Australia	Bigpond/Telstra	DSL	BigPond Elite 2 GB	20 000	1 000	2 000	32.69	46.73	1.63	2.34	32.69	46.73
Australia	Bigpond/Telstra	DSL	BigPond Turbo 50 GB	20 000	1 000	50 000	52.32	74.79	2.62	3.74	52.32	74.79
Australia	Bigpond/Telstra	DSL	BigPond Elite 200 GB	20 000	1 000	200 000	65.41	93.50	3.27	4.67	65.41	93.50
Australia	Bigpond/Telstra	Cable	BigPond Turbo 2 GB	8 000	128	2 000	26.15	37.37	3.27	4.67	26.15	37.37
Australia	Bigpond/Telstra	Cable	BigPond Elite 2 GB	30 000	1 000	2 000	32.69	46.73	1.09	1.56	32.69	46.73
Australia	Bigpond/Telstra	Cable	BigPond Turbo 50 GB	30 000	1 000	50 000	52.32	74.79	1.74	2.49	52.32	74.79
Australia	Bigpond/Telstra	Cable	BigPond Elite 200 GB	30 000	1 000	200 000	65.41	93.50	2.18	3.12	65.41	93.50
Australia	Optus	Cable	Naked (Standalone) Broadband 14 GB	20 000		120 000	39.26	56.12	1.96	2.81	39.26	56.12
Australia	Optus	Cable	Naked (Standalone) Broadband 30 GB	20 000		150 000	45.80	65.47	2.29	3.27	45.80	65.47
Australia	Optus	Cable	Naked (Standalone) Broadband 60 GB	20 000		170 000	52.35	74.83	2.62	3.74	52.35	74.83
Australia	Optus	Cable	30 GB Broadband + Home Phone	20 000		30 000	45.75	65.39	2.29	3.27	26.15	37.37
Australia	Internode	DSL	Home-NakedExtreme-10	24 000	1 000	10 000	32.69	46.73	1.36	1.95	32.69	46.73
Australia	Internode	DSL	Home-NakedExtreme-60	24 000	1 000	60 000	45.78	65.43	1.91	2.73	45.78	65.43
Australia	Internode	DSL	Home-NakedExtreme-100	24 000	1 000	100 000	58.87	84.14	2.45	3.51	58.87	84.14
Australia	Internode	DSL	Home-NakedExtreme-240	24 000	1 000	240 000	71.96	102.85	3.00	4.29	71.96	102.85
Australia	Internode	DSL	Home-512-Starter	512	128	5 000	26.15	37.37	52.29	74.74	26.15	37.37
Australia	Internode	DSL	Home-Standard-25	1 500	256	25 000	52.29	74.74	34.86	49.83	32.69	46.73
Australia	Internode	DSL	Home-Standard-50	1 500	256	50 000	58.84	84.10	39.22	56.06	39.23	56.08
Australia	Internode	DSL	Home-Standard-100	1 500	256	100 000	85.01	121.52	56.68	81.01	65.41	93.50
Australia	Internode	DSL	Home-UltraBundle-10	20 000	820	10 000	39.20	56.03	1.96	2.80	39.20	56.03
Australia	Internode	DSL	Home-UltraBundle-60	20 000	820	60 000	52.29	74.74	2.61	3.74	52.29	74.74
Australia	Internode	DSL	Home-UltraBundle-60	20 000	820	100 000	65.38	93.45	3.27	4.67	65.38	93.45
Australia	Internode	DSL	Home-NakedUltra-10	20 000	820	10 000	32.69	46.73	1.63	2.34	32.69	46.73
Australia	Internode	DSL	Home-NakedUltra-60	20 000	820	60 000	45.78	65.43	2.29	3.27	45.78	65.43
Australia	Internode	DSL	Home-NakedUltra-100	20 000	820	100 000	58.87	84.14	2.94	4.21	58.87	84.14
Australia	Internode	DSL	Easy Broadband	24 000	1 000	50 000	52.29	74.74	2.18	3.11	32.69	46.73
Australia	Internode	DSL	Home-Extreme-30	24 000	1 000	30 000	45.75	65.39	1.91	2.72	26.15	37.37

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Australia	Internode	DSL	Home-Fast-25	24 000	1 000	25 000	65.38	93.45	2.72	3.89	45.78	65.43
Australia	Internode	DSL	Home-Fast-50	24 000	1 000	50 000	85.01	121.52	3.54	5.06	65.41	93.50
Australia	Internode	DSL	Home-Fast-100	24 000	1 000	100 000	111.19	158.93	4.63	6.62	91.59	130.92
Australia	Internode	FTTx	Home-FibreEntry-15 (standard plan)	25 000	2 000	15 000	32.69	46.73	1.31	1.87	32.69	46.73
Australia	Internode	FTTx	Home-FibreEntry-30	25 000	2 000	30 000	39.23	56.08	1.57	2.24	39.23	56.08
Australia	Internode	FTTx	Home-FibreEntry-60	25 000	2 000	60 000	45.78	65.43	1.83	2.62	45.78	65.43
Australia	Internode	FTTx	Home-FibreEntry-100	25 000	2 000	100 000	58.87	84.14	2.35	3.37	58.87	84.14
Australia	Internode	FTTx	Home-FibreEntry-200	25 000	2 000	200 000	85.05	121.56	3.40	4.86	85.05	121.56
Australia	Internode	FTTx	Home-FibreMid-15	50 000	4 000	15 000	39.23	56.08	0.78	1.12	39.23	56.08
Australia	Internode	FTTx	Home-FibreMid-30	50 000	4 000	30 000	45.78	65.43	0.92	1.31	45.78	65.43
Australia	Internode	FTTx	Home-FibreMid-60	50 000	4 000	60 000	52.32	74.79	1.05	1.50	52.32	74.79
Australia	Internode	FTTx	Home-FibreMid-100	50 000	4 000	100 000	65.41	93.50	1.31	1.87	65.41	93.50
Australia	Internode	FTTx	Home-FibreMid-200	50 000	4 000	200 000	87.01	124.37	1.74	2.49	87.01	124.37
Australia	Internode	FTTx	Home-FibreHigh-15	100 000	8 000	15 000	52.32	74.79	0.52	0.75	52.32	74.79
Australia	Internode	FTTx	Home-FibreHigh-30	100 000	8 000	30 000	58.87	84.14	0.59	0.84	58.87	84.14
Australia	Internode	FTTx	Home-FibreHigh-60	100 000	8 000	60 000	65.41	93.50	0.65	0.93	65.41	93.50
Australia	Internode	FTTx	Home-FibreHigh-100	100 000	8 000	100 000	78.50	112.21	0.79	1.12	78.50	112.21
Australia	Internode	FTTx	Home-Fibrehigh-200	100 000	8 000	200 000	104.68	149.63	1.05	1.50	104.68	149.63
Australia				**31 642**	**2 171**	**73 435**	**55.06**	**78.70**	**6.17**	**8.82**	**51.23**	**73.22**
Austria	Telekom Austria	DSL	aonBreitband-Duo	6 000	768		23.22	26.01	3.87	4.34	23.22	26.01
Austria	Telekom Austria	DSL	aonBreitband-Duo	16 000	1 000		28.94	32.42	1.81	2.03	28.94	32.42
Austria	Telekom Austria	DSL	aonBreitband-Duo	30 000	3 000		40.61	45.49	1.35	1.52	40.61	45.49
Austria	UPC	DSL	Take it Max	20 000	1 024		29.05	32.55	1.45	1.63	29.05	32.55
Austria	UPC	DSL	Take it Easy	8 192	768		29.05	32.55	3.63	4.07	29.05	32.55
Austria	UPC	DSL	aDSL Simple	8 192	768		28.40	31.82	3.55	3.98	8.05	9.02
Austria	UPC	DSL	aDSL Simple + Speed Up	30 720	4 096		45.79	51.29	1.53	1.71	25.44	28.50
Austria	UPC	DSL	aDSL Strong	16 384	1 024		35.40	39.66	2.21	2.48	15.05	16.86
Austria	UPC	DSL	aDSL Solo	8 192	768		30.22	33.86	3.78	4.23	30.22	33.86
Austria	UPC	DSL	aDSL Solo Plus	16 384	1 024		34.89	39.08	2.18	2.44	34.89	39.08

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Austria	UPC	Cable	Fiber Power Easy	2 048	256		23.22	26.01	11.61	13.01	23.22	26.01
Austria	UPC	Cable	Fiber Power Fun	16 384	1 024		26.72	29.93	1.67	1.87	26.72	29.93
Austria	UPC	Cable	Fiber Power Classic	25 600	1 536		57.18	64.05	2.29	2.56	57.18	64.05
Austria	UPC	Cable	Fiber Power Plus	51 200	5 120		80.51	90.20	1.61	1.80	80.51	90.20
Austria	UPC	Cable	Fiber Power Ultra	102 400	10 240		86.35	96.73	0.86	0.97	86.35	96.73
Austria	Blizznet	FTTx	Blizz:flat_M	10 000	10 240		23.22	26.01	2.32	2.60	23.22	26.01
Austria	Blizznet	FTTx	Blizz:flat_L	30 000	30 720		34.89	39.08	1.16	1.30	34.89	39.08
Austria	Blizznet	FTTx	Blizz:flat_XL	50 000	51 200		46.56	52.16	0.93	1.04	46.56	52.16
Austria	Blizznet	FTTx	Blizz:flat_Xtreme	100 000	102 400		69.89	78.30	0.70	0.78	69.89	78.30
Austria				**28 826**	**11 946**		**40.74**	**45.64**	**2.55**	**2.86**	**37.53**	**42.04**
Belgium	Belgacom	DSL	Internet Start	3 000	400	15 000	35.09	41.42	11.70	13.81	20.03	23.64
Belgium	Belgacom	DSL	Internet Comfort	12 000	1 500	50 000	31.95	37.72	2.66	3.14	31.95	37.72
Belgium	Belgacom	DSL	Internet Favorite	25 000	3 500	100 000	41.07	48.48	1.64	1.94	41.07	48.48
Belgium	Belgacom	DSL	Internet Intense	30 000	4 500		53.71	63.40	1.79	2.11	53.71	63.40
Belgium	Telenet	Cable	BasicNet	4 000	256	15 000	20.93	24.71	5.23	6.18	20.93	24.71
Belgium	Telenet	Cable	ComfortNet	15 000	1 000	50 000	33.93	40.05	2.26	2.67	33.93	40.05
Belgium	Telenet	Cable	ExpressNet	30 000	1 250	80 000	47.52	56.09	1.58	1.87	47.52	56.09
Belgium	Telenet	Cable	TurboNet	30 000	1 250		67.91	80.16	2.26	2.67	67.91	80.16
Belgium	Telenet	Cable	FiberNet 50	50 000	2 500		76.41	90.20	1.53	1.80	76.41	90.20
Belgium	Telenet	Cable	FiberNet 100	100 000	5 000		109.63	129.41	1.10	1.29	109.63	129.41
Belgium	Base	DSL	home internet 1	1 000		1 000	27.69	32.68	27.69	32.68	27.69	32.68
Belgium	Base	DSL	home internet 4	4 000			33.22	39.22	8.31	9.80	33.22	39.22
Belgium	Base	DSL	home internet 12	12 000			44.30	52.29	3.69	4.36	44.30	52.29
Belgium				**24 308**	**2 116**	**44 429**	**47.95**	**56.60**	**5.50**	**6.49**	**46.79**	**55.23**
Canada	Bell Canada	DSL	Essential Plus	2 000	800	2 000	30.71	36.54	15.35	18.27	30.71	36.54
Canada	Bell Canada	DSL	Performance	6 000	1 000	25 000	39.90	47.48	6.65	7.91	39.90	47.48
Canada	Bell Canada	DSL	Fibe12	12 000	1 000	50 000	46.80	55.68	3.90	4.64	46.80	55.68
Canada	Bell Canada	DSL	Fibe12 + option 7 Mbps upload	12 000	7 000	50 000	51.40	61.15	4.28	5.10	51.40	61.15
Canada	Bell Canada	DSL	Fibe16	16 000	1 000	75 000	55.99	66.62	3.50	4.16	55.99	66.62

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Canada	Bell Canada	DSL	Fibe16 + option 7 Mbps up load	16 000	7 000	75 000	60.59	72.09	3.79	4.51	60.59	72.09
Canada	Bell Canada	DSL	Fibe25	25 000	7 000	75 000	64.27	76.46	2.57	3.06	64.27	76.46
Canada	Rogers	Cable	Ultra-lite	500	256	2 000	28.49	33.90	56.99	67.80	28.49	33.90
Canada	Rogers	Cable	Lite	3 000	256	15 000	35.85	42.65	11.95	14.22	35.85	42.65
Canada	Rogers	Cable	Express	10 000	512	60 000	45.96	54.68	4.60	5.47	45.96	54.68
Canada	Rogers	Cable	Extreme	15 000	1 000	80 000	61.59	73.28	4.11	4.89	61.59	73.28
Canada	Rogers	Cable	Extreme Plus	25 000	1 000	125 000	70.79	84.22	2.83	3.37	70.79	84.22
Canada	Rogers	Cable	Ultimate	50 000	2 000	175 000	98.37	117.04	1.97	2.34	98.37	117.04
Canada	Shaw	Cable	High-speed lite	1 000	256	13 000	28.47	33.87	28.47	33.87	28.47	33.87
Canada	Shaw	Cable	High-speed	7 500	512	75 000	39.75	47.29	5.30	6.31	39.75	47.29
Canada	Shaw	Cable	High-Speed Extreme	15 000	1 000	125 000	48.86	58.13	3.26	3.88	48.86	58.13
Canada	Shaw	Cable	Warp	50 000	3 000	250 000	97.51	116.01	1.95	2.32	97.51	116.01
Canada	Shaw	Cable	Nitro	100 000	5 000	500 000	145.81	173.48	1.46	1.73	145.81	173.48
Canada				**20 333**	**2 200**	**98 444**	**58.40**	**69.48**	**9.05**	**10.77**	**58.40**	**69.48**
Chile	Movistar	DSL	Plan Banda Ancha 2 Megas	2 000	550		49.26	37.43	24.63	18.72	49.26	37.43
Chile	Movistar	DSL	Plan Banda Ancha 4 Megas	4 000	550		50.59	38.45	12.65	9.61	50.59	38.45
Chile	Movistar	DSL	Plan Banda Ancha 6 Megas	6 000	550		53.25	40.47	8.88	6.75	53.25	40.47
Chile	Movistar	DSL	Plan Banda Ancha 10 Megas	10 000	700		61.24	46.55	6.12	4.65	61.24	46.55
Chile	VTR	Cable	Banda Ancha Mega 6	6 000	512		53.01	40.29	8.84	6.71	53.01	40.29
Chile	VTR	Cable	Banda Ancha Mega 15	15 000	1 000		63.91	48.57	4.26	3.24	63.91	48.57
Chile	VTR	Cable	Banda Ancha Mega 30	30 000	2 000		79.89	60.72	2.66	2.02	79.89	60.72
Chile	Telmex	DSL	Internet 1 Mega	1 000			34.63	26.32	34.63	26.32	34.63	26.32
Chile	Telmex	DSL	Internet 4 Mega	4 000			53.28	40.49	13.32	10.12	53.28	40.49
Chile				**8 667**	**837**		**55.45**	**42.14**	**12.89**	**9.79**	**55.45**	**42.14**
Czech Republic	O2	DSL	O2 Internet	8 000			43.55	35.71	5.44	4.46	43.55	35.71
Czech Republic	O2	DSL	O2 Internet Plus	16 000			48.65	39.89	3.04	2.49	48.65	39.89
Czech Republic	UPC	Cable	UPC Fiber Power 10	10 000	1 000		27.89	22.87	2.79	2.29	27.89	22.87
Czech Republic	UPC	Cable	UPC Fiber Power 25	25 000	1 500		33.82	27.74	1.35	1.11	33.82	27.74
Czech Republic	UPC	Cable	UPC Fiber Power 50	50 000	5 000		47.26	38.75	0.95	0.78	47.26	38.75

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Czech Republic	UPC	Cable	UPC Fiber Power 100	100 000	10 000		59.09	48.45	0.59	0.48	59.09	48.45
Czech Republic	T-Mobile	DSL	Internet ADSL	8 000	512		54.04	44.32	6.76	5.54	30.89	25.33
Czech Republic	T-Mobile	DSL	Internet ADSL	8 000	512		45.10	36.98	5.64	4.62	45.10	36.98
Czech Republic	T-Mobile	DSL	Internet ADSL	16 000	768		69.53	57.01	4.35	3.56	46.38	38.03
Czech Republic	T-Mobile	DSL	Internet ADSL	16 000	768		54.78	44.92	3.42	2.81	54.78	44.92
Czech Republic				**25 700**	**2 508**		**48.37**	**39.66**	**3.43**	**2.81**	**43.74**	**35.87**
Denmark	TDC	DSL	HomeDuo Basic	5 000	512		27.29	43.66	5.46	8.73	27.29	43.66
Denmark	TDC	DSL	HomeDuo	10 000	1 000		32.77	52.43	3.28	5.24	32.77	52.43
Denmark	TDC	DSL	HomeDuo mere upload	10 000	2 000		38.14	61.02	3.81	6.10	38.14	61.02
Denmark	TDC	DSL	HomeDuo mere download	20 000	1 000		38.14	61.02	1.91	3.05	38.14	61.02
Denmark	TDC	DSL	HomeDuo mere download og upload	20 000	2 000		43.51	69.61	2.18	3.48	43.51	69.61
Denmark	TDC	DSL	HomeDuo det hurtigste valg	50 000	5 000		54.69	87.50	1.09	1.75	54.69	87.50
Denmark	Stofa	Cable	8 Mbit./1 Mbit.	8 000	1 000		18.74	29.98	2.34	3.75	18.74	29.98
Denmark	Stofa	Cable	8 Mbit./1 Mbit. Ekstra upload 1 M	8 000	2 000		24.22	38.75	3.03	4.84	24.22	38.75
Denmark	Stofa	Cable	8 Mbit./1 Mbit. Ekstra upload 2 M	8 000	3 000		29.70	47.52	3.71	5.94	29.70	47.52
Denmark	Stofa	Cable	12 Mbit./1 Mbit.	12 000	1 000		24.66	39.45	2.06	3.29	24.66	39.45
Denmark	Stofa	Cable	12 Mbit./1 Mbit. Ekstra upload 1M	12 000	2 000		30.14	48.22	2.51	4.02	30.14	48.22
Denmark	Stofa	Cable	12 Mbit./1 Mbit. Ekstra upload 2 M	12 000	3 000		35.62	56.99	2.97	4.75	35.62	56.99
Denmark	Stofa	Cable	25 Mbit./2 Mbit.	25 000	2 000		29.59	47.34	1.18	1.89	29.59	47.34
Denmark	Stofa	Cable	25 Mbit./2 Mbit. Ekstra upload 1 M	25 000	3 000		35.07	56.11	1.40	2.24	35.07	56.11
Denmark	Stofa	Cable	25 Mbit./2 Mbit. Ekstra upload 2 M	25 000	4 000		40.55	64.88	1.62	2.60	40.55	64.88
Denmark	Stofa	Cable	50 Mbit./5 Mbit.	50 000	5 000		39.46	63.12	0.79	1.26	39.46	63.12
Denmark	Stofa	Cable	50 Mbit./5 Mbit. Ekstra upload 1 M	50 000	6 000		44.94	71.89	0.90	1.44	44.94	71.89
Denmark	Stofa	Cable	50 Mbit./5 Mbit. Ekstra upload 2 M	50 000	7 000		50.42	80.66	1.01	1.61	50.42	80.66
Denmark	Dansk Bredbånd	FTTx	Dansk bredbands fibernet 4/4 M	4 000	4 000		21.81	34.89	5.45	8.72	21.81	34.89
Denmark	Dansk Bredbånd	FTTx	Dansk bredbands fibernet 10/10 M	10 000	10 000		32.77	52.43	3.28	5.24	32.77	52.43
Denmark	Dansk Bredbånd	FTTx	Dansk bredbands fibernet 15/15 M	15 000	15 000		38.25	61.20	2.55	4.08	38.25	61.20
Denmark	Dansk Bredbånd	FTTx	Dansk bredbands fibernet 25/25 M	25 000	25 000		43.73	69.96	1.75	2.80	43.73	69.96

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Denmark	Dansk Bredbånd	FTTx	Dansk bredbands fibernet 50/50 M	50 000	50 000		54.69	87.50	1.09	1.75	54.69	87.50
Denmark	Dansk Bredbånd	FTTx	Dansk bredbands fibernet 100/100 M	100 000	100 000		109.49	175.17	1.09	1.75	109.49	175.17
Denmark				**25 167**	**10 605**		**39.10**	**62.55**	**2.35**	**3.76**	**39.10**	**62.55**
Estonia	Elion	Cable	Stardipakett	1 000	1 000		22.81	20.99	22.81	20.99	22.81	20.99
Estonia	Elion	Cable	Kodulahendus	12 000	1 000		38.93	35.81	3.24	2.98	38.93	35.81
Estonia	Elion	FTTx	hüperkiire internet	100 000	20 000		50.89	46.82	0.51	0.47	50.89	46.82
Estonia	STV	Cable	STV Mini	2 000	256		31.57	29.04	15.78	14.52	22.59	20.78
Estonia	STV	Cable	STV Kodu	3 000	256		36.10	33.21	12.03	11.07	27.12	24.95
Estonia	STV	Cable	STV Kodu X	4 000	512		40.64	37.39	10.16	9.35	31.66	29.12
Estonia	STV	Cable	STV Kodu +	5 000	512		45.17	41.56	9.03	8.31	36.19	33.30
Estonia	STV	Cable	STV Pro	6 000	512		49.71	45.73	8.28	7.62	40.73	37.47
Estonia	STV	FTTx	Saturn MINI	1 000	1 000		13.52	12.43	13.52	12.43	13.52	12.43
Estonia	STV	FTTx	Saturn Neo	5 000	5 000		18.05	16.61	3.61	3.32	18.05	16.61
Estonia	STV	FTTx	Saturn Kodu	10 000	10 000		27.12	24.95	2.71	2.50	27.12	24.95
Estonia	Starman	Cable	S pakett	1 000	256		16.24	14.94	16.24	14.94	16.24	14.94
Estonia	Starman	Cable	M pakett	4 000	1 000		24.40	22.45	6.10	5.61	24.40	22.45
Estonia	Starman	Cable	L pakett	30 000	4 000		31.66	29.12	1.06	0.97	31.66	29.12
Estonia	Starman	Cable	XL pakett	150 000	20 000		39.82	36.64	0.27	0.24	39.82	36.64
Estonia				**22 267**	**4 354**		**32.44**	**29.85**	**8.36**	**7.69**	**29.45**	**27.09**
Finland	Elisa	Cable	Laajakaista Super (Super broadband) 10 M/10 M	10 000	10 000		23.92	32.55	2.39	3.25	23.92	32.55
Finland	Elisa	Cable	Laajakaista Super (Super broadband) 50 M/10 M	50 000	10 000		34.49	46.93	0.69	0.94	34.49	46.93
Finland	Elisa	Cable	Laajakaista Super (Super broadband) 100 M/10 M	100 000	10 000		41.21	56.08	0.41	0.56	41.21	56.08
Finland	Elisa	Cable	Laajakaista Super (Super broadband) 1 M/1 M	1 000	1 000		21.21	28.86	21.21	28.86	21.21	28.86
Finland	Elisa	Cable	Laajakaista Super (Super broadband) 5 M/1 M	5 000	1 000		24.11	32.81	4.82	6.56	24.11	32.81
Finland	Elisa	Cable	Laajakaista Super (Super broadband) 10 M/1 M	10 000	1 000		31.86	43.36	3.19	4.34	31.86	43.36
Finland	Elisa	Cable	Laajakaista Super (Super broadband) 24 M/1 M	1 000	1 000		36.71	49.95	36.71	49.95	36.71	49.95

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Finland	Elisa	DSL	ADSL ja Kotikaista (ADSL and broadband) 1 M/512 kbit/s	1 000	512		25.84	35.16	25.84	35.16	25.84	35.16
Finland	Elisa	DSL	ADSL ja Kotikaista (ADSL and broadband) 2 M/512 kbit/s	2 000	512		25.84	35.16	12.92	17.58	25.84	35.16
Finland	Elisa	DSL	ADSL ja Kotikaista (ADSL and broadband) 8 M/1 M Full rate	8 000	1 000		25.84	35.16	3.23	4.40	25.84	35.16
Finland	Elisa	DSL	ADSL ja Kotikaista (ADSL and broadband) 24 M/1 M Full rate	24 000	1 000		32.56	44.31	1.36	1.85	32.56	44.31
Finland	Elisa	Cable	Laajakaista Heti (broadband immediately) 600/600 kbit/s	600	600		17.34	23.59	28.90	39.32	17.34	23.59
Finland	Elisa	Cable	Laajakaista Heti (broadband immediately) 1.2 M/600 kbit/s	1 200	600		21.21	28.86	17.68	24.05	21.21	28.86
Finland	Elisa	Cable	Laajakaista Heti (broadband immediately) 3 M/600 kbit/s	3 000	600		27.02	36.77	9.01	12.26	27.02	36.77
Finland	Elisa	Cable	Laajakaista Heti (broadband immediately) 10 M/1 M	10 000	1 000		33.80	46.00	3.38	4.60	33.80	46.00
Finland	Elisa	Cable	Laajakaista Heti (broadband immediately) 30 M/1 M	30 000	1 000		38.65	52.59	1.29	1.75	38.65	52.59
Finland	Welho	Cable	Welho XL	200 000	10 000		44.33	60.33	0.22	0.30	44.33	60.33
Finland	Welho	Cable	Welho L	110 000	5 000		37.13	50.52	0.34	0.46	37.13	50.52
Finland	Welho	Cable	Welho M	40 000	2 000		30.64	41.70	0.77	1.04	30.64	41.70
Finland	Welho	Cable	Welho S	10 000	1 000		22.72	30.92	2.27	3.09	22.72	30.92
Finland	Welho	DSL	Welho ADSL	24 000	1 000		34.49	46.93	1.44	1.96	34.49	46.93
Finland	Sonera	DSL	Sonera Laajakaista 24 Mbit/s / 1 Mbit/s	24 000	1 000		38.33	52.16	1.60	2.17	38.33	52.16
Finland	Sonera	DSL	Sonera Laajakaista 8 Mbit/s / 1 Mbit/s	8 000	1 000		28.72	39.08	3.59	4.89	28.72	39.08
Finland	Sonera	DSL	Sonera Laajakaista 2 Mbit/s / 512 Kbit/s	2 000	512		28.72	39.08	14.36	19.54	28.72	39.08
Finland	Sonera	VDSL	Sonera Laajakaista Extra	100 000	10 000		38.33	52.16	0.38	0.52	38.33	52.16
Finland	Sonera	VDSL	Sonera Laajakaista Extra	24 000	10 000		38.33	52.16	1.60	2.17	38.33	52.16
Finland	Sonera	VDSL	Sonera Laajakaista Extra	10 000	10 000		24.88	33.86	2.49	3.39	24.88	33.86
Finland				**29 956**	**3 420**		**30.68**	**41.74**	**7.48**	**10.18**	**30.68**	**41.74**
France	Orange	DSL	Net Plus sans abonnement ligne fixe	20 000	800		42.68	49.54	2.13	2.48	42.68	49.54
France	Orange	DSL	Surf Musique	20 000	800		37.05	43.01	1.85	2.15	37.05	43.01
France	Orange	DSL	Formule Plus	20 000	800		55.07	63.92	2.75	3.20	37.05	43.01
France	Orange	FTTx	La Fibre	100 000	10 000		42.68	49.54	0.43	0.50	42.68	49.54

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
France	Orange	FTTx	La Fibre Plus	100 000	10 000		47.62	55.28	0.48	0.55	47.62	55.28
France	Orange	FTTx	La Fibre + option symmetrique	100 000	100 000		65.20	75.69	0.65	0.76	65.20	75.69
France	Orange	FTTx	La Fibre Plus + option symmetrique	100 000	100 000		70.14	81.42	0.70	0.81	70.14	81.42
France	Free	DSL	Free ADSL	28 000	1 000		33.77	39.20	1.21	1.40	33.77	39.20
France	Free	FTTx	Free Fibre Optique	100 000	50 000		33.77	39.20	0.34	0.39	33.77	39.20
France	Numericable	Cable	ncBOXHD	30 000			33.67	39.08	1.12	1.30	33.67	39.08
France	Numericable	FTTx	ncBOXHDpower	100 000			43.06	49.98	0.43	0.50	43.06	49.98
France				**65 273**	**30 378**		**45.88**	**53.26**	**1.10**	**1.28**	**44.25**	**51.36**
Germany	T-Home	DSL	Call&surf Basic mit Internet-Flatrate	2 048			35.28	39.15	17.64	19.58	35.28	39.15
Germany	T-Home	DSL	Call&Surf Comfort	6 000			47.06	52.22	7.84	8.70	47.06	52.22
Germany	T-Home	VDSL	Call&Surf VDSL	25 000	5 000		52.94	58.76	2.12	2.35	52.94	58.76
Germany	T-Home	VDSL	Call&Surf VDSL+option 50	50 000	10 000		58.83	65.29	1.18	1.31	58.83	65.29
Germany	T-Home	DSL	Call&Surf Comfort Plus	16 000	1 024		52.94	58.76	3.31	3.67	52.94	58.76
Germany	Kabel Deutschland	Cable	Internetanschluss 6	6 000	460		23.44	26.01	3.91	4.34	23.44	26.01
Germany	Kabel Deutschland	Cable	Internetanschluss 32	32 000	2 000		29.33	32.55	0.92	1.02	29.33	32.55
Germany	Vodafone	DSL	Vodafone DSL Classic Paket	16 128	800		29.39	32.61	1.84	2.04	29.39	32.61
Germany	Vodafone	DSL	Vodafone DSL InternetFlat Paket	16 128	800		23.50	26.08	1.47	1.63	23.50	26.08
Germany	Vodafone	DSL	Vodafone DSLTelefonFlat Paket	1 000			29.39	32.61	29.39	32.61	29.39	32.61
Germany	Vodafone	DSL	Vodafone Surf-Sofort Classic	16 000	800		29.39	32.61	1.84	2.04	29.39	32.61
Germany				**16 937**	**2 611**		**37.41**	**41.52**	**6.49**	**7.21**	**37.41**	**41.52**
Greece	OTE	DSL	Conn-x 2 Mbps	2 000			26.13	27.43	13.07	13.71	26.13	27.43
Greece	OTE	DSL	Conn-x 24 Mbps	24 000			35.63	37.40	1.48	1.56	35.63	37.40
Greece	HOL	DSL	Hol ADSL INTERNET 6	6 000			23.34	24.50	3.89	4.08	23.34	24.50
Greece	HOL	DSL	Hol ADSL INTERNET 6	6 000			21.17	22.22	3.53	3.70	21.17	22.22
Greece	HOL	DSL	Hol ADSL INTERNET 24	24 000	1 000		26.71	28.04	1.11	1.17	26.71	28.04
Greece	HOL	DSL	Hol ADSL INTERNET 24	24 000	1 000		25.03	26.27	1.04	1.09	25.03	26.27
Greece	forthnet/Nova	DSL	forthnet ADSL economy	24 000	1 000		28.71	30.14	1.20	1.26	28.71	30.14
Greece				**15 714**	**1 000**		**26.67**	**28.00**	**3.62**	**3.80**	**26.67**	**28.00**

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Hungary	T-Home	DSL	Kezdo (DSL Kezdo)	5 000	500		28.44	21.04	5.69	4.21	28.44	21.04
Hungary	T-Home	Cable	Kezdo (Kabelnet Kezdo)	5 000	500		28.44	21.04	5.69	4.21	28.44	21.04
Hungary	T-Home	FTTx	Kezdo (Optinet Kezdo)	5 000	2 500	1 000	28.44	21.04	5.69	4.21	28.44	21.04
Hungary	T-Home	DSL	Alap (DSL Alap)	5 000	500		35.00	25.90	7.00	5.18	35.00	25.90
Hungary	T-Home	Cable	Alap (Kabelnet Alap)	5 000	500	350 000	35.00	25.90	7.00	5.18	35.00	25.90
Hungary	T-Home	FTTx	Alap (Optinet Alap)	5 000	2 500		35.00	25.90	7.00	5.18	35.00	25.90
Hungary	T-Home	DSL	Csaladi (DSL Csaladi)	15 000	900		43.12	31.91	2.87	2.13	43.12	31.91
Hungary	T-Home	Cable	Csaladi (Kabelnet Csaladi)	15 000	1 000		43.12	31.91	2.87	2.13	43.12	31.91
Hungary	T-Home	FTTx	Csaladi (Optinet Csaladi)	15 000	7 500		43.12	31.91	2.87	2.13	43.12	31.91
Hungary	T-Home	DSL	Extra (DSL Extra)	25 000	5 000		53.44	39.54	2.14	1.58	53.44	39.54
Hungary	T-Home	Cable	Extra (Kabelnet Extra)	25 000	5 000		53.44	39.54	2.14	1.58	53.44	39.54
Hungary	T-Home	FTTx	Extra (Optinet Extra)	25 000	12 500		53.44	39.54	2.14	1.58	53.44	39.54
Hungary	T-Home	Cable	Super (Kabelnet Super)	50 000	5 000	350 000	66.25	49.02	1.32	0.98	66.25	49.02
Hungary	T-Home	FTTx	Super (Optinet Super)	50 000	25 000		66.25	49.02	1.32	0.98	66.25	49.02
Hungary	T-Home	Cable	Maximum (Kabelnet Maximum)	80 000	5 000	350 000	72.50	53.65	0.91	0.67	72.50	53.65
Hungary	T-Home	FTTx	Maximum (Optinet Maximum)	80 000	5 000		72.50	53.65	0.91	0.67	72.50	53.65
Hungary	GTS-Datanet	DSL	easy_C	1 280	128		17.78	13.16	14.22	10.53	17.78	13.16
Hungary	GTS-Datanet	DSL	Beginner	1 280	128		18.75	13.87	15.00	11.10	18.75	13.87
Hungary	GTS-Datanet	DSL	Fair_C	4 480	256		25.66	18.99	5.86	4.34	25.66	18.99
Hungary	GTS-Datanet	DSL	Basic	4 480	256		26.47	19.59	6.05	4.48	26.47	19.59
Hungary	GTS-Datanet	DSL	Fair_C	5 000	500		25.75	19.05	5.15	3.81	25.75	19.05
Hungary	GTS-Datanet	DSL	Basic	5 000	500		26.56	19.66	5.31	3.93	26.56	19.66
Hungary	GTS-Datanet	DSL	easy_C2	2 560	192		21.78	16.12	8.71	6.45	21.78	16.12
Hungary	GTS-Datanet	DSL	Advanced	8 096	512		37.62	27.84	4.76	3.52	37.62	27.84
Hungary	GTS-Datanet	DSL	Advanced	10 000	500		38.41	28.42	3.84	2.84	38.41	28.42
Hungary	GTS-Datanet	DSL	YoDSL 1	1 696	256		19.30	14.28	11.65	8.62	19.30	14.28
Hungary	GTS-Datanet	DSL	YoDSL 4	4 096	256		26.69	19.75	6.67	4.94	26.69	19.75
Hungary	UPC	Cable	Internet start	2 000	500		15.62	11.56	7.81	5.78	15.62	11.56
Hungary	UPC	Cable	Fiber Power 15	15 000	1 500		18.75	13.87	1.25	0.92	18.75	13.87

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Hungary	UPC	Cable	Fiber Power 30	30 000	3 000		25.00	18.50	0.83	0.62	25.00	18.50
Hungary	UPC	Cable	Fiber Power 60	60 000	6 000		31.25	23.12	0.52	0.39	31.25	23.12
Hungary	UPC	Cable	Fiber Power 120	120 000	10 000		37.50	27.75	0.31	0.23	37.50	27.75
Hungary	UPC	DSL	ADSL start	1 024	256		18.75	13.87	18.75	13.87	18.75	13.87
Hungary	UPC	DSL	ADSL bronze	2 560	512		25.00	18.50	10.00	7.40	25.00	18.50
Hungary	UPC	DSL	ADSL silver	8 192	768		38.12	28.21	4.77	3.53	38.12	28.21
Hungary	UPC	DSL	ADSL gokl	12 288	1 536		51.87	38.39	4.32	3.20	51.87	38.39
Hungary	UPC	DSL	ADSL platinum	18 432	1 536		91.25	67.52	5.07	3.75	91.25	67.52
Hungary				**19 661**	**2 919**	**262 750**	**37.71**	**27.91**	**5.36**	**3.97**	**37.71**	**27.91**
Iceland	Siminn	DSL	Grunnáskrift	12 000	382		36.47	43.39	3.04	3.62	24.49	29.14
Iceland	Siminn	FTTx	Leið 1	12 000	640		45.10	53.67	3.76	4.47	33.12	39.41
Iceland	Siminn	FTTx	Leið 2	12 000	820	60 000	58.05	69.08	4.84	5.76	46.07	54.82
Iceland	Siminn	FTTx	Leið 3	16 000	1 024	120 000	66.69	79.36	4.17	4.96	54.71	65.10
Iceland	Vodafone	DSL	Huggulega 1GB	12 000		1 000	28.35	33.74	2.36	2.81	28.35	33.74
Iceland	Vodafone	DSL	Huggulega 10GB	12 000		10 000	36.70	43.67	3.06	3.64	36.70	43.67
Iceland	Vodafone	DSL	Flotta netið	12 000		30 000	43.46	51.72	3.62	4.31	43.46	51.72
Iceland	Vodafone	DSL	Ofurnetið 70GB	12 000		70 000	50.65	60.28	4.22	5.02	50.65	60.28
Iceland	Vodafone	DSL	Enn meira niðurhal	12 000		120 000	59.29	70.55	4.94	5.88	59.29	70.55
Iceland	Vodafone	FTTx	Huggulega netið - meiri hraði	50 000		10 000	42.09	50.09	0.84	1.00	24.75	29.45
Iceland	Vodafone	FTTx	Flotta netið - meiri hraði	50 000		30 000	49.29	58.65	0.99	1.17	31.95	38.02
Iceland	Vodafone	FTTx	Ofurnetið - meiri hraði	50 000		70 000	57.13	67.98	1.14	1.36	39.79	47.35
Iceland	Vodafone	FTTx	Enn meira niðurhal	50 000		120 000	66.56	79.20	1.33	1.58	49.22	58.57
Iceland	TAL	DSL	DSL 1G B	12 000		1 000	26.19	31.17	2.18	2.60	26.19	31.17
Iceland	TAL	DSL	DSL 10 GB	12 000		10 000	30.51	36.30	2.54	3.03	30.51	36.30
Iceland	TAL	DSL	DSL 20 GB	12 000		20 000	37.70	44.87	3.14	3.74	37.70	44.87
Iceland	TAL	DSL	DSL 60 GB	12 000		60 000	44.90	53.43	3.74	4.45	44.90	53.43
Iceland	TAL	DSL	DSL 80 GB	12 000		80 000	52.09	61.99	4.34	5.17	52.09	61.99
Iceland	TAL	DSL	DSL 120 GB	12 000		120 000	55.69	66.27	4.64	5.52	55.69	66.27
Iceland	TAL	FTTx	FTTH 10 GB net	50 000		10 000	21.51	25.60	0.43	0.51	21.51	25.60

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Iceland	TAL	FTTx	FTTH 30 GB net	50 000		30 000	28.71	34.16	0.57	0.68	28.71	34.16
Iceland	TAL	FTTx	FTTH 60 GB net	50 000	50 000	60 000	33.03	39.30	0.66	0.79	33.03	39.30
Iceland	TAL	FTTx	FTTH 80 GB net	50 000	50 000	80 000	40.22	47.86	0.80	0.96	40.22	47.86
Iceland	TAL	FTTx	FTTH 120 GB net	50 000	50 000	120 000	45.98	54.71	0.92	1.09	45.98	54.71
Iceland				**26 417**	**21 838**	**56 000**	**44.01**	**52.38**	**2.60**	**3.09**	**39.13**	**46.56**
Ireland	Eircom	DSL	Up to 1 Mb home broadband	1 000	128	10 000	43.32	57.65	43.32	57.65	18.41	24.50
Ireland	Eircom	DSL	Up to 3 Mb home broadband	3 000	384	30 000	48.23	64.19	16.08	21.40	23.32	31.04
Ireland	Eircom	DSL	Up to 7 Mb home broadband	7 000	384	50 000	57.15	76.06	8.16	10.87	32.24	42.91
Ireland	Eircom	DSL	Up to 24 Mb home broadband	24 000	768	75 000	65.92	87.72	2.75	3.65	41.00	54.57
Ireland	UPC Ireland	Cable	8 Mb Broadband Value	8 000	1 000	120 000	32.17	42.81	4.02	5.35	24.56	32.68
Ireland	UPC Ireland	Cable	15 Mb Broadband Express	15 000	1 500	120 000	39.05	51.96	2.60	3.46	31.43	41.83
Ireland	UPC Ireland	Cable	30 Mb Broadband Ultra	30 000	3 000	120 000	48.87	65.03	1.63	2.17	41.26	54.90
Ireland	Irish Broadband	DSL	Imagine up to 1 Mb	1 000	128	10 000	39.74	52.89	39.74	52.89	14.73	19.61
Ireland	Irish Broadband	DSL	Imagine up to 3 Mb	3 000	256	20 000	49.57	65.96	16.52	21.99	24.56	32.68
Ireland	Irish Broadband	DSL	Imagine up to 7 Mb	7 600	384	30 000	59.39	79.03	7.81	10.40	34.38	45.75
Ireland	Irish Broadband	FixedWireless	Breeze	4 000	4 000		53.81	71.61	13.45	17.90	53.81	71.61
Ireland				**9 418**	**1 085**	**58 500**	**48.84**	**64.99**	**14.19**	**18.88**	**30.88**	**41.10**
Israel	Bezeq	DSL	ADSL 1.5 M	1 500	150		17.58	21.62	11.72	14.42	17.58	21.62
Israel	Bezeq	DSL	ADSL 2.0 M	2 000	200		20.55	25.28	10.28	12.64	20.55	25.28
Israel	Bezeq	DSL	ADSL 2.5 M	2 500	250		21.64	26.62	8.66	10.65	21.64	26.62
Israel	Bezeq	DSL	ADSL 4.0 M	4 000	400		25.68	31.58	6.42	7.89	25.68	31.58
Israel	Bezeq	DSL	ADSL 5.0 M	5 000	500		29.33	36.07	5.87	7.21	29.33	36.07
Israel	Bezeq	DSL	ADSL 8.0 M	8 000	800		33.74	41.50	4.22	5.19	33.74	41.50
Israel	Bezeq	FTTx	NGN 10 M	10 000	800		31.96	39.30	3.20	3.93	31.96	39.30
Israel	Bezeq	FTTx	NGN 15 M	15 000	800		38.23	47.01	2.55	3.13	38.23	47.01
Israel	Bezeq	FTTx	NGN 20 M	20 000	1 000		58.07	71.42	0.00	0.00	58.07	71.42
Israel	Bezeq	FTTx	NGN 30 M	30 000	1 000		72.77	89.50	0.00	0.00	72.77	89.50
Israel	HOT	Cable	2.5 M	2 000	250		22.15	27.24	11.08	13.62	22.15	27.24
Israel	HOT	Cable	5 M	5 000	500		30.49	37.50	6.10	7.50	30.49	37.50

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Israel	HOT	Cable	12 M	12 000	1 000		38.83	47.75	3.24	3.98	38.83	47.75
Israel	HOT	Cable	100 M	100 000	2 000		204.44	251.43	2.04	2.51	204.44	251.43
Israel				**15 500**	**689**		**46.10**	**56.70**	**5.38**	**6.62**	**46.10**	**56.70**
Italy	Alice	DSL	Internet Senza Limiti	7 000	384		33.71	38.78	4.82	5.54	33.71	38.78
Italy	Alice	DSL	7 Mega	7 000	384		40.89	47.03	5.84	6.72	22.61	26.01
Italy	Alice	DSL	20 Mega	20 000	1 000		46.63	53.63	2.33	2.68	28.35	32.61
Italy	Fastweb	Cable	Joy	20 000	1 000		30.68	35.29	1.53	1.76	30.68	35.29
Italy	Fastweb	FTTx	Joy + Fibra	10 240	10 240		30.68	35.29	3.07	3.53	30.68	35.29
Italy	Fastweb	FTTx	Joy + Fibra100ready	102 400	10 240		42.05	48.37	0.42	0.48	42.05	48.37
Italy	Fastweb	Cable	NavigaCasa	20 000	1 000		34.80	40.03	1.74	2.00	34.80	40.03
Italy	Fastweb	FTTx	NavigaCasa + Fibra	10 240	10 240		34.80	40.03	3.48	4.00	34.80	40.03
Italy	Fastweb	FTTx	NavigaCasa + Fibra100ready	102 400	10 240		46.16	53.10	0.46	0.53	46.16	53.10
Italy	Tiscali	DSL	ADSL 8 Mega	8 000	512		31.95	36.75	3.99	4.59	21.72	24.99
Italy	Tiscali	DSL	ADSL 20 Mega	20 000	1 024		37.16	42.75	1.86	2.14	26.93	30.98
Italy				**29 753**	**4 206**		**37.23**	**42.82**	**2.69**	**3.09**	**32.05**	**36.86**
Japan	NTT East	DSL	フレッツADSL　モアIII(47M)	47 000	5 000		31.64	47.78	0.67	1.02	31.64	47.78
Japan	NTT East	DSL	フレッツADSL　モアI(12 M)	12 000	1 000		30.41	45.91	2.53	3.83	30.41	45.91
Japan	NTT East	DSL	フレッツADSL　8 M	8 000	1 000		29.99	45.29	3.75	5.66	29.99	45.29
Japan	NTT East	DSL	フレッツADSL　1.5 M	1 500	512		29.58	44.67	19.72	29.78	29.58	44.67
Japan	NTT East	DSL	フレッツADSL エントリー(1 M)	1 000	512		19.69	29.74	19.69	29.74	19.69	29.74
Japan	NTT East	FTTx	フレッツ光ネクスト ファミリー・ハイスピードタイプ　Family high-speed type (home)	200 000	100 000		39.14	59.10	0.20	0.30	39.14	59.10
Japan	NTT East	FTTx	フレッツ光ネクスト ファミリータイプ　Family basic type (home)	100 000			39.14	59.10	0.39	0.59	39.14	59.10
Japan	NTT East	FTTx	フレッツ光ネクスト マンション・ハイスピードタイプ　ミニ　Apartment: Mini (FTTH)	200 000	100 000		33.65	50.81	0.17	0.25	33.65	50.81

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Japan	NTT East	FTTx	フレッツ光ネクスト マンション・ハイスピード タイプ　プラン１ Apartment: Plan 1 (FTTH)	200 000	100 000		29.53	44.59	0.15	0.22	29.53	44.59
Japan	NTT East	FTTx	フレッツ光ネクスト マンション・ハイスピード タイプ　プラン２ Apartment: Plan 2 (FTTH)	200 000	100 000		26.78	40.44	0.13	0.20	26.78	40.44
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ　ミニ 光配線方式　Apartment: Mini (FTTH)	100 000			33.65	50.81	0.34	0.51	33.65	50.81
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ プラン１　光配線方式 Apartment: Plan 1 (FTTH)	100 000			29.53	44.59	0.30	0.45	29.53	44.59
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ プラン２　光配線方式 Apartment: Plan 2 (FTTH)	100 000			26.78	40.44	0.27	0.40	26.78	40.44
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ　ミニ VDSL方式　Apartment: Mini (VDSL)	100 000			29.87	45.11	0.30	0.45	29.87	45.11
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ プラン１　VDSL方式 Apartment: Plan 1 (VDSL)	100 000			25.75	38.88	0.26	0.39	25.75	38.88
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ プラン２　VDSL方式 Apartment: Plan 2 (VDSL)	100 000			23.00	34.74	0.23	0.35	23.00	34.74
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ　ミニ LAN方式　Apartment: Mini (LAN)	100 000			27.47	41.48	0.27	0.41	27.47	41.48
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ プラン１　LAN方式 Apartment: Plan 1 (LAN)	100 000			23.35	35.26	0.23	0.35	23.35	35.26

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Japan	NTT East	FTTx	フレッツ光ネクスト マンションタイプ プラン２　LAN方式 Apartment: Plan 2 (LAN)	100 000			20.60	31.11	0.21	0.31	20.60	31.11
Japan	J:COM	Cable	J:COM Net ウルトラ160M	160 000	10 000		49.44	74.66	0.31	0.47	49.44	74.66
Japan	J:COM	Cable	J:COM Net 40 M	40 000	2 000		45.32	68.44	1.13	1.71	45.32	68.44
Japan	J:COM	Cable	J:COM Net 12 M	12 000	2 000		32.80	49.52	2.73	4.13	32.80	49.52
Japan	J:COM	Cable	J:COM Net 1M	1 000	512		24.56	37.08	24.56	37.08	24.56	37.08
Japan	Yahoo! BB	FTTx	Yahoo!BB光withフレッツ マンション　VDSL方式 ミニ　Mini (Apt)	100 000	100 000		32.96	49.77	0.33	0.50	32.96	49.77
Japan	Yahoo! BB	FTTx	Yahoo!BB光withフレッツ マンション　VDSL方式 プラン1　VDSL Plan 1 (Apt)	100 000	100 000		28.84	43.55	0.29	0.44	28.84	43.55
Japan	Yahoo! BB	FTTx	Yahoo!BB光withフレッツ マンション　VDSL方式 プラン２　VDSL Plan 2 (Apt)	100 000	100 000		26.09	39.40	0.26	0.39	26.09	39.40
Japan	Yahoo! BB	FTTx	Yahoo!BB光withフレッツ マンション　光配線方式 ミニ／ミニハイパー　FTTH Mini hyper (Apt)	100 000	100 000		36.73	55.47	0.37	0.55	36.73	55.47
Japan	Yahoo! BB	FTTx	Yahoo!BB光withフレッツ マンション　光配線方式 プラン１／プラン１ハイパー　FTTH Plan 1 hyper (Apt)	100 000	100 000		32.61	49.25	0.33	0.49	32.61	49.25
Japan	Yahoo! BB	FTTx	Yahoo!BB光withフレッツ マンション　光配線方式 プラン２／プラン２ハイパー　FTTH Plan 2 hyper (Apt)	100 000	100 000		29.87	45.10	0.30	0.45	29.87	45.10
Japan	Yahoo! BB	FTTx	Yahoo!BB光withフレッツ ホーム　Yahoo BB Hikari with Flets (home)	100 000	100 000		43.95	66.36	0.44	0.66	43.95	66.36
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL 8 M	8 000	900		23.70	35.78	2.96	4.47	23.70	35.78
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL 12 M	12 000	1 000		26.99	40.76	2.25	3.40	26.99	40.76
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL 26 M	26 000	1 000		29.47	44.49	1.13	1.71	29.47	44.49
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL 50 M	50 000	3 000		30.29	45.74	0.61	0.91	30.29	45.74
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL 50 M Revo	50 000	12 500		32.76	49.47	0.66	0.99	32.76	49.47

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL Reach DSL	960	960		23.70	35.78	24.68	37.27	23.70	35.78
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL バリュープラン12 M	12 000	1 000		14.82	22.39	1.24	1.87	14.82	22.39
Japan	Yahoo! BB	DSL	Yahoo!BB ADSL バリュープラン50 M	50 000	3 000		21.11	31.88	0.42	0.64	21.11	31.88
Japan				**78 723**	**40 925**		**29.88**	**45.12**	**3.02**	**4.56**	**29.88**	**45.12**
Korea	KT	DSL	라이트(Lite)	8 000	640		37.24	29.80	4.66	3.72	37.24	29.80
Korea	KT	FTTx	라이트(Lite)	50 000	50 000		37.24	29.80	0.74	0.60	37.24	29.80
Korea	KT	VDSL	라이트(Lite)	50 000	10 000		37.24	29.80	0.74	0.60	37.24	29.80
Korea	KT	FTTx	스페셜(Special)	100 000	100 000		43.63	34.90	0.44	0.35	43.63	34.90
Korea	KT	VDSL	스페셜(Special)	100 000	100 000		43.63	34.90	0.44	0.35	43.63	34.90
Korea	KT	LAN	스페셜(Special)	100 000	100 000		43.63	34.90	0.44	0.35	43.63	34.90
Korea	SK Broadband	VDSL	스피드(Speed)	50 000	50 000		36.18	28.94	0.72	0.58	36.18	28.94
Korea	SK Broadband	FTTx	스피드(Speed)	20 000	20 000		36.18	28.94	1.81	1.45	36.18	28.94
Korea	SK Broadband	Cable	스피드(Speed)	20 000	5 000		36.18	28.94	1.81	1.45	36.18	28.94
Korea	SK Broadband	LAN	광랜 (Fiber LAN)	100 000	100 000		41.80	33.44	0.42	0.33	41.80	33.44
Korea	SK Broadband	FTTx	광랜 (Fiber LAN)	100 000	100 000		41.80	33.44	0.42	0.33	41.80	33.44
Korea	SK Broadband	VDSL	광랜 (Fiber LAN)	100 000	100 000		41.80	33.44	0.42	0.33	41.80	33.44
Korea	Tbroad	Cable	파워 프로(Power Pro)+인터넷전화(internet phone)	15 000	1 000		39.02	31.21	2.60	2.08	39.02	31.21
Korea	Tbroad	Cable	파워 프리미엄(Power Premium)+인터넷전화(internet phone)	20 000	1 000		46.11	36.89	2.31	1.84	46.11	36.89
Korea	Tbroad	Cable	파워100M(Power 100M)+인터넷전화(internet phone)	100 000	5 000		41.57	33.26	0.42	0.33	41.57	33.26
Korea	Tbroad	LAN	광랜 파워프로(Fiber LAN power pro)+인터넷전화(internet phone)	50 000	50 000		34.29	27.43	0.69	0.55	34.29	27.43
Korea	Tbroad	LAN	광랜 파워프리미엄(Fiber LAN power premium)+인터넷전화(internet phone)	100 000	100 000		35.94	28.75	0.36	0.29	35.94	28.75
Korea	Tbroad	Cable	아이디지털 (digital cable TV)+파워(Power)	10 000	1 000		51.79	41.43	5.18	4.14	51.79	41.43
Korea	Tbroad	Cable	아이디지털 프리미엄(digital cable TV)+파워(Power)	10 000	1 000		54.35	43.48	5.43	4.35	54.35	43.48

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Korea	Tbroad	Cable	아이디지털 HD 기본형(digital cable TV)+파워(Power)	10 000	1 000		53.83	43.06	5.38	4.31	53.83	43.06
Korea	Tbroad	Cable	아이디지털 HD 프리미엄(digital cable TV)+파워(Power)	10 000	1 000		56.38	45.10	5.64	4.51	56.38	45.10
Korea	Tbroad	Cable	아이디지털 (digital cable TV)+파워 프로(Power Pro)	15 000	1 000		57.26	45.80	3.82	3.05	57.26	45.80
Korea	Tbroad	Cable	아이디지털 프리미엄(digital cable TV)+파워 프로(Power Pro)	15 000	1 000		59.81	47.85	3.99	3.19	59.81	47.85
Korea	Tbroad	Cable	아이디지털 HD 기본형(digital cable TV)+파워 프로(Power Pro)	15 000	1 000		59.29	47.43	3.95	3.16	59.29	47.43
Korea	Tbroad	Cable	아이디지털 HD 프리미엄(digital cable TV)+파워 프로(Power Pro)	15 000	1 000		61.84	49.47	4.12	3.30	61.84	49.47
Korea	Tbroad	Cable	아이디지털 (digital cable TV)+파워100 M(Power 100 M)	100 000	5 000		59.71	47.77	0.60	0.48	59.71	47.77
Korea	Tbroad	Cable	아이디지털 프리미엄(digital cable TV)+파워100 M(Power 100 M)	100 000	5 000		62.27	49.81	0.62	0.50	62.27	49.81
Korea	Tbroad	Cable	아이디지털 HD 기본형(digital cable TV)+파워100 M(Power 100 M)	100 000	5 000		61.75	49.40	0.62	0.49	61.75	49.40
Korea	Tbroad	Cable	아이디지털 HD 프리미엄(digital cable TV)+파워100 M(Power 10 0M)	100 000	5 000		64.30	51.44	0.64	0.51	64.30	51.44
Korea	Tbroad	LAN	아이디지털 (digital cable TV)+광랜 파워프로(Fiber LAN power pro)	50 000	50 000		52.53	42.02	1.05	0.84	52.53	42.02
Korea	Tbroad	LAN	아이디지털 프리미엄(digital cable TV)+광랜 파워프로(Fiber LAN power pro)	50 000	50 000		55.08	44.06	1.10	0.88	55.08	44.06
Korea				**54 290**	**32 924**		**47.86**	**38.29**	**1.99**	**1.59**	**47.86**	**38.29**
Luxembourg	EPT	DSL	LuxDSL Junior	5 000	512	2 000	53.46	66.81	10.69	13.36	34.21	42.76
Luxembourg	EPT	DSL	LuxDSL Run	10 000	640	15 000	72.29	90.34	7.23	9.03	53.04	66.29
Luxembourg	EPT	DSL	LuxDSL Professional	20 000	7 689		105.76	132.17	5.29	6.61	86.51	108.12
Luxembourg	Numericable	Cable	Internet 3 Mega	3 000	256	3 000	33.37	41.70	11.12	13.90	33.37	41.70
Luxembourg	Numericable	Cable	Internet 30 Mega	30 000	1 024		46.97	58.69	1.57	1.96	46.97	58.69
Luxembourg	Visual Online	DSL	Vodsl Flat Surf	5 000	500		58.31	72.86	11.66	14.57	39.06	48.81

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Luxembourg	Visual Online	DSL	Vodsl Flat Office	10 000	640		78.60	98.22	7.86	9.82	59.35	74.17
Luxembourg	Visual Online	DSL	Vodsl Flat Premium	20 000	768		110.03	137.51	5.50	6.88	90.79	113.45
Luxembourg				**12 875**	**1 504**	**6 667**	**69.85**	**87.29**	**7.62**	**9.52**	**55.41**	**69.25**
Mexico	Telmex	DSL	Paquete conectes en Infinitum	1 000			45.83	30.25	45.83	30.25	45.83	30.25
Mexico	Telmex	DSL	Paquete acerques	2 000			70.57	46.57	35.29	23.29	70.57	46.57
Mexico	Telmex	DSL	Todo México sin Límites	5 000			117.70	77.68	23.54	15.54	117.70	77.68
Mexico	Cablevision	Cable	Access 1 000 Kbps	1 000			23.44	15.47	23.44	15.47	23.44	15.47
Mexico	Cablevision	Cable	Ultra 2 000 Kbps	2 000			35.23	23.25	17.61	11.62	35.23	23.25
Mexico	Megacable	Cable	TV conecta + Internet	512			41.12	27.14	82.23	54.27	41.12	27.14
Mexico	Megacable	Cable	TV conecta + Internet	1 500			47.01	31.02	31.34	20.68	47.01	31.02
Mexico	Megacable	Cable	TV conecta + Internet	2 000			47.01	31.02	23.50	15.51	47.01	31.02
Mexico	Megacable	Cable	TV conecta + Internet	3 000			58.79	38.80	19.60	12.93	58.79	38.80
Mexico	Megacable	Cable	TV conecta + Internet	4 000			70.57	46.57	17.64	11.64	70.57	46.57
Mexico	Megacable	Cable	TV conecta + Internet	10 000			117.70	77.68	11.77	7.77	117.70	77.68
Mexico				**2 910**			**61.36**	**40.50**	**30.16**	**19.91**	**61.36**	**40.50**
Netherlands	KPN	DSL	Internet Basis	8 000	1 000		27.46	31.05	3.43	3.88	27.46	31.05
Netherlands	KPN	DSL	Internet Extra	16 000	2 000		39.02	44.12	2.44	2.76	39.02	44.12
Netherlands	KPN	DSL	Internet Premium	40 000	3 000		56.36	63.73	1.41	1.59	56.36	63.73
Netherlands	UPC	Cable	Internet 5	5 000	512		40.81	46.14	8.16	9.23	21.39	24.18
Netherlands	UPC	Cable	Fiber Power 25	25 000	1 500		48.32	54.64	1.93	2.19	28.90	32.68
Netherlands	UPC	Cable	Fiber Power 30	30 000	3 000		54.68	61.83	1.82	2.06	35.26	39.87
Netherlands	UPC	Cable	Fiber Power 60	60 000	6 000		66.24	74.90	1.10	1.25	46.82	52.94
Netherlands	UPC	Cable	Fiber Power 90	90 000	6 000		77.80	87.97	0.86	0.98	58.38	66.01
Netherlands	UPC	Cable	Fiber Power 120	120 000	10 000		100.92	114.12	0.84	0.95	81.50	92.16
Netherlands	Ziggo	Cable	Internet Z1	5 000	500		42.08	47.58	8.42	9.52	23.06	26.08
Netherlands	Ziggo	Cable	Internet Z2	15 000	2 500		53.64	60.65	3.58	4.04	34.62	39.15
Netherlands	Ziggo	Cable	Internet Z3	50 000	5 000		74.45	84.18	1.49	1.68	55.43	62.68
Netherlands				**38 667**	**3 418**		**56.82**	**64.24**	**2.96**	**3.34**	**42.35**	**47.89**
New Zealand	Telecom	DSL	Go	24 000		3 000	55.63	66.73	2.32	2.78	30.22	36.25

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
New Zealand	Telecom	DSL	Explorer	24 000		10 000	61.68	73.98	2.57	3.08	36.27	43.51
New Zealand	Telecom	DSL	Adventure	24 000		20 000	67.73	81.24	2.82	3.39	42.32	50.76
New Zealand	Telecom	DSL	Pro	24 000		40 000	79.82	95.75	3.33	3.99	54.42	65.28
New Zealand	TelstraClear	Cable	LightSpeed 20 G	15 000	1 000	20 000	33.85	40.60	2.26	2.71	33.85	40.60
New Zealand	TelstraClear	Cable	LightSpeed 40 G	15 000	1 000	40 000	42.32	50.76	2.82	3.38	42.32	50.76
New Zealand	TelstraClear	Cable	LightSpeed 60 G	15 000	2 000	60 000	58.05	69.63	3.87	4.64	58.05	69.63
New Zealand	TelstraClear	Cable	LightSpeed 90 G	15 000	2 000	90 000	84.66	101.56	5.64	6.77	84.66	101.56
New Zealand	TelstraClear	Cable	WarpSpeed 120 G	25 000	2 000	120 000	127.01	152.36	5.08	6.09	127.01	152.36
New Zealand	Vodafone	DSL	Easy Pack	24 000	1 000	5 000	42.35	50.80	1.76	2.12	42.35	50.80
New Zealand	Vodafone	DSL	Ideal Pack	24 000	1 000	10 000	48.40	58.06	2.02	2.42	48.40	58.06
New Zealand	Vodafone	DSL	Ultimate Pack	24 000	1 000	30 000	54.45	65.31	2.27	2.72	54.45	65.31
New Zealand	Vodafone	DSL	Ideal Naked	24 000	1 000	10 000	57.77	66.44	2.41	2.77	57.77	66.44
New Zealand	Vodafone	DSL	Ultimate Nacked	24 000	1 000	30 000	51.42	61.68	2.14	2.57	51.42	61.68
New Zealand				**21 500**	**1 300**	**34 857**	**61.79**	**73.92**	**2.95**	**3.53**	**54.53**	**65.21**
Norway	Telenor	DSL	Bredbånd Basis (ADSL)	1 500	400		38.50	62.38	25.67	41.58	30.46	49.34
Norway	Telenor	DSL	Bredbånd Medium (ADSL)	5 000	500		43.60	70.63	8.72	14.13	35.55	57.59
Norway	Telenor	DSL	Bredbånd Premium (ADSL)	16 000	800		53.78	87.13	3.36	5.45	45.74	74.09
Norway	Telenor	DSL	Bredbånd Turbo (ADSL)	16 000	800		48.69	78.88	3.04	4.93	40.64	65.84
Norway	Telenor	FTTx	Bredbånd Medium (FTTH)	8 000	8 000		45.74	74.09	5.72	9.26	45.74	74.09
Norway	Telenor	FTTx	Bredbånd Premium (FTTH)	25 000	25 000		55.92	90.59	2.24	3.62	55.92	90.59
Norway	Telenor	FTTx	Bredbånd Max (FTTH)	50 000	50 000		141.59	229.37	2.83	4.59	141.59	229.37
Norway	Get	Cable	S	2 000	1 000		25.36	41.09	12.68	20.54	25.36	41.09
Norway	Get	Cable	S	2 000	2 000		30.36	49.17	15.18	24.59	30.36	49.17
Norway	Get	Cable	M	5 000	1 000		30.46	49.34	6.09	9.87	30.46	49.34
Norway	Get	Cable	M	5 000	2 000		35.45	57.43	7.09	11.49	35.45	57.43
Norway	Get	Cable	L	10 000	1 000		40.64	65.84	4.06	6.58	40.64	65.84
Norway	Get	Cable	L	10 000	4 000		45.64	73.93	4.56	7.39	45.64	73.93
Norway	Get	Cable	XL	18 000	2 000		50.83	82.34	2.82	4.57	50.83	82.34
Norway	Get	Cable	XL	18 000	4 000		55.82	90.43	3.10	5.02	55.82	90.43

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Norway	Get	Cable	Xtreme	25 000	2 000		61.02	98.84	2.44	3.95	61.02	98.84
Norway	Get	Cable	Xtreme	25 000	4 000		66.01	106.93	2.64	4.28	66.01	106.93
Norway	Get	Cable	Xtreme 50	50 000	5 000		122.14	197.85	2.44	3.96	122.14	197.85
Norway	Lyse	FTTx	Internett Familie 10/10 Mbit/s	10 000	10 000		45.74	74.09	4.57	7.41	45.74	74.09
Norway	Lyse	FTTx	Internett Ekspress 30/30 Mbit/s	30 000	30 000		71.20	115.35	2.37	3.84	71.20	115.35
Norway	Lyse	FTTx	Internett Super 50/50 Mbit/s	50 000	50 000		147.70	239.27	2.95	4.79	147.70	239.27
Norway	Lyse	FTTx	Internett 100/100 Mbit/s	100 000	100 000		202.71	328.38	2.03	3.28	202.71	328.38
Norway	Lyse	FTTx	Internett 200/200 Mbit/s	200 000	200 000		355.51	575.91	1.78	2.88	355.51	575.91
Norway	Lyse	FTTx	Internett 400/400 Mbit/s	400 000	400 000		610.17	988.45	1.53	2.47	610.17	988.45
Norway				**45 063**	**37 646**		**101.02**	**163.66**	**5.41**	**8.77**	**99.68**	**161.48**
Poland	TP	DSL	512 kb/s	512	128		34.87	25.45	69.74	50.90	21.76	15.88
Poland	TP	DSL	1 Mb/s	1 000	256		37.35	27.26	37.35	27.26	24.24	17.69
Poland	TP	DSL	2 Mb/s	2 000	256		42.43	30.97	21.22	15.48	29.33	21.41
Poland	TP	DSL	6 Mb/s	6 000	512		47.07	34.36	7.85	5.73	33.97	24.79
Poland	TP	DSL	10 Mb/s	10 000	1 000		57.24	41.78	5.72	4.18	44.14	32.21
Poland	TP	DSL	20 Mb/s	20 000	1 000		64.02	46.73	3.20	2.34	50.92	37.16
Poland	UPC	Cable	Internet Fiber Power 5	5 000	512		22.78	16.63	4.56	3.33	22.78	16.63
Poland	UPC	Cable	Internet Fiber Power 10	10 000	1 000		26.92	19.65	2.69	1.97	26.92	19.65
Poland	UPC	Cable	Internet Fiber Power 25	25 000	1 500		32.72	23.88	1.31	0.96	32.72	23.88
Poland	UPC	Cable	Internet Fiber Power 50	50 000	5 000		41.42	30.23	0.83	0.60	41.42	30.23
Poland	UPC	Cable	Internet Fiber Power 120	120 000	10 000		62.13	45.35	0.52	0.38	62.13	45.35
Poland	Dialog	DSL	DialNet Mega 1	1 000	256		20.33	14.84	40.66	29.68	20.33	14.84
Poland	Dialog	DSL	DialNet Mega 2	2 000	512		20.33	14.84	10.16	7.42	20.33	14.84
Poland	Dialog	DSL	DialNet Mega 4	4 000	512		28.92	21.11	7.23	5.28	28.92	21.11
Poland	Dialog	DSL	DialNet Mega 6	6 000	512		33.43	24.40	5.57	4.07	33.43	24.40
Poland	Dialog	DSL	DialNet Mega 10	10 000	640		37.96	27.70	3.80	2.77	37.96	27.70
Poland	Dialog	DSL	DialNet Mega 20	20 000	1 000		42.48	31.00	2.12	1.55	42.48	31.00
Poland	Dialog	DSL	DialNet Mega 50	50 000	2 000		51.51	37.60	1.03	0.75	51.51	37.60
Poland	Dialog	DSL	DialNet Mega 100	100 000	4 000		65.07	47.49	0.65	0.47	65.07	47.49

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Poland				**23 290**	**1 610**		**40.47**	**29.54**	**11.91**	**8.69**	**36.34**	**26.52**
Portugal	Portugal Telecom	DSL	Sapo ADSL 12 Mb	12 000	1 024		49.59	46.16	4.13	3.85	28.08	26.13
Portugal	Portugal Telecom	DSL	Sapo ADSL 24 Mb	24 000	1 024		56.62	52.69	2.36	2.20	35.10	32.67
Portugal	Portugal Telecom	DSL	Sapo ADSL 4 Mb	4 096	1 024		49.59	46.16	12.40	11.54	28.08	26.13
Portugal	Portugal Telecom	DSL	Sapo ADSL 8 Mb	8 124	1 024		55.39	51.55	6.98	6.50	33.87	31.52
Portugal	Portugal Telecom	DSL	Sapo ADSL 12 Mb	12 000	1 024		61.88	57.59	5.16	4.80	40.37	37.57
Portugal	Portugal Telecom	DSL	Sapo ADSL 24 Mb	24 000	1 024		70.31	65.44	2.93	2.73	48.79	45.41
Portugal	Portugal Telecom	FTTx	Sapo Fibra 30 Mb	30 000	3 000		40.37	37.57	1.35	1.25	40.37	37.57
Portugal	Portugal Telecom	FTTx	Sapo Fibra 100 Mb	100 000	10 000		52.65	49.01	0.53	0.49	52.65	49.01
Portugal	Portugal Telecom	FTTx	Sapo Fibra 200 Mb	200 000	20 000		122.88	114.37	0.61	0.57	122.88	114.37
Portugal	Portugal Telecom	DSL	Meo Total 10 (3Play)	10 000	1 024		53.88	50.15	5.39	5.02	53.88	50.15
Portugal	Portugal Telecom	DSL	Meo Surf 20 (TV+net)	20 000	1 024		54.41	50.64	2.72	2.53	54.41	50.64
Portugal	Portugal Telecom	FTTx	Meo Total 20 (3Play)	20 000	2 048		60.87	56.66	3.04	2.83	60.87	56.66
Portugal	Portugal Telecom	FTTx	Meo Total 50 (3Play)	50 000	5 000		74.07	68.94	1.48	1.38	74.07	68.94
Portugal	Portugal Telecom	FTTx	Meo Total 200 (3Play)	200 000	20 000		132.18	123.03	0.66	0.62	132.18	123.03
Portugal	Portugal Telecom	FTTx	Meo Surf 30 (TV+Net)	30 000	3 000		53.88	50.15	1.80	1.67	53.88	50.15
Portugal	Portugal Telecom	FTTx	Meo Surf 100 (TV+Net)	100 000	10 000		73.72	68.61	0.74	0.69	73.72	68.61
Portugal	Zon	Cable	Zon Net SD Net	5 000	256	10 000	35.38	32.93	7.08	6.59	35.38	32.93
Portugal	Zon	Cable	Zon Net Light Plus	10 000	512		52.65	49.01	5.27	4.90	52.65	49.01
Portugal	Zon	Cable	Zon Net Surf Plus	20 000	1 000		60.87	56.66	3.04	2.83	60.87	56.66
Portugal	Zon	Cable	Zon Fibra 30	30 000	2 000		58.42	54.37	1.95	1.81	58.42	54.37
Portugal	Zon	Cable	Zon Fibra 50	50 000	3 000		76.71	71.39	1.53	1.43	76.71	71.39
Portugal	Zon	Cable	Zon Fibra 100	100 000	6 000		88.64	82.50	0.89	0.83	88.64	82.50
Portugal	Zon	Cable	Zon Fibra 200	200 000	10 000		134.82	125.48	0.67	0.63	134.82	125.48
Portugal	Zon	FTTx	Zon Fibra 1GB	1 000 000	1 000 000		357.42	332.65	0.36	0.33	357.42	332.65
Portugal	Clix	DSL	Pack ADSL Net + Telefone Sem assinatura	24 000	1 024	60 000	26.91	25.04	1.12	1.04	26.91	25.04
Portugal	Clix	DSL	Pack ADSL Net Outras Zonas + Telefone	1 024	128	12 000	56.62	52.69	56.62	52.69	35.10	32.67
Portugal	Clix	DSL	Pack ADSL Net Outras Zonas + Telefone	8 000	512	50 000	71.94	66.95	9.07	8.44	50.42	46.93

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Portugal	Clix	DSL	Pack ADSL Net Outras Zonas + Telefone	24 000	1 024	100 000	98.06	91.27	4.09	3.80	76.54	71.24
Portugal	Clix	FTTx	Pack Fibra Net + Telefone	30 000	3 000	60 000	40.37	37.57	1.35	1.25	40.37	37.57
Portugal	Clix	FTTx	Pack Fibra Net + Telefone	100 000	10 000	200 000	53.83	50.10	0.00	0.00	53.83	50.10
Portugal	Clix	FTTx	Pack Fibra Net + Telefone	100 000	10 000	200 000	67.29	62.62	0.00	0.00	67.29	62.62
Portugal				**82 137**	**36 442**	**86 500**	**77.51**	**72.14**	**4.82**	**4.48**	**71.26**	**66.32**
Slovak Republic	T-Com	DSL	Turbo 2 Mini	2 048	256	2 000	19.34	15.67	9.67	7.84	19.34	15.67
Slovak Republic	T-Com	DSL	Turbo 2 Mini Solo + (faster upload)	2 048	512	2 000	19.34	15.67	9.67	7.84	19.34	15.67
Slovak Republic	T-Com	DSL	Turbo 2 Solo	2 048	256	120 000	27.81	22.54	13.90	11.27	27.81	22.54
Slovak Republic	T-Com	DSL	Turbo 2 Solo + (faster upload)	2 048	512	120 000	27.81	22.54	13.90	11.27	27.81	22.54
Slovak Republic	T-Com	DSL	Turbo 3 Solo	3 584	256	120 000	37.48	30.38	10.71	8.68	37.48	30.38
Slovak Republic	T-Com	DSL	Turbo 3 Solo + (faster upload)	3 584	512	120 000	37.48	30.38	10.71	8.68	37.48	30.38
Slovak Republic	T-Com	DSL	Turbo 4 Solo	12 288	512	240 000	48.37	39.20	4.03	3.27	48.37	39.20
Slovak Republic	T-Com	DSL	Turbo 2 Mini	2 048	256	2 000	14.50	11.75	7.25	5.88	14.50	11.75
Slovak Republic	T-Com	DSL	Turbo 2 Mini + (faster upload)	2 048	512	2 000	14.50	11.75	7.25	5.88	14.50	11.75
Slovak Republic	T-Com	DSL	Turbo 2	2 048	256	120 000	25.39	20.58	12.69	10.29	25.39	20.58
Slovak Republic	T-Com	DSL	Turbo 2 + (faster upload)	2 048	512	120 000	25.39	20.58	12.69	10.29	25.39	20.58
Slovak Republic	T-Com	DSL	Turbo 3	3 584	256	120 000	35.06	28.42	10.02	8.12	35.06	28.42
Slovak Republic	T-Com	DSL	Turbo 3 + (faster upload)	3 584	512	120 000	35.06	28.42	10.02	8.12	35.06	28.42
Slovak Republic	T-Com	DSL	Turbo 4	12 288	512	240 000	45.95	37.24	3.83	3.10	45.95	37.24
Slovak Republic	T-Com	FTTx	Optik 1	10 000	512	2 000	14.50	11.75	1.45	1.18	14.50	11.75
Slovak Republic	T-Com	FTTx	Optik 2	20 000	1 000	120 000	25.39	20.58	1.27	1.03	25.39	20.58
Slovak Republic	T-Com	FTTx	Optik 3	40 000	2 000	240 000	36.27	29.40	0.91	0.73	36.27	29.40
Slovak Republic	T-Com	FTTx	Optik 4	80 000	4 000	240 000	45.95	37.24	0.57	0.47	45.95	37.24
Slovak Republic	UPC	Cable	UPC Fiber Power 2	2 048	512		17.74	14.38	8.87	7.19	17.74	14.38
Slovak Republic	UPC	Cable	UPC Fiber Power 2 + (faster upload)	2 048	1 024		24.93	20.20	12.46	10.10	24.93	20.20
Slovak Republic	UPC	Cable	UPC Fiber Power 10	10 240	1 024		21.37	17.32	2.14	1.73	21.37	17.32
Slovak Republic	UPC	Cable	UPC Fiber Power 10 + (faster upload)	10 240	2 048		28.56	23.14	2.86	2.31	28.56	23.14
Slovak Republic	UPC	Cable	UPC Fiber Power 30	30 720	3 072		29.84	24.18	0.99	0.81	29.84	24.18

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Slovak Republic	UPC	Cable	UPC Fiber Power 60	60 000	6 000		38.31	31.05	0.64	0.52	38.31	31.05
Slovak Republic	UPC	Cable	UPC Fiber Power 120	120 000	10 000		50.40	40.85	0.42	0.34	50.40	40.85
Slovak Republic	Swan / Max Multimedia	FTTx	Štart 1.5/1.5 Mbit/s	1 500	1 500		15.97	12.94	10.65	8.63	15.97	12.94
Slovak Republic	Swan / Max Multimedia	FTTx	Mini 3/3 Mbit/s	3 000	3 000		20.81	16.86	6.94	5.62	20.81	16.86
Slovak Republic	Swan / Max Multimedia	FTTx	Mini 10/1 Mbit/s	10 000	1 000		20.81	16.86	2.08	1.69	20.81	16.86
Slovak Republic	Swan / Max Multimedia	FTTx	Klasik 20/1 Mbit/s	20 000	1 000		24.03	19.48	1.20	0.97	24.03	19.48
Slovak Republic	Swan / Max Multimedia	FTTx	Klasik 10/10 Mbit/s	10 000	10 000		24.03	19.48	2.40	1.95	24.03	19.48
Slovak Republic	Swan / Max Multimedia	FTTx	Plus 15/15 Mbit/s	15 000	15 000		36.94	29.93	2.46	2.00	36.94	29.93
Slovak Republic	Swan / Max Multimedia	FTTx	Plus 40/40 Mbit/s	40 000	40 000		36.94	29.93	0.92	0.75	36.94	29.93
Slovak Republic	Swan / Max Multimedia	FTTx	Plus 40/2 Mbit/s	40 000	2 000		36.94	29.93	0.92	0.75	36.94	29.93
Slovak Republic	Swan / Max Multimedia	FTTx	Premium 30/30 Mbit/s	30 000	30 000		48.23	39.08	1.61	1.30	48.23	39.08
Slovak Republic	Swan / Max Multimedia	FTTx	Premium 80/4 Mbit/s	80 000	4 000		48.23	39.08	0.60	0.49	48.23	39.08
Slovak Republic	Swan / Max Multimedia	FTTx	Max Giga 1/1 Gbit/s	1 000 000	1 000 000		575.81	466.67	0.58	0.47	575.81	466.67
Slovak Republic				**46 947**	**31 787**	**113 889**	**45.43**	**36.82**	**5.54**	**4.49**	**45.43**	**36.82**
Slovenia	Telekom Slovenije	ADSL	SiOL Začetek 1 M / 256 kbit/s	1 000	256		32.49	32.19	32.49	32.19	32.49	32.19
Slovenia	Telekom Slovenije	VDSL	SiOL Začetek 1 M / 1 M	1 000	1 000		32.49	32.19	32.49	32.19	32.49	32.19
Slovenia	Telekom Slovenije	FTTx	SiOL Začetek 20 M / 20 M	20 000	20 000		41.72	41.34	2.09	2.07	41.72	41.34
Slovenia	Telekom Slovenije	ADSL	SiOL Začetek 2 M / 384 kbit/s	2 000	384		42.22	41.83	21.11	20.92	42.22	41.83
Slovenia	Telekom Slovenije	DSL	SiOL Začetek 4 M / 512 kbit/s	4 000	512		50.13	49.67	12.53	12.42	50.13	49.67
Slovenia	Telekom Slovenije	DSL	SiOL Začetek 10 M / 768 kbit/s	10 000	768		58.05	57.52	5.80	5.75	58.05	57.52
Slovenia	Telekom Slovenije	VDSL	SiOL Začetek 5 M / 5 M	5 000	5 000		47.49	47.06	9.50	9.41	47.49	47.06
Slovenia	Telekom Slovenije	VDSL	SiOL Začetek 10M / 10M	10 000	10 000		87.07	86.27	8.71	8.63	87.07	86.27
Slovenia	Telekom Slovenije	FTTx	SiOL Začetek 60 M / 60 M	60 000	60 000		105.54	104.58	1.76	1.74	105.54	104.58
Slovenia	Telekom Slovenije	FTTx	SiOL Začetek 100 M / 100 M	100 000	100 000		184.70	183.01	1.85	1.83	184.70	183.01
Slovenia	Amis	DSL	Amis DSL Omrezje Amis Enka Maxi	10 000	768		30.21	29.93	3.02	2.99	30.21	29.93

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Slovenia	Amis	DSL	Amis DSL Omrezje Amis Enka Classic	4 000	512		31.66	31.37	7.92	7.84	31.66	31.37
Slovenia	Amis	DSL	Amis DSL Omrezje Amis Enka Mini	1 000	256		29.02	28.76	29.02	28.76	29.02	28.76
Slovenia	Amis	FTTx	Amis Optika 15/15	15 000	15 000		21.46	21.27	1.43	1.42	21.46	21.27
Slovenia	Amis	FTTx	Amis Optika 20/20	20 000	20 000		26.39	26.14	1.32	1.31	26.39	26.14
Slovenia	Amis	FTTx	Amis Optika 25/25	25 000	25 000		32.98	32.68	1.32	1.31	32.98	32.68
Slovenia	Amis	FTTx	Amis Optika 50/50	50 000	50 000		63.32	62.75	1.27	1.25	63.32	62.75
Slovenia	Amis	Cable	Kabelski dostop K1	1 024	256		21.46	21.27	21.46	21.27	21.46	21.27
Slovenia	Amis	Cable	Kabelski dostop K2	1 536	256		24.78	24.55	16.52	16.37	24.78	24.55
Slovenia	Amis	Cable	Kabelski dostop K3	2 048	384		25.42	25.19	12.71	12.59	25.42	25.19
Slovenia	Amis	Cable	Kabelski dostop K4	4 096	512		29.38	29.11	7.34	7.28	29.38	29.11
Slovenia	Amis	Cable	Kabelski dostop K5	4 096	768		25.07	24.84	6.27	6.21	25.07	24.84
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 10M/10M	10 000	10 000		25.07	24.84	2.51	2.48	25.07	24.84
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 100M/10M	100 000	10 000		32.98	32.68	0.33	0.33	32.98	32.68
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 20M/20M	20 000	20 000		36.94	36.60	1.85	1.83	36.94	36.60
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 50M/50M	50 000	50 000		51.45	50.98	1.03	1.02	51.45	50.98
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 100M/100M	100 000	100 000		64.64	64.05	0.65	0.64	64.64	64.05
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 200M/200M	200 000	200 000		263.85	261.44	1.32	1.31	263.85	261.44
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 300M/300M	300 000	300 000		395.78	392.16	1.32	1.31	395.78	392.16
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 500M/500M	500 000	500 000		659.63	653.59	1.32	1.31	659.63	653.59
Slovenia	T-2	FTTx	Dostop prek optike (FTTH) 1G/1G	1 000 000	1 000 000		1319.26	1307.19	1.32	1.31	1319.26	1307.19
Slovenia	T-2	VDSL	Dostop prek VDSL 1M/256kbps	1 000	256		29.02	28.76	29.02	28.76	21.11	20.92
Slovenia	T-2	VDSL	Dostop prek VDSL 1 M / 1 M	1 000	1 000		31.66	31.37	31.66	31.37	23.75	23.53
Slovenia	T-2	VDSL	Dostop prek VDSL 2 M / 2 M	2 000	2 000		38.26	37.91	19.13	18.95	30.34	30.07
Slovenia	T-2	VDSL	Dostop prek VDSL 4 M / 512 kbps	4 000	512		34.30	33.99	8.58	8.50	26.39	26.14
Slovenia	T-2	VDSL	Dostop prek VDSL 4 M /1 M	4 000	1 000		35.62	35.29	8.91	8.82	27.70	27.45
Slovenia	T-2	VDSL	Dostop prek VDSL 8 M / 1 M	8 000	1 000		36.94	36.60	4.62	4.58	29.02	28.76

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Slovenia	T-2	VDSL	Dostop prek VDSL 5 M/ 5 M	5 000	5 000		48.81	48.37	9.76	9.67	40.90	40.52
Slovenia	T-2	VDSL	Dostop prek VDSL 10 M / 1 M	10 000	1 000		38.26	37.91	3.83	3.79	30.34	30.07
Slovenia	T-2	VDSL	Dostop prek VDSL 10 M / 2 M	10 000	2 000		40.90	40.52	4.09	4.05	32.98	32.68
Slovenia	T-2	VDSL	Dostop prek VDSL 10 M / 4 M	10 000	4 000		43.54	43.14	4.35	4.31	35.62	35.29
Slovenia	T-2	VDSL	Dostop prek VDSL 10 M / 10 M	10 000	10 000		77.84	77.12	7.78	7.71	69.92	69.28
Slovenia	T-2	VDSL	Dostop prek VDSL 20 M / 1 M	20 000	1 000		46.17	45.75	2.31	2.29	38.26	37.91
Slovenia	T-2	VDSL	Dostop prek VDSL 20 M / 4 M	20 000	4 000		48.81	48.37	2.44	2.42	40.90	40.52
Slovenia	T-2	VDSL	Dostop prek VDSL 20 M / 10 M	20 000	10 000		80.47	79.74	4.02	3.99	72.56	71.90
Slovenia	T-2	VDSL	Dostop prek VDSL 40 M / 8 M	40 000	8 000		80.47	79.74	2.01	1.99	72.56	71.90
Slovenia	T-2	VDSL	Dostop prek VDSL 40 M / 15 M	40 000	15 000		91.03	90.20	2.28	2.25	83.11	82.35
Slovenia	T-2	VDSL	Dostop prek VDSL 60 M / 25 M	60 000	25 000		104.22	103.27	1.74	1.72	96.31	95.42
Slovenia				**60 329**	**54 008**		**99.98**	**99.06**	**8.25**	**8.18**	**97.18**	**96.29**
Spain	Telefonica	DSL	Movistar kit ADSL 10 Mb	10 000	800		65.99	67.28	6.60	6.73	44.86	45.73
Spain	Telefonica	DSL	Movistar kit ADSL 6 Mb	6 000	640		65.23	66.51	10.87	11.09	44.10	44.96
Spain	Telefonica	DSL	Movistar kit ADSL 1 Mb	1 000	256	20 000	66.37	67.67	66.37	67.67	45.23	46.12
Spain	Telefonica	DSL	Movistar kit ADSL Mini	1 000	320	2 000	51.24	52.24	51.24	52.24	30.11	30.70
Spain	Telefonica	DSL	Movistar ADSL Libre 3 Mb	3 000	320		44.48	45.35	14.83	15.12	44.48	45.35
Spain	Telefonica	DSL	Movistar Linea Internet 25 Mb	25 000	1 000		77.71	79.24	3.11	3.17	56.58	57.69
Spain	Ono	Cable	Teléfono + Internet 6 Mb	6 000	300		52.80	53.83	8.80	8.97	52.80	53.83
Spain	Ono	Cable	Teléfono + Internet 12 Mb	12 000	500		67.93	69.26	5.66	5.77	67.93	69.26
Spain	Ono	Cable	Teléfono + Internet 30 Mb	30 000	1 000		83.05	84.68	2.77	2.82	83.05	84.68
Spain	Ono	Cable	Teléfono + Internet 50 Mb	50 000	3 000		83.05	84.68	1.66	1.69	83.05	84.68
Spain	Orange	DSL	ADSL TDI	20 000	1 000		49.47	50.44	2.47	2.52	28.29	28.84
Spain	Orange	DSL	ADSL 6Mb + llamadas nacionales	6 000	512		56.05	57.15	9.34	9.53	34.92	35.60
Spain				**14 167**	**804**	**11 000**	**63.61**	**64.86**	**15.31**	**15.61**	**51.28**	**52.29**
Sweden	Telia	DSL	0 20-0 25 Mbit/s	256	128		34.11	45.02	136.42	180.07	24.56	32.42
Sweden	Telia	FTTx	0 20-0 25 Mbit/s	256	256		34.11	45.02	136.42	180.07	24.56	32.42
Sweden	Telia	DSL	1 5-2 Mbit/s	2 000	400		34.96	46.15	17.48	23.07	25.42	33.55
Sweden	Telia	DSL	6-8 Mbit/s	8 000	800		41.08	54.22	5.13	6.78	31.53	41.62

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Sweden	Telia	FTTx	80-10 Mbit/s	10 000	10 000		40.72	53.75	4.07	5.37	31.17	41.15
Sweden	Telia	DSL	12-24 Mbit/s	24 000	2 500		46.44	61.30	1.93	2.55	36.89	48.70
Sweden	Telia	FTTx	50/8-100/10 Mbit/s	100 000	10 000		44.83	59.17	0.45	0.59	35.29	46.57
Sweden	Telia	FTTx	50-100 Mbit/s	100 000	100 000		71.55	94.45	0.72	0.94	62.01	81.85
Sweden	Telia	FTTx	500-1 000/100 Mbit/s	1 000 000	100 000		116.69	154.02	0.12	0.15	107.14	141.42
Sweden	Com Hem AB	Cable	Bredband Small 5	5 000	1 000		21.34	28.17	4.27	5.63	21.34	28.17
Sweden	Com Hem AB	Cable	Bredband Medium 10	10 000	1 000		27.78	36.66	2.78	3.67	27.78	36.66
Sweden	Com Hem AB	Cable	Bredband Large 25	25 000	1 000		29.39	38.79	1.18	1.55	29.39	38.79
Sweden	Com Hem AB	Cable	Bredband XXL 100	100 000	10 000		37.43	49.41	0.37	0.49	37.43	49.41
Sweden	Bredbandsbolaget	FTTx	Bredband 2	2 000	2 500		24.56	32.42	12.28	16.21	24.56	32.42
Sweden	Bredbandsbolaget	DSL	Bredband 2	6 000	1 000		26.71	35.25	4.45	5.87	26.71	35.25
Sweden	Bredbandsbolaget	DSL	Bredband 8	12 000	2 000		34.21	45.16	2.85	3.76	34.21	45.16
Sweden	Bredbandsbolaget	DSL	Bredband 24	24 000	3 000		32.07	42.33	1.34	1.76	32.07	42.33
Sweden	Bredbandsbolaget	DSL	Bredband 60	60 000	20 000		34.75	45.87	0.58	0.76	34.75	45.87
Sweden	Bredbandsbolaget	FTTx	Bredband 100	100 000	10 000		30.51	40.27	0.31	0.40	30.51	40.27
Sweden				**83 606**	**14 504**		**40.17**	**53.02**	**17.53**	**23.14**	**35.65**	**47.05**
Switzerland	Swisscom	DSL	DSL mini	1 000	100		34.37	59.13	34.37	59.13	19.72	33.93
Switzerland	Swisscom	DSL	DSL standard	5 000	500		43.07	74.10	8.61	14.82	28.42	48.90
Switzerland	Swisscom	DSL	Infinity	20 000	1 000		54.67	94.06	2.73	4.70	40.02	68.86
Switzerland	Cablecom	Cable	hispeed 500	500	100		26.07	44.86	52.15	89.72	2.90	4.99
Switzerland	Cablecom	Cable	hispeed 2000	2 000	200		34.19	58.83	17.10	29.42	19.72	33.93
Switzerland	Cablecom	Cable	Fiber Power internet 20	20 000	2 000		43.47	74.80	2.17	3.74	29.00	49.90
Switzerland	Cablecom	Cable	Fiber Power internet 50	50 000	5 000		49.27	84.78	0.99	1.70	34.80	59.88
Switzerland	Cablecom	Cable	Fiber Power internet 100	100 000	7 000		63.78	109.73	0.64	1.10	49.30	84.83
Switzerland	Sunrise	DSL	Sunrise click&call 5 000+	5 000	500		34.22	58.88	6.84	11.78	34.22	58.88
Switzerland	Sunrise	DSL	Sunrise click&call 15 000+	15 000	1 000		45.82	78.84	3.05	5.26	45.82	78.84
Switzerland	Sunrise	DSL	Sunrise click&call relax+	15 000	1 000		66.71	114.77	4.45	7.65	66.71	114.77
Switzerland	Sunrise	DSL	Sunrise click 10 000+	10 000	1 000		40.02	68.86	4.00	6.89	40.02	68.86
Switzerland				**20 292**	**1 617**		**44.64**	**76.80**	**11.43**	**19.66**	**34.22**	**58.88**

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Turkey	Superonline	DSL	1 Mbps Limitsiz	1 000	250	15 000	44.70	39.78	44.70	39.78	33.53	29.85
Turkey	Superonline	DSL	2 Mbps Limitsiz	2 000	512	15 000	58.76	52.30	29.38	26.15	47.60	42.36
Turkey	Superonline	DSL	4 Mbps Limitsiz	4 000	1 000	15 000	72.84	64.83	18.21	16.21	61.67	54.89
Turkey	Superonline	DSL	8 Mbps Limitsiz	8 000	1 000	15 000	84.77	75.45	10.60	9.43	73.61	65.52
Turkey	Superonline	DSL	8 Mbps'e kadar 4 GB	8 000	1 000	4 000	31.69	28.20	3.96	3.53	20.52	18.26
Turkey	Superonline	DSL	8 Mbps'e kadar 6 GB	8 000	1 000	6 000	38.27	34.07	4.78	4.26	27.11	24.13
Turkey	Superonline	DSL	8 Mbps'e kadar Limitsiz	8 000	1 000	15 000	44.86	39.93	5.61	4.99	33.70	29.99
Turkey	Superonline	FTTx	Hızlı 10 Mbps 4GB	10 000	1 000	4 000	20.64	18.38	2.06	1.84	20.64	18.38
Turkey	Superonline	FTTx	Hızlı 10 Mbps Limitsiz	10 000	1 000	50 000	34.45	30.66	3.44	3.07	34.45	30.66
Turkey	Superonline	FTTx	Daha Hızlı 20 Mbps 8 GB	20 000	5 000	8 000	27.55	24.52	1.38	1.23	27.55	24.52
Turkey	Superonline	FTTx	Daha Hızlı 20 Mbps Limitsiz	20 000	5 000	100 000	48.25	42.95	2.41	2.15	48.25	42.95
Turkey	Superonline	FTTx	Çok Hızlı 50 Mbps 12 GB	50 000	5 000	12 000	41.35	36.81	0.84	0.75	41.35	36.81
Turkey	Superonline	FTTx	Çok Hızlı 50 Mbps Limitsiz	50 000	5 000	250 000	68.96	61.38	1.40	1.25	68.96	61.38
Turkey	Superonline	FTTx	En Hızlı 100 Mbps 16 GB	100 000	5 000	16 000	62.06	55.24	0.62	0.55	62.06	55.24
Turkey	Superonline	FTTx	En Hızlı 100 Mbps Limitsiz	100 000	5 000	500 000	137.99	122.82	1.38	1.23	137.99	122.82
Turkey	Turk Telekom / TTNet	DSL	NET4	8 000	1 000	4 000	21.84	19.44	2.73	2.43	21.84	19.44
Turkey	Turk Telekom / TTNet	DSL	NET4 (Plus)*	8 000	1 000	4 000	23.34	20.78	2.92	2.60	23.34	20.78
Turkey	Turk Telekom / TTNet	DSL	NET6	8 000	1 000	6 000	29.37	26.14	3.67	3.27	29.37	26.14
Turkey	Turk Telekom / TTNet	DSL	NETLİMİTSİZ	8 000	1 000	15 000	36.90	32.84	4.61	4.11	36.90	32.84
Turkey	Turk Telekom / TTNet	DSL	1LİMİTSİZ	1 024	250		34.12	30.37	34.12	30.37	34.12	30.37
Turkey	Turk Telekom / TTNet	DSL	2LİMİTSİZ	2 048	500		48.05	42.77	24.02	21.38	48.05	42.77
Turkey	Turk Telekom / TTNet	DSL	4LİMİTSİZ	4 096	1 000		61.99	55.17	15.50	13.79	61.99	55.17
Turkey	Turk Telekom / TTNet	DSL	8LİMİTSİZ	8 192	1 000		74.55	66.35	9.32	8.29	74.55	66.35
Turkey	Turk Telekom / TTNet	VDSL	16 Mbps	16 000	2 000		82.86	73.75	5.18	4.61	82.86	73.75
Turkey	Turk Telekom / TTNet	VDSL	32 Mbps	32 000	2 000		103.77	92.36	3.46	3.08	103.77	92.36
Turkey	Turksat/Uydunet	Cable	1 Mbps'e kadar limitli	1 024		1 000	14.31	12.73	14.31	12.73	9.04	8.04

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
Turkey	Turksat/Uydunet	Cable	5 Mbps'e kadar limitli	5 120		1 000	0.00	0.00	0.00	0.00	12.05	10.72
Turkey	Turksat/Uydunet	Cable	10 Mbps'e kadar limitli	10 240		1 000	20.33	18.10	2.03	1.81	15.06	13.40
Turkey	Turksat/Uydunet	Cable	1 Mbps'e kadar sınırsız	1 024			27.11	24.13	27.11	24.13	21.84	19.44
Turkey	Turksat/Uydunet	Cable	5 Mbps'e kadar sınırsız	5 120			57.23	50.94	11.45	10.19	51.96	46.25
Turkey	Turksat/Uydunet	Cable	10 Mbps'e kadar sınırsız	10 240			79.82	71.05	7.98	7.10	74.55	66.35
Turkey	Turksat/Uydunet	Cable	15 Mbps'e kadar son sürat	15 360			117.47	104.56	7.83	6.97	112.20	99.87
Turkey	Turksat/Uydunet	Cable	20 Mbps'e kadar son sürat	20 480			155.12	138.07	7.76	6.90	149.85	133.38
Turkey				**17 060**	**1 940**	**48 045**	**54.71**	**48.69**	**9.54**	**8.49**	**51.58**	**45.91**
United Kingdom	BT	DSL	Option 1	20 000		10 000	38.14	39.69	1.91	1.98	23.94	24.91
United Kingdom	BT	DSL	Option 2	20 000		40 000	45.63	47.48	2.28	2.37	31.42	32.69
United Kingdom	BT	DSL	Unlimited (Option 3)	20 000			51.62	53.71	2.58	2.69	37.41	38.93
United Kingdom	BT	VDSL	BT Infinity Option 1	40 000	2 000	40 000	44.13	45.92	1.10	1.15	29.93	31.14
United Kingdom	BT	VDSL	BT Infinity Option 2	40 000	10 000		51.62	53.71	1.29	1.34	37.41	38.93
United Kingdom	Sky	DSL	Sky Broadband Unlimited with Sky Talk	20 000	1 300	40 000	31.44	32.71	1.57	1.64	14.97	15.58
United Kingdom	Sky	DSL	Sky Broadband Unlimited without Sky Talk	20 000	1 300	40 000	22.46	23.36	1.12	1.17	22.46	23.36
United Kingdom	Virgin	Cable	L	10 000	512		29.00	30.18	2.90	3.02	29.00	30.18
United Kingdom	Virgin	Cable	XL	20 000	768		43.04	44.78	2.15	2.24	43.04	44.78
United Kingdom	Virgin	Cable	XXL	50 000	1 500		55.95	58.22	1.12	1.16	55.95	58.22
United Kingdom				**26 000**	**2 483**	**34 000**	**41.30**	**42.98**	**1.80**	**1.88**	**32.55**	**33.87**
United States	Comcast	Cable	Performance	15 000	3 000		39.46	39.46	2.63	2.63	39.46	39.46
United States	Comcast	Cable	Economy Internet Service	1 500	384		26.95	26.95	17.97	17.97	26.95	26.95
United States	Comcast	Cable	Blast	20 000	4 000		54.95	54.95	2.75	2.75	54.95	54.95
United States	Comcast	Cable	Ultra	30 000	7 000		62.95	62.95	2.10	2.10	62.95	62.95
United States	Comcast	Cable	Extreme 50	50 000	10 000		99.95	99.95	2.00	2.00	99.95	99.95
United States	Verizon	DSL	Fast (DSL)	1 000	384		29.99	29.99	29.99	29.99	29.99	29.99
United States	Verizon	DSL	Faster (DSL)	3 000	768		34.99	34.99	11.66	11.66	34.99	34.99
United States	Verizon	DSL	Fastest (DSL)	7 100	768		38.99	38.99	5.57	5.57	38.99	38.99
United States	Verizon	DSL	Ultimate	15 000	768		54.99	54.99	3.67	3.67	54.99	54.99

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Table 7.19. **Broadband pricing for residential users in the OECD area, September 2010** *(cont.)*

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	USD price (monthly) PPP	USD price (monthly)	P Mbit/s USD PPP	P Mbit/s USD	USD price (monthly) PPP, no line	USD price (monthly), no line charge
United States	Verizon	FTTx	Fast (FiOS)	15 000	5 000		52.70	52.70	3.51	3.51	52.70	52.70
United States	Verizon	FTTx	Faster (FiOS	25 000	15 000		67.07	67.07	2.68	2.68	67.07	67.07
United States	Verizon	FTTx	Fastest (FiOS)	50 000	20 000		144.95	144.95	2.90	2.90	144.95	144.95
United States	AT&T	VDSL	Pro U-Verse	3 000	1 000		27.50	27.50	9.17	9.17	27.50	27.50
United States	AT&T	VDSL	Elite U-Verse	6 000	1 000		32.50	32.50	5.42	5.42	32.50	32.50
United States	AT&T	VDSL	Max U-Verse	12 000	1 500		37.50	37.50	3.13	3.13	37.50	37.50
United States	AT&T	VDSL	Max Plus U-Verse	18 000	1 500		47.50	47.50	3.96	3.96	47.50	47.50
United States	AT&T	VDSL	Max Turbo U-Verse	24 000	3 000		57.50	57.50	2.40	2.40	57.50	57.50
United States	AT&T	DSL	DSL Direct Basic	768	384		24.95	24.95	16.63	16.63	24.95	24.95
United States	AT&T	DSL	DSL Direct Express	1 500	384		27.48	27.48	9.16	9.16	27.48	27.48
United States	AT&T	DSL	DSL Direct Pro	3 000	512		29.98	29.98	19.98	19.98	29.98	29.98
United States	AT&T	DSL	DSL Direct Elite	6 000	768		32.48	32.48	5.41	5.41	32.48	32.48
United States				**14 613**	**3 672**		**48.82**	**48.82**	**7.75**	**7.75**	**48.82**	**48.82**

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OECD Communications Outlook 2011

Chapter 8

Recent Developments in Household and Individual Communication Expenditures and Use

This chapter explores the evolution of household expenditure with regard to ICT goods and services. Specifically, it looks at one of the most striking phenomena of the last decade: the rise of mobile communications in telecommunication services expenditure. This dimension of expenditure mirrors the massive diffusion and uptake of mobile wireless services – and the variety of services on offer is increasing. SMS was an early addition to mobile telephony and its growth is now being replicated by the use of data services. Undoubtedly, the development of new technologies, services and lower prices, all driven by competition, has played a part in the increased use of communication services by households.

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.

Introduction

Information and communication technologies (ICTs) have become an increasing part of everyday life. All manner of communication and computing devices, along with the Internet and broadband, have reached a high level of diffusion in the majority of OECD countries. Overall ICT expenditures have been the most dynamic component of household expenditure in recent years. While these data allow for only a limited breakdown for components directly attributable to communications, it is clear that the latter have been an important driver of this growth.

This chapter explores the evolution of household expenditure with regard to ICT goods and services. Specifically, it looks at one of the most striking phenomena of the last decade: the rise of mobile communications in telecommunication services expenditure. This dimension of expenditure mirrors the massive diffusion and uptake of mobile wireless services – and the variety of services on offer is increasing. SMS was an early addition to mobile telephony and its growth is now being replicated by the use of data services. Undoubtedly, the development of new technologies, services and lower prices, all driven by competition, has played a part in the increased use of communication services by households.

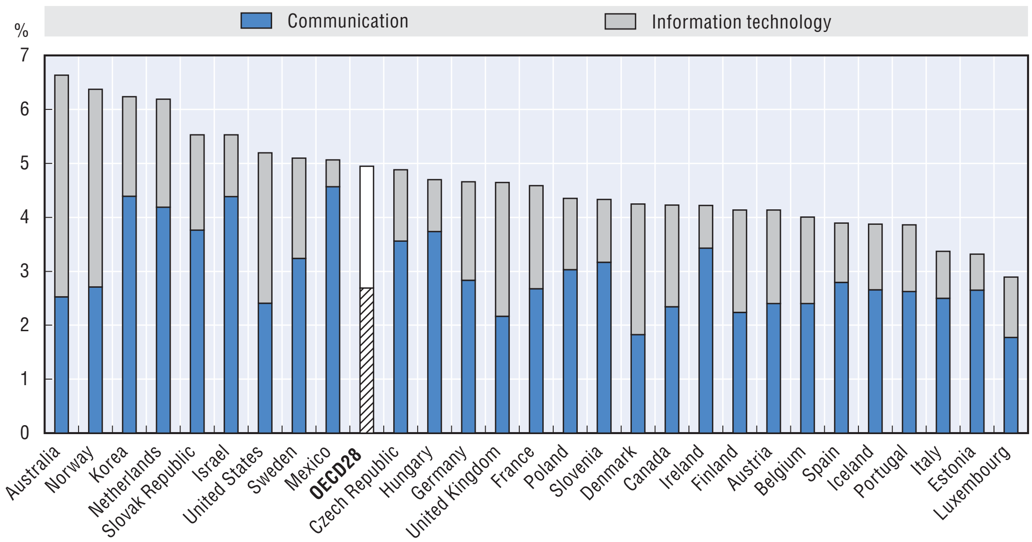
ICT household expenditures in OECD countries

In 2009, the amount of household final consumption expenditures devoted to ICT goods and services reached USD PPP 1003 billion in 28 OECD countries, or around 4.9% of total final consumption expenditures (Figure 8.1). Communication's share within ICT expenditures was dominant in most countries, reaching 75% and above in Estonia, Hungary, Ireland, Israel and Mexico. The only exceptions to this general pattern were Australia, Denmark, Norway, the United Kingdom and the United States, where expenditure in information technology (IT) goods and services exceeded those for communication.

Households in OECD countries have widely different propensities to allocate expenditures to communications, relative to their total expenditures. In 2009, the share of expenditures devoted to communications by Mexican households relative to their total expenditures was 1.7 times higher than the OECD average. In contrast, this share was 0.65 of the OECD average in Luxembourg (Figure 8.2). Various factors can affect the propensity to spend relatively more on communication compared to other types of expenditures, in particular level of income, availability of infrastructures, penetration of services, ICT penetration rate and level of communication prices.

Figure 8.1. **Share of households' ICT expenditures[1] in OECD countries, 2009**

Percentage of final consumption expenditure of households on the territory



1. Based on National Accounts using COICOP classifications. Information technology includes audiovisual, photographic and information processing equipment. Communication includes telecommunication equipment and services and postal services. (See Boxes 8.1 and 8.2 for definitions.)

Source: OECD, based on data from the *National Accounts Database*, March 2011.

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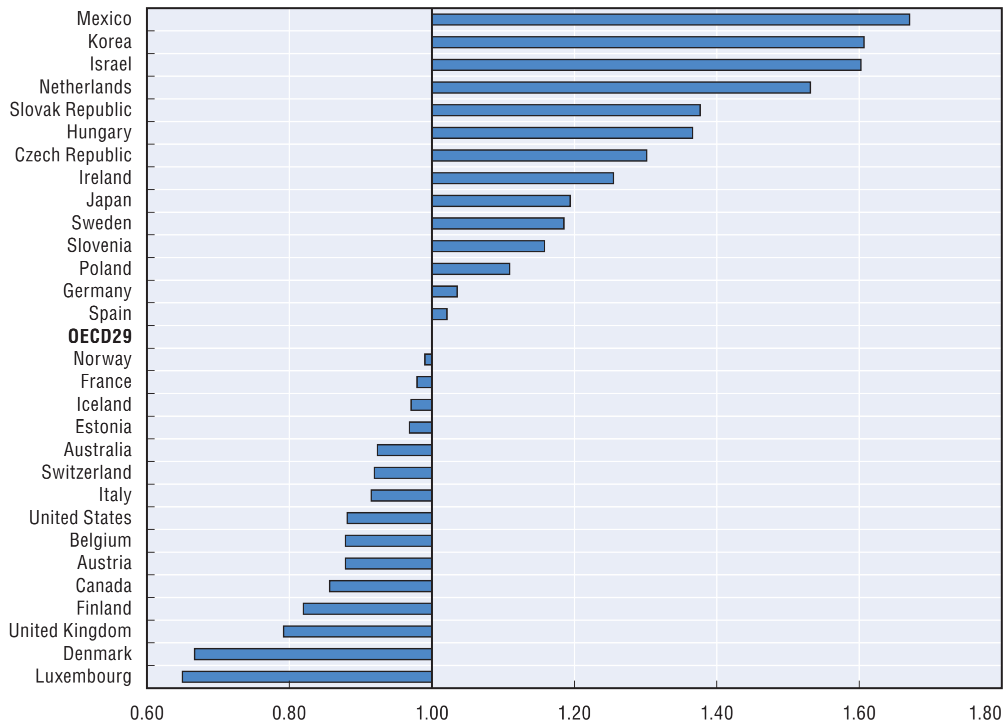
The budgetary coefficients for communication increased in all countries over the period 1990-2009 (Table 8.1). The relative propensity index – relative to the OECD average – has also increased in some countries. This increase was particularly strong in the Czech Republic, Hungary, Iceland, Korea and the Netherlands, as well as in the Slovak Republic. In contrast, the relative propensity has either constant or decreased slightly in the other countries during the period 1995-2008, and the decline was marked in the United Kingdom (Figure 8.3, Table 8.2).

The share of communication in total household expenditures in the OECD area has been increasing since the mid-1990s. This trend reflects the development of mobile telephony, the Internet and broadband. Growth continued even after the Internet bubble burst in 2001, with consumer demand for an increasing array of communication products and services acting as a significant driving factor. Price declines – both for equipment and services – have further stimulated demand. Stronger competition has pushed down these prices and brought the benefits of Moore's law (more power for less money, with the speed of microprocessors doubling every 18 months) to consumers.

In 1995, total household communication expenditures in the OECD area were USD PPP 240 billion, or 2.0% of final consumption expenditure. By 2009, this amount in current terms had grown more rapidly than any other consumption item out of all household final consumption, and had multiplied by a factor of 2.6 to reach USD PPP 625 billion or 2.7% of final consumption expenditure. This average share increased very substantially during the second part of the 1990s but has flattened off since 2002. During the latter period, the share of expenditures devoted to health and education have grown more rapidly than all other expenditure items, aside from communications (Figure 8.4).

Figure 8.2. **Relative communication expenditures[1] by households in OECD countries, 2009**

Relative propensity index[2]



1. Communication includes telecommunication equipment and services and postal services. (A definition of communication expenditures is provided in Box 8.1.)
2. The index, for a country i, is calculated as: (Communication expenditures of households/Total expenditures of households) for country i/(Communication expenditures of households/Total expenditures of households) for OECD total. The OECD index is equal to one. OECD 29: Chile, Greece, New Zealand, Portugal and Turkey are not included.

Source: OECD, based on data from the *National Accounts Database*, March 2011 (see also Table 8.2.)

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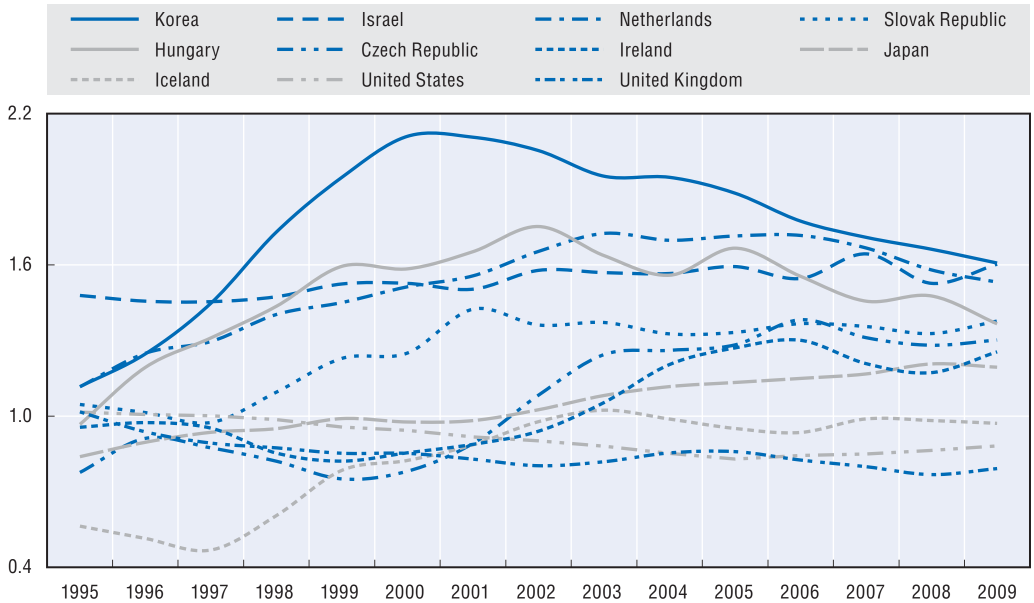
In more than half of OECD countries, the year 2009 was marked by the slowdown of households' total consumption expenditures, and telecommunications were not an exception (see also Finland and France below). However, expressed in terms of budgetary coefficient, the relative propensity of households to consume communication, despite the global economic crisis, remains unchanged at the OECD level and is only declining marginally in a limited number of countries, with the exception of Estonia (see Table 8.1).

Shares of communication and IT have not always been constant (Figure 8.5) and have evolved in different ways across those OECD countries for which data are available.[1] Between 1990 and 2009, communication expenditures became significantly higher than those devoted to IT in all OECD countries but two: Denmark and Norway. This change began during the mid-1990s and was more pronounced in some countries (*i.e.* Iceland, Italy, Korea and the Netherlands) than others. In Finland, following strong growth in communication expenditures – as in many countries – the relative share declined after 2004 to return to the level of IT expenditures by 2008. It 2009, it started to increase in most countries.

Figure 8.3. **Evolution of the relative propensity index of communications expenditures[1] in selected OECD countries, 1995-2009**



1. Communication includes postal services, telephone and telefax equipment, and telephone and telefax services. The index is calculated as indicated in the Figure 8.2.

Source: OECD, based on data from the *National Accounts Database*, March 2011. (See also Table 8.2.)

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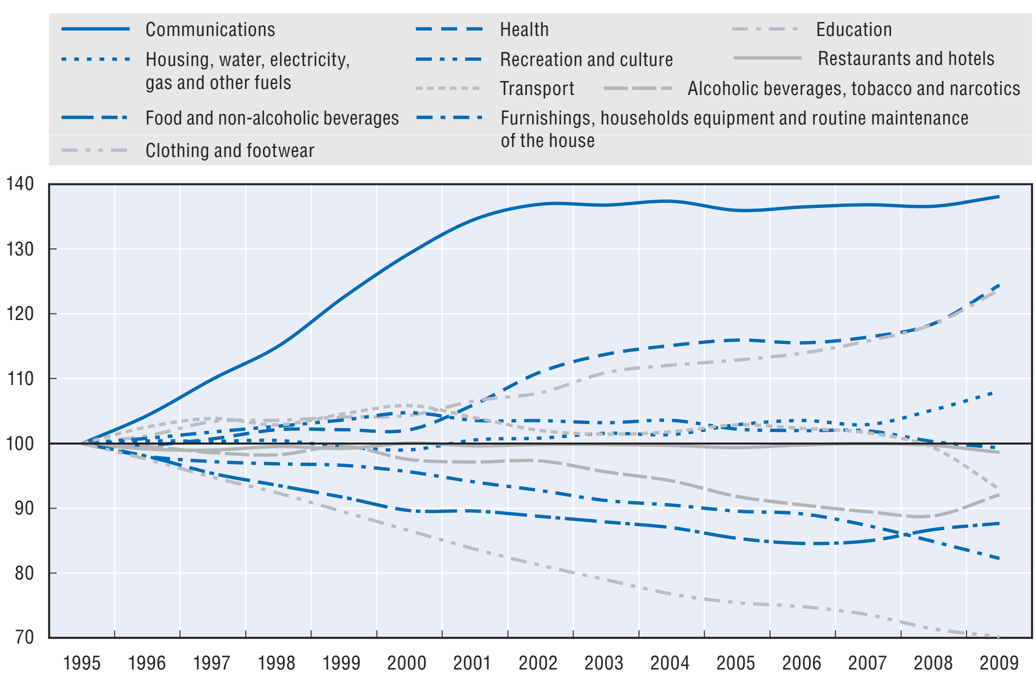
Figure 8.4. **Changes in the proportion of households' expenditure by category in the OECD,[1] 1995-2009**

Base 100 in 1995



1. OECD 29: Chile, Greece, New Zealand, Portugal and Turkey are not included.

Source: OECD, based on data from the *National Accounts Database*, March 2011.

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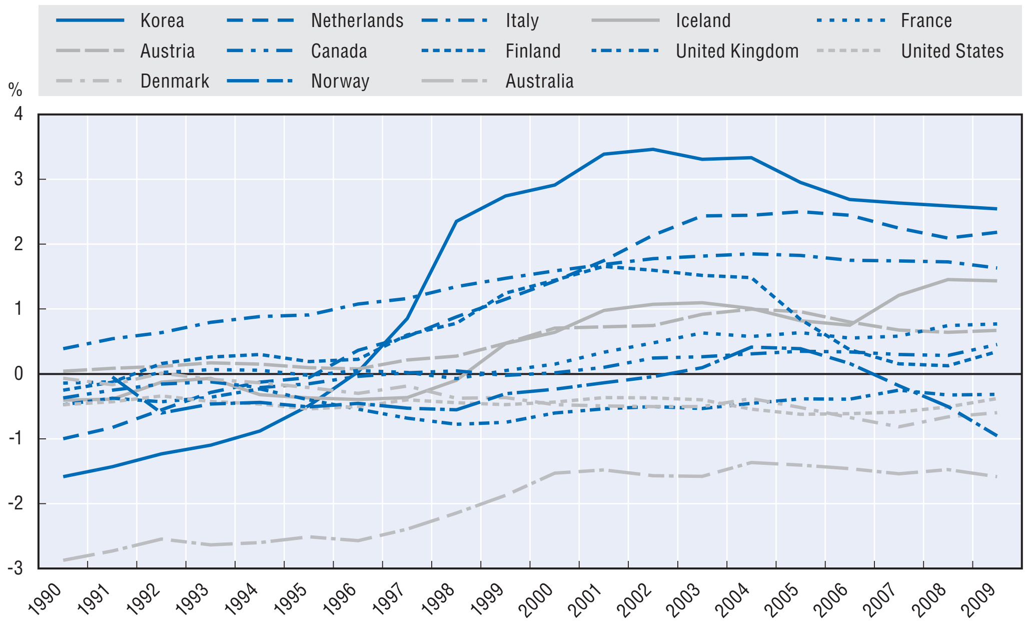
Figure 8.5. **Difference between information and communication technology expenditures[1] in selected OECD countries, 1990-2009**



1. See note 1 of Figure 8.1.

Source: OECD, based on data from the *National Accounts Database*, March 2011.

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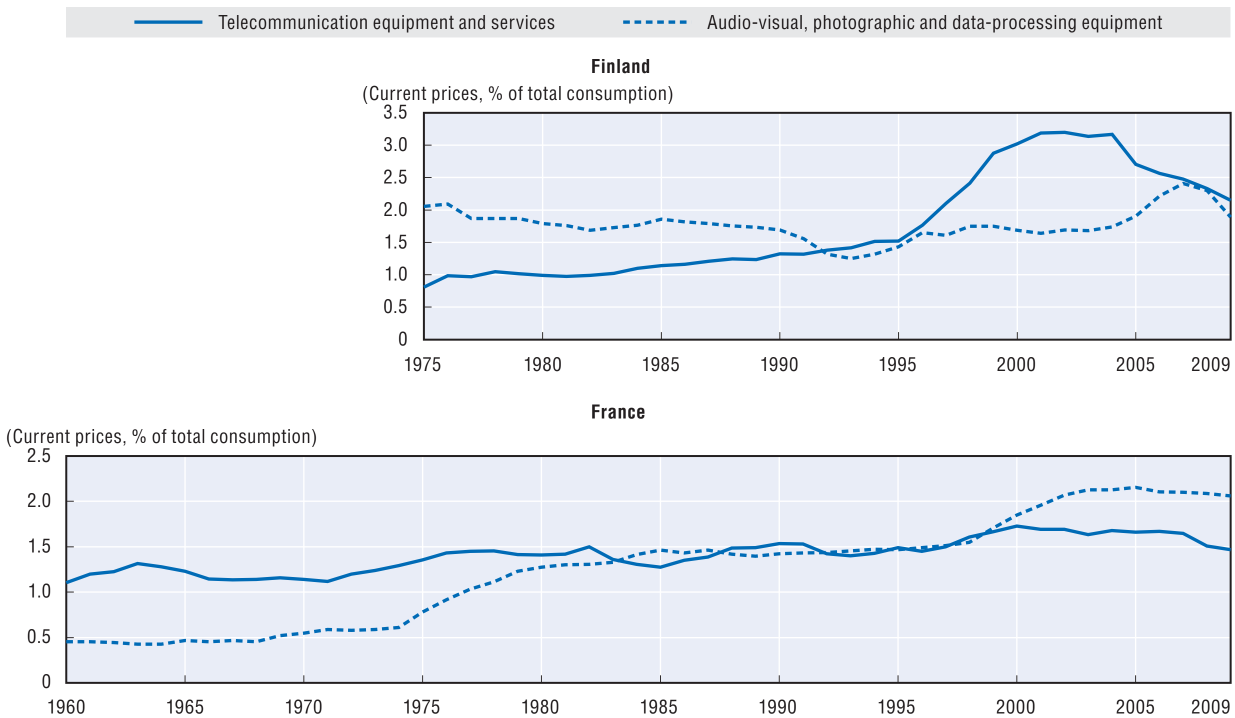
The examples of France and Finland, where data on ICT expenditures are available for a longer period, allow this change to be viewed within a historical framework (Figure 8.6). In France, IT expenditures remained higher than for communication from 1956 to 1979. The two items fluctuated at around the same share between 1979 and 1999, when communication started to exceed IT expenditures. In Finland, the prevalence of IT over communication expenditures dates back as far as 1975 and continued until 1992, when the share of communication became largely dominant. From 2005 onward, however, the gap between IT and communication expenditure tended to close.

In Finland, the 2009 global economic crisis seemed to have an impact on the share of total household expenditures devoted to ICT, which declined throughout the year. In contrast, this share remained relatively constant in France. But in 2009, despite the continuous price decline, communication services expenditures stopped growing in volume for the first time since the development of mobile wireless and the Internet (INSEE, 2010). This suggests that the economic crisis influenced some of household expenditures. Concerning telecommunication expenditures in France, for example, one person in 10 (aged 12 or more) reported having postponed or cancelled a decision to buy a mobile phone in 2009. Among people equipped with mobile phones, more than one in five declared that they had reduced their mobile service expenditures during the previous months (CREDOC, 2009).

Monthly spending by a household on communication equipment and services expenditures has been compared using national surveys in USD PPP, with a breakdown, where available, for Internet, mobile and fixed-related communication expenditures (Figure 8.7). There is a wide range of spending patterns across the OECD countries, not only for the global amount spent, but also with regards to how it breaks down across the three categories. It should be borne in mind that comparison is not always straightforward as the data originate

Figure 8.6. **Share of ICT expenditures in the total consumption expenditures of households in Finland and France, 1960-2009**



Source: OECD, based on data from National Accounts, September 2010.

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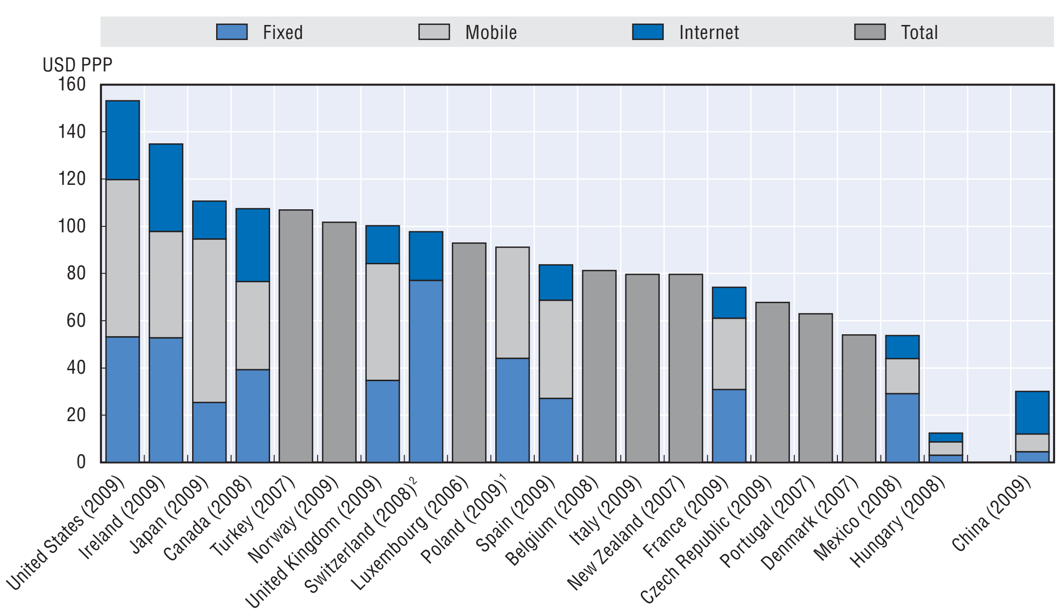
Figure 8.7. **Monthly household expenditures on communications in OECD, 2009**

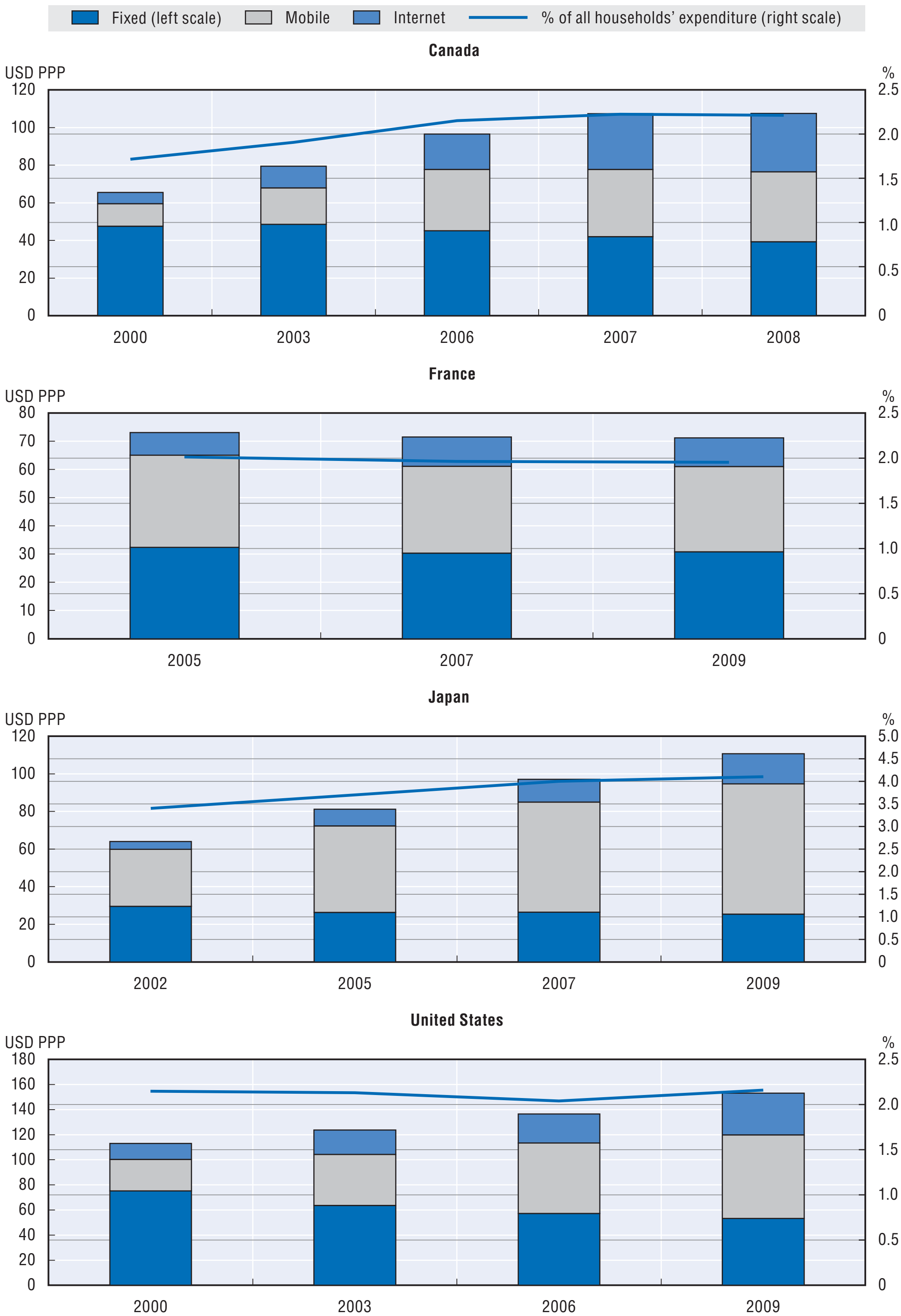


1. Internet expenditure is not included. 2. Cellular mobile expenditures are included in fixed line expenditures.

Source: OECD, *Telecommunication Database*, March 2011.

StatLink http://dx.doi.org/10.1787/888932396504

Figure 8.8. **Monthly household expenditures on communications in selected OECD countries**



Source: OECD, *Telecommunication Database*, March 2011.

StatLink http://dx.doi.org/10.1787/888932396523

from surveys featuring different questionnaires, definitions and methodologies. For example, the data for Poland do not include Internet services. In 2009, the average expenditures for communication varied between USD PPP 153 per month in the United States and USD PPP 67.8 per month in the Czech Republic. The broad average for the 10 countries where 2009 data were available reaches USD PPP 99.7 per month. In China, the amount reached USD PPP 30 per month, with 60% devoted to Internet – the highest share of all the countries.

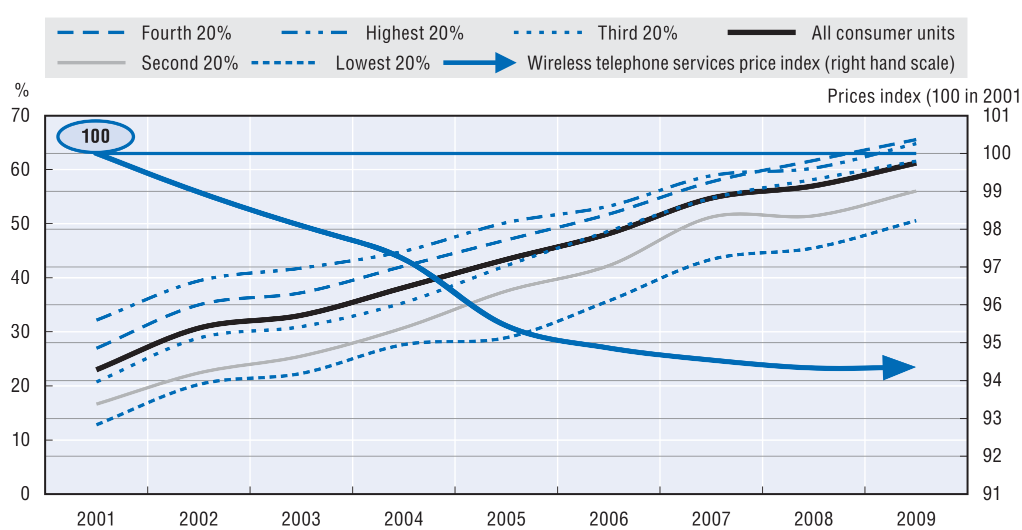
Detailed data on communication expenditures for Canada, France, Japan and the United States are given here (Figure 8.8). Communication expenditures as a percentage of total household spending are now stagnating in Canada and France while still growing in Japan, although there they have already reached a level double that of the first two countries (around 4%). In the United States, the percentage remained relatively constant during the first part of the decade, but has grown since 2006. In absolute terms in all the countries, Internet expenditures have grown the most rapidly during the respective periods of observation, with the exception of the United States where the pace was similar to that of mobile-related expenditures. Those expenditures (which include both services and equipment) have been catching up with fixed expenditures and are now reaching the same order of magnitude in Canada and France. In Japan they are more than 2.7 times higher than fixed-related communication expenditures, and in the United States, 25% higher.

The rise of mobile phones in telecommunication services expenditures

The first decade of the twenty-first century witnessed a significant shift in telephony expenditures toward mobile phone expenditures. The structure of telecommunication services expenditure has modified significantly within the last decade, mirroring the spread of mobile telephone use within society. For example, the increase in telephone services expenditures from 2001 to 2006 in the United States was due almost exclusively to higher expenditure on cellular phone services (Creech, 2008). This trend continued between 2006 and 2009 (Figure 8.9).

Figure 8.9. **Households cellphone expenditures by income level and prices in the United States, 2001-09**

Percentage of total phone expenditures



Source: US BLS.

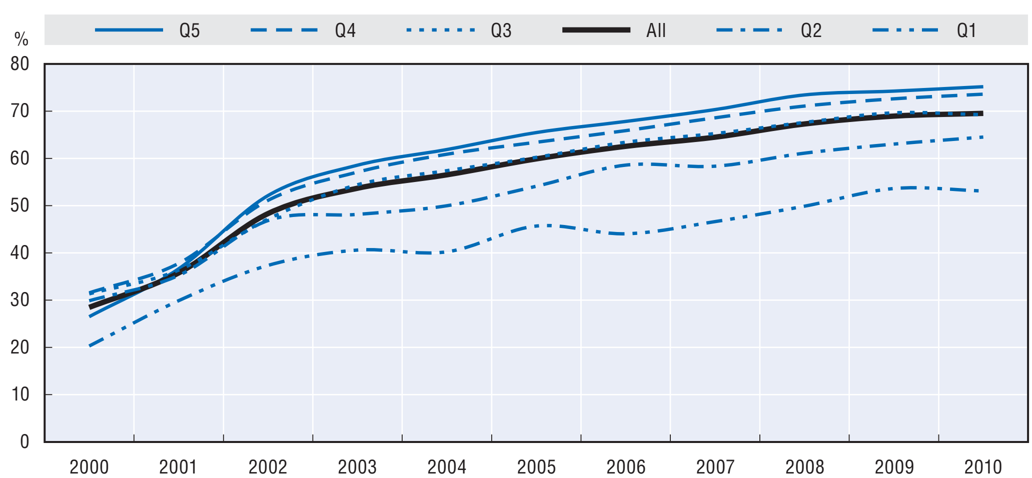
StatLink http://dx.doi.org/10.1787/888932396542

In 2001, mobile wireless expenditure accounted for only 23% of total telecommunication expenditures in the United States. By 2009, this had reached 61%. People with the highest incomes were the initial adopters, and by 2005 had already devoted more than 50% of expenditures to mobile. People with lower incomes followed this general trend, reaching the 50% threshold in 2009. Wireless telephones service prices declined significantly in parallel (see the section on prices).

The increasing share of mobile phone expenditure can be observed in Japan, where a 50% threshold was reached in 2002 (Figure 8.10). As in the United States, people with lower incomes have followed the general trend, despite a slight time-lag. In Canada, the share of mobile phones is also growing, but had reached only 40% in 2009 (Figure 8.11). This difference may be related to mobile penetration per capita. In 2009, mobile penetration per 100 inhabitants was 89.2 in the United States and 70 in Canada (see Table 4.9 in Chapter 4).

Figure 8.10. **Mobile wireless charges expenditures as % of total phone charges expenditures[1] in Japan, 2000-10**

By quintile of income



1. Total phone charges expenditures include telephone charges, mobile telephone charges and forwarding charges.

Sources: Family income and Expenditure Survey, Statistics Bureau and the Ministry of Internal Affairs and Communications, Japan.

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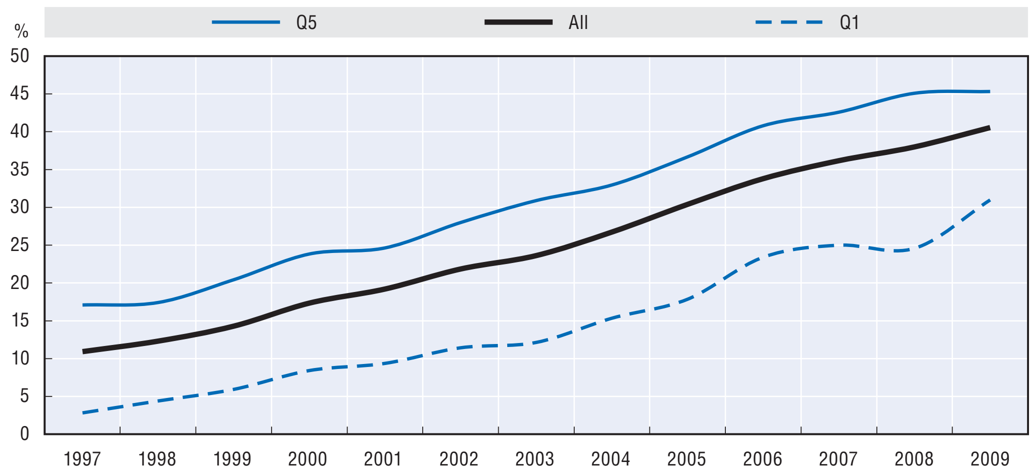
In the United Kingdom the trend was relatively similar up till 2008, although less marked in comparison to Canada, Japan and the United States (Figure 8.12). In 2009, household expenditure fell for the first time in 10 years, and the share attributed to mobile services in total telecommunication services paused relative to its recent growth.

A generational effect

Younger generations have clearly been leading in the shift toward mobile within telecommunication expenditures. In 2009 in the United States, people aged below 26 were devoting more than 85% of their telecommunication expenditures to mobile, compared to 25% for those aged above 75 (Figure 8.13).

Figure 8.11. **Share of mobile phone expenditures in the telecommunication services expenditures in Canada, by level of income**



Source: Statistics Canada, *Survey of Household Spending*, various years.

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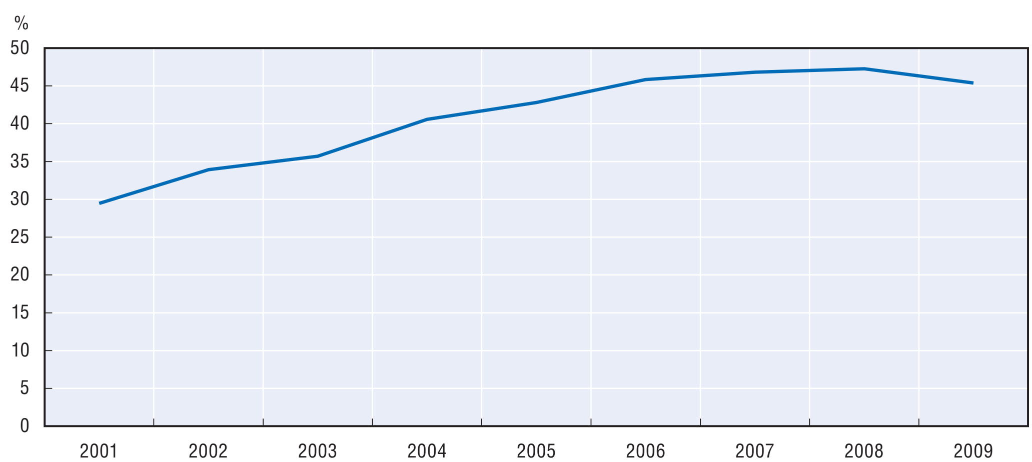
Figure 8.12. **Share of mobile phone services expenditures in the total telecommunication services expenditures in the United Kingdom, 2001-09**[1]

Percentage of total phone services expenditures



1. Financial year from April 2000 to March 2001 for 2001, and similarly until 2006 included.

Sources: OECD, based on Family Spending and Family Expenditure Survey, Office for National Statistics, various issues.

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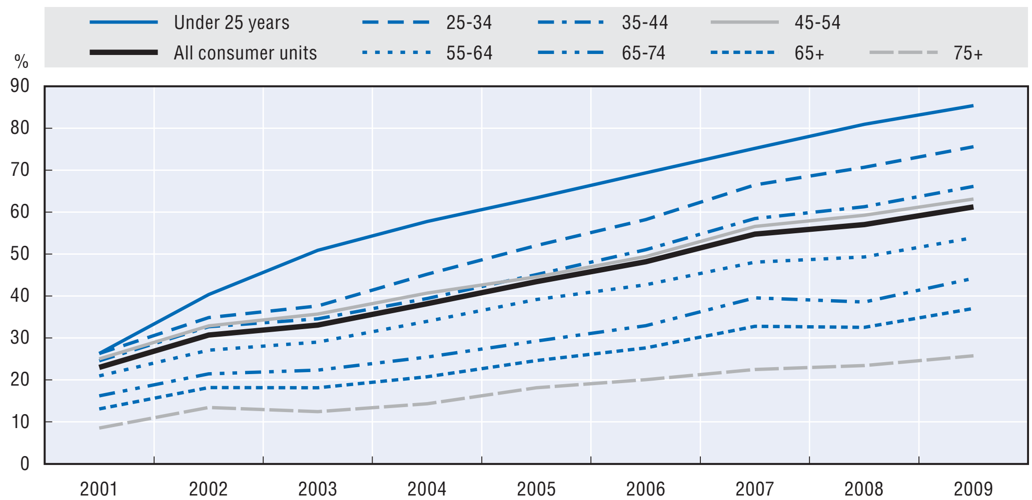
In Korea, the average share devoted to mobile expenditures rose from 62% to 66% between 2005 and 2007. Differences between age are not as marked as in other countries, and the shares are not necessarily decreasing with age: the highest share of IT services expenditure devoted to mobile is around 68% for households where the head is in his/her forties; and the lowest is 64% for households where the head is in his/her thirties. The share is not increasing with age (Figure 8.14).

Figure 8.13. **Cellphone expenditures as a percentage of total telephone expenditures by age group in the United States, 2001-09**



Source: US Bureau of Labor Statistics.

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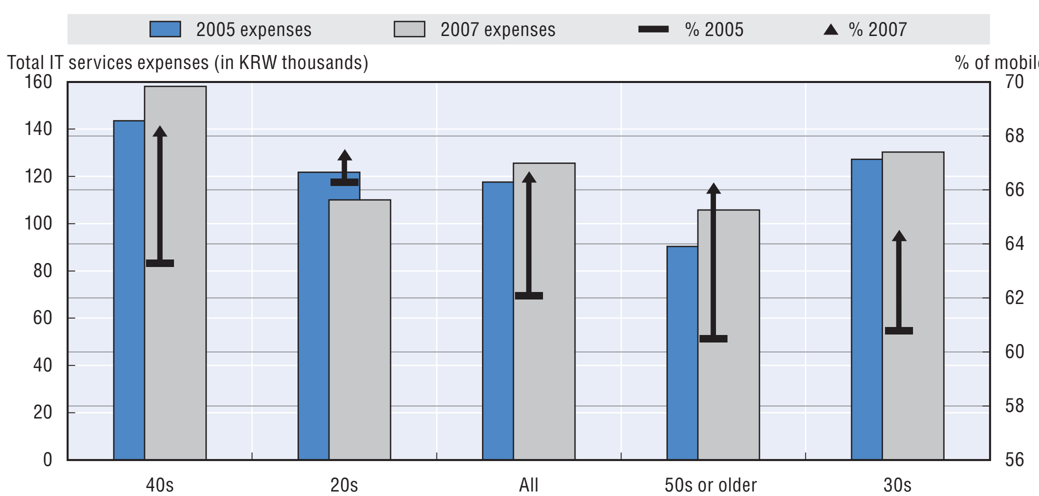
Figure 8.14. **Evolution of IT services expenditures and share of mobile phone expenditures in South Korea, 2005-07**

Per month, per household, by age of head of household



Source: KISA, Survey on Internet Usage.

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The pervasiveness of mobile phones

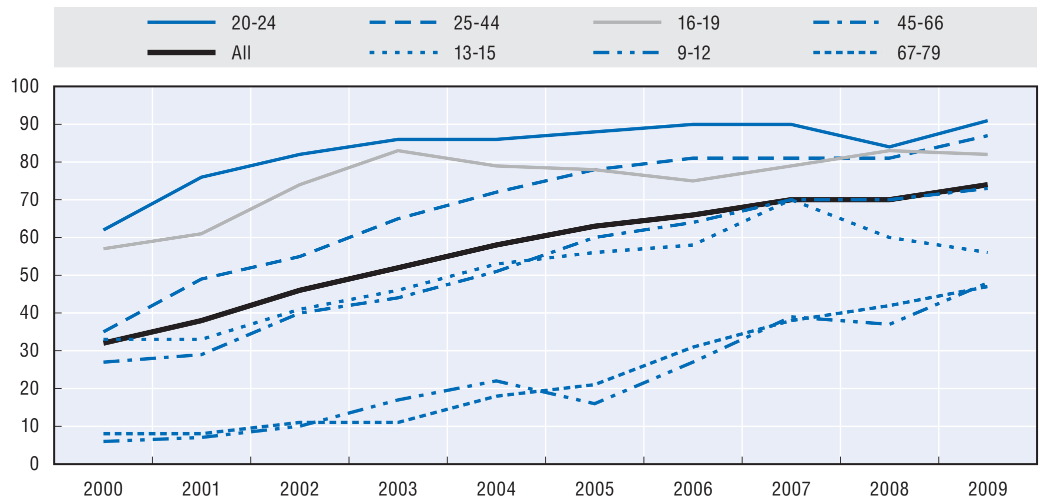
Rapid diffusion in OECD countries

The diffusion of mobile communications has been extremely rapid in OECD countries. This probably constitutes one of the fastest take-ups of a new device, as compared with other major ICT devices, except television or colour television (Table 8.3).

Norway provides a good illustration of the pervasiveness of the mobile phone in our everyday life. In 2000, only one person in three made a private mobile call per day. In 2009, this was the case for three people out of four. Even among the eldest generation, it is now the case of one person out of two, against less than one in 10 in 2000 – an evolution strikingly close to that of the youngest generation (Figure 8.15).

Figure 8.15. **Individuals giving/receiving private mobile call an average day in Norway**

Percentage of individuals of each age category



Sources: Statistics Norway, Norvegian Mediabarometer.

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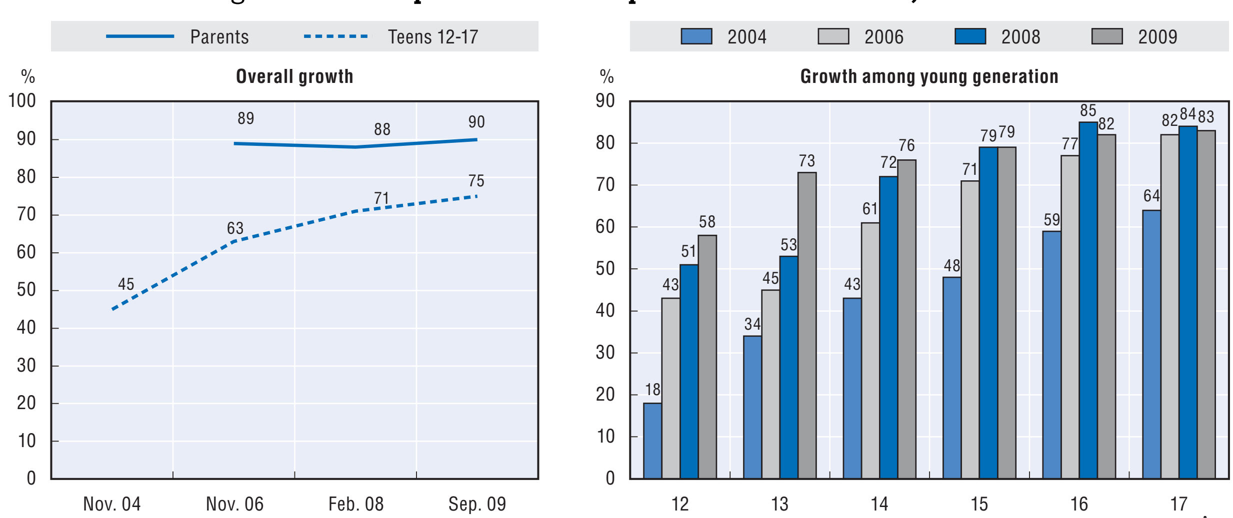
Younger populations now account for high levels of mobile ownership in OECD countries, although initial diffusion occurred mainly among the adult population. In Australia, 54% of young people (8-18 years old) owned a mobile in 2007. In 2009, only 22% of children aged between 9 and 11 owned a mobile phone, but among those aged between 12 and 14 the figure was 76% (ACMA, 2010a). In the United States, the gap between parent and teenage cellphone ownership is steadily narrowing and, as is the case in Norway, it appears that, over time, older teens are more likely to own a mobile compared to younger teenagers (Figure 8.16). However, there is a trend in recent years for children to become

Figure 8.16. **Cellphone ownership in the United States, 2004-09**



Source: PEW (2010a).

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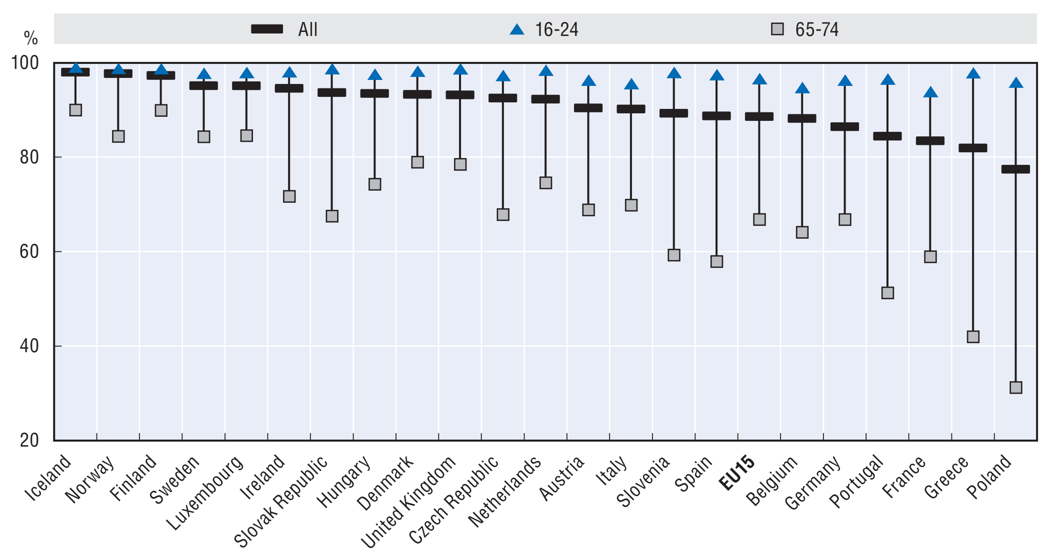
mobile owners at increasingly younger ages. In the United States, about two-thirds of children below 14 were mobile owners in September 2009 (PEW, 2010a). In France, more than eight individuals aged between 12 and 17 were mobile owner in 2009, against only six in 2003 (CREDOC 2009). In 2008, mobile ownership for teenagers aged 11 to 14 was above 60% in Spain and above 80% in Germany, Italy, Poland and the United Kingdom. More than two individuals out of 10 aged 6 to 10 owned their own mobile in Italy and the United Kingdom, more than three in Germany and four in Poland (Eurobarometer, 2008).

In Australia, there are also clear differences among the youngest generations: 31% of children aged 5 to 14 have their own mobile phones, but mobile ownership reaches three-quarters (76%) of children in the 12-14 year age group, compared to one-fifth (22%) of children aged 9 to 11 (ABS, 2009). In France, however, mobile ownership for people aged 12 to 17 has remained similar to that of adults (aged 18 or more) since 2003 (CREDOC, 2009).

In most European Union countries, use of mobile communications is now reaching more than 80% of the population, with almost 100% of individuals aged between 16 and 24 now using mobiles. However, the situation is much more diverse among people aged above 65. The gap between young and old generations is generally very small in the Nordic countries and varies from 7% in Finland to 46% in Poland (Figure 8.17).

Figure 8.17. **Individuals mobile use[1] by age categories, selected EU countries, 2008**



1. Percentage of individuals having answered positively to the question: “I use a mobile phone”.

Sources: Eurostat, ICT usage in households and by individuals, 2008 Survey.

StatLink http://dx.doi.org/10.1787/888932396694

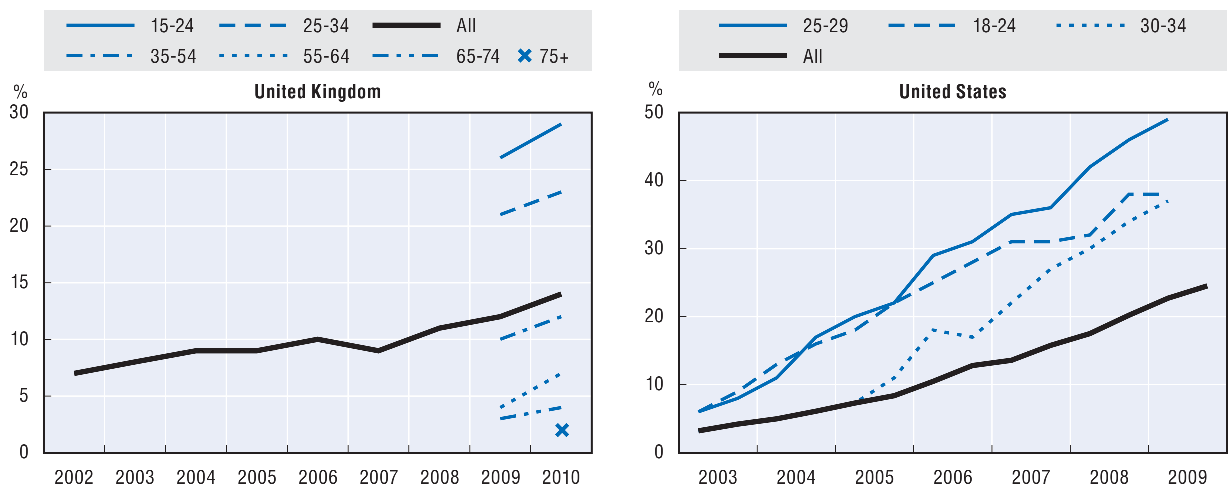
Significant growth of the mobile-only population in some countries

At the EU27 level, more than one household in six (18%) was a mobile-only user (no fixed telephone access) on average at the end of 2006. By the end of 2009, this share had increased significantly with around 25% of EU27 households now using just mobile. The proportion was significantly higher in the new member states (46%) than in the EU15 (21%), with the exception of Finland (71%), Austria and Greece (both 45%) and Portugal (41%) (Eurobarometer, 2010).

Surveys indicate that the "mobile-only" population has grown significantly, especially among young people, in the United Kingdom and United States during the current decade (Figure 8.18). However, some respondents, while not having a traditional public switched telephone network (PSTN) line, may have access to an alternative fixed-line connection (*e.g.* via an unbundled DSL line or a cable television connection through which they access a VoIP service). In the United Kingdom, the increase in mobile-only households is more likely to be partly driven by take-up of mobile broadband. (At the beginning of 2010, 11% of individuals aged between 15 and 34 had mobile broadband and no fixed broadband connection.)

Figure 8.18. **The mobile-only population in United Kingdom and United States, 2002-09**

Percentage of adults[1]



1. 15+ in the United Kingdom and 18+ in the United States. In the United States, "mobile-only" refers to a person living in a family and having a working cellular telephone, where there is no working landline inside the household. In the United Kingdom, mobile-only refers to the share of the population that relies solely on a mobile handset for voice telephony.

Sources: OFCOM Research and US National Health Interview Survey.

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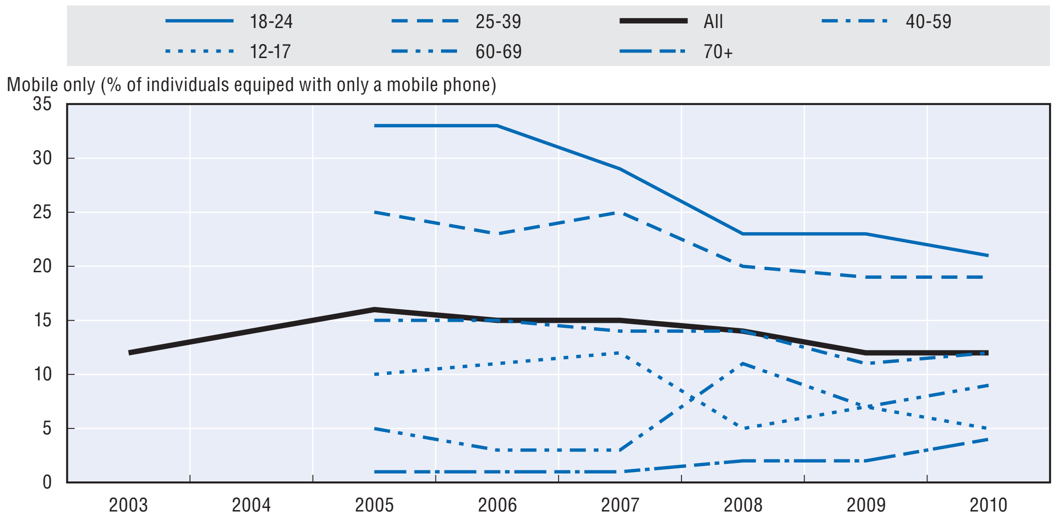
The mobile-only population in France over the same period has been relatively stable (around 12%). Younger people are also more attuned to the mobile-only lifestyle (especially the 18-24 age group). However, since 2005 there has been a slight decline in this trend. Previously, the need for a fixed line to obtain an xDSL Internet connection was a major contributory factor. The popularity of bundled services (*i.e.* telephony, video and Internet access for a single price) over unbundled PSTN lines undoubtedly contributed to survey results. In 2010, for example, around 54% of individuals were equipped with a multiservice box enabling telephone over the Internet, against only 7% in 2005. Users of these services are more likely to consider themselves as "mobile only" since they do not subscribe to a traditional telephony service. Interpretation of survey data will become more challenging with the introduction of quadruple offers that bundle fixed services (recently launched by mobile operators in France).

The growth of smartphones with Internet and video-access capabilities may contribute to an increase in the community of mobile-only users. Currently, the two main factors of influence are income and age. Single household, low-level income people and blue collar workers are the groups for which mobile-only possession is the most frequent. In 2010, more than three-quarters of the generations below 60 were equipped with both a fixed and a mobile phone (Figure 8.19).

Figure 8.19. **The mobile-only population in France, 2002-10**



Source: CREDOC, 2010.

StatLink http://dx.doi.org/10.1787/888932396732

Mobile phone activities: from voice to multimedia

Activities on mobile telephones are, of course, no longer restricted to telephone calls. Mobile terminals have become more multi-functional and network capabilities have increased, with mobile devices being used for an increasing variety of activities. Growing functionality offers the possibility of "triple-play services" (voice, data and video) while applications such as Bluetooth and Wi-Fi enable the wireless connection of technology devices.

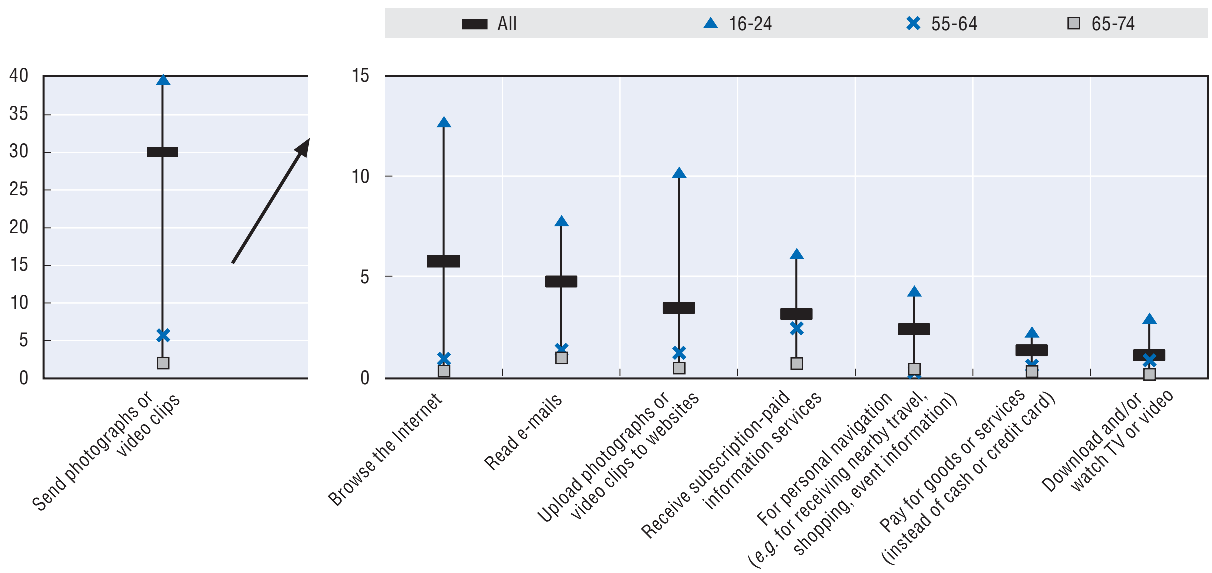
The use of mobile, widely diffused in European countries (87% of individuals in the EU27 used a mobile phone in 2008), encompasses much more than voice or text messaging. In 2008, 30% of individuals used mobiles to send photographs or video clips, and around 6% to browse the Internet. Other types of use are still marginal, with the exception of uploading photographs or video clips to websites among the younger generations (more than 10% of individuals aged 16 to 24) – a result of the rise of social networks (Figure 8.20).

In Korea, the sending and receiving of text messages remains the most popular non-voice activity on mobile devices. However, ringtone and wallpaper downloads increased significantly between 2007 and 2009, reaching six mobile phone users out of 10. In 2009, three out of 10 users were sending and receiving photo or video, and two out of 10 were gaming, downloading music or paying for products or services on their mobile. While still a marginal activity, downloading or streaming video is growing vigorously (Figure 8.21).

In Europe and the United States, age is a strong discriminatory factor with regards to new forms of usage of mobile telephones. Mobile telephones are predominantly used for talking and texting, but variety of use is broadening with young generations often the first to integrate innovative usage of mobile devices, thereby giving birth to new practices. In Australia, use of mobile phone for new media activities (taking photographs, playing games, listening to music/radio, watching videos footage or television shows or clips) started to emerge in 2007 among younger generations (ACMA, 2010). In France, more than four out of 10 individuals are using their mobile as a "pocket torch", with the figure rising to seven out of 10 for individuals aged between 12 and 17 (AFOM, 2010a).

Figure 8.20. **Mobile use[1] in the EU[2] for selected age categories, 2008**

Percentage of individuals

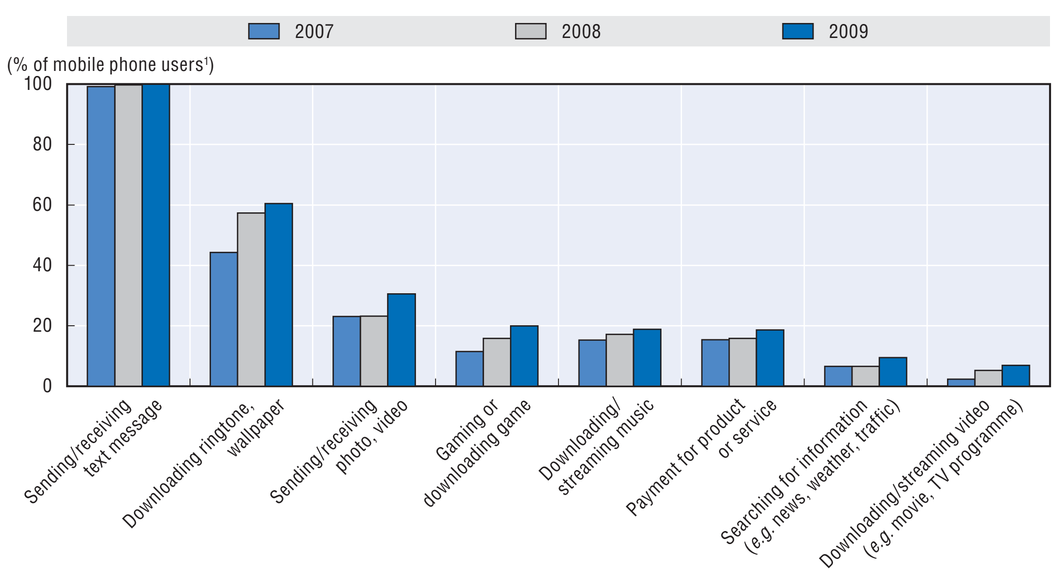


1. SMS and mobile phone calls not included.
2. EU27.

Source: Eurostat, ICT usage in households and by individuals, 2008 Survey.

StatLink http://dx.doi.org/10.1787/888932396751

Figure 8.21. **Purposes of using a mobile phone in Korea, 2007-09**



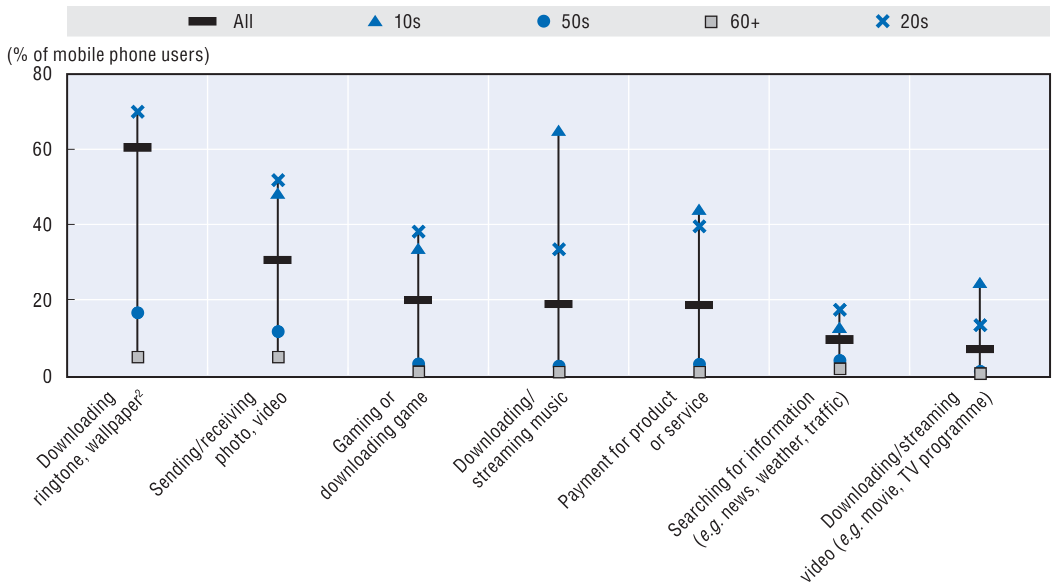
1. Aged 3 and over.

Source: KISA, Survey on Internet usage, 2008-10 issues.

StatLink http://dx.doi.org/10.1787/888932396770

In Korea, a clear generation gap can be observed for most mobile phone-related activities except sending and receiving messages. The latter activity, unlike European countries and the United States, is extremely popular among all age categories, including the oldest (Figure 8.22).

Figure 8.22. **Purposes[1] of using a mobile phone by age in Korea, 2009**



1. The item "sending/receiving text message" has been omitted, as it falls above 99.6% of each age category.
2. More than 99.8% of the users aged between 10 and 19 are undertaking this activity.

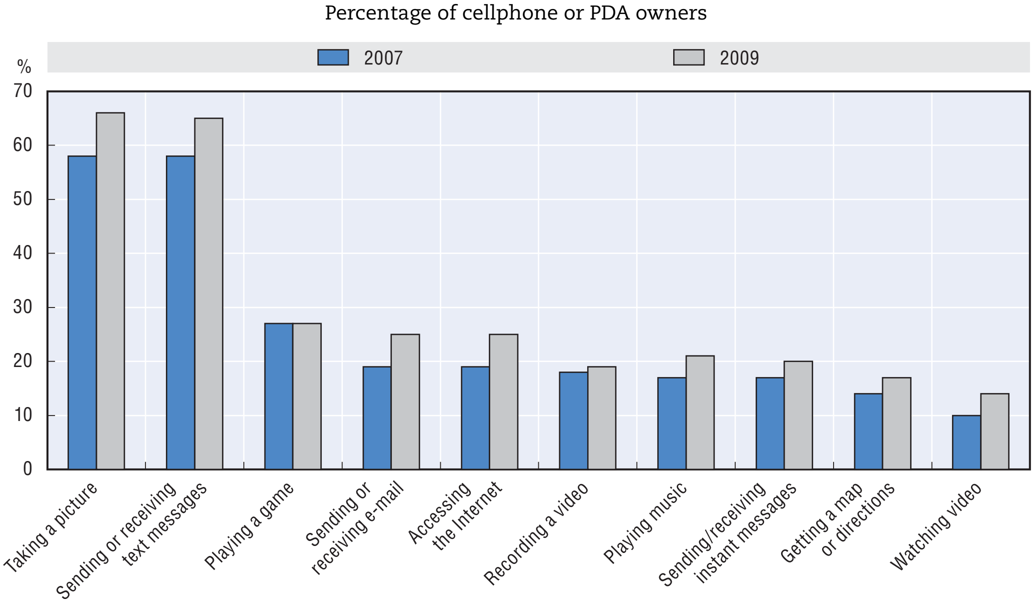
Source: KISA, Survey on Internet usage, 2010.

StatLink http://dx.doi.org/10.1787/888932396789

In the United States, all mobile telephone device activities except game playing increased among telephone users between 2007 and 2009. Taking a photograph has become the most popular activity, followed by sending and receiving text messages. Accessing the Internet and sending or receiving emails have gained the highest share of mobile users over the two-year period (Figure 8.23).

Figure 8.23. **Cellphone activities in the United States, 2007-09**

Percentage of cellphone or PDA owners



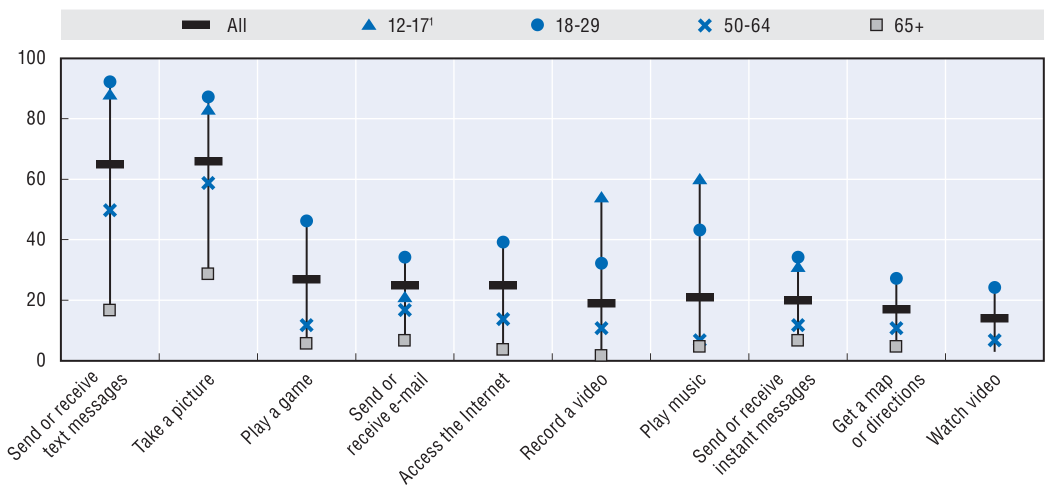
Source: PEW (2010a).

StatLink http://dx.doi.org/10.1787/888932396808

As observed in other countries, younger generations are involved in a higher variety of activities compared to older generations (Figure 8.24). Differences are particularly striking for texting (sending or receiving text messages), taking photographs, or playing music. For the two first activities, there is also a marked difference between people in their fifties and those aged 65 or more. Intensive use of SMS (or texting) by teenagers, for example, is mirroring a direct-network effect, which can be observed on people of older generations (in particular, close parents or grandparents). In September 2009, more than seven in 10 (71%) of telephone-owning parents of teens aged 12 to 17 said they send or receive text messages on their cellphones. In comparison, 65% of all adults aged 18 and older send or receive text messages (PEW, 2010a).

Figure 8.24. **2009 cellphone activities in the United States for selected age categories**

Percentage of cellphone or PDA owners, by age category



1. Indicated only for the activities where data are available.

Source: PEW (2010a and 2010b).

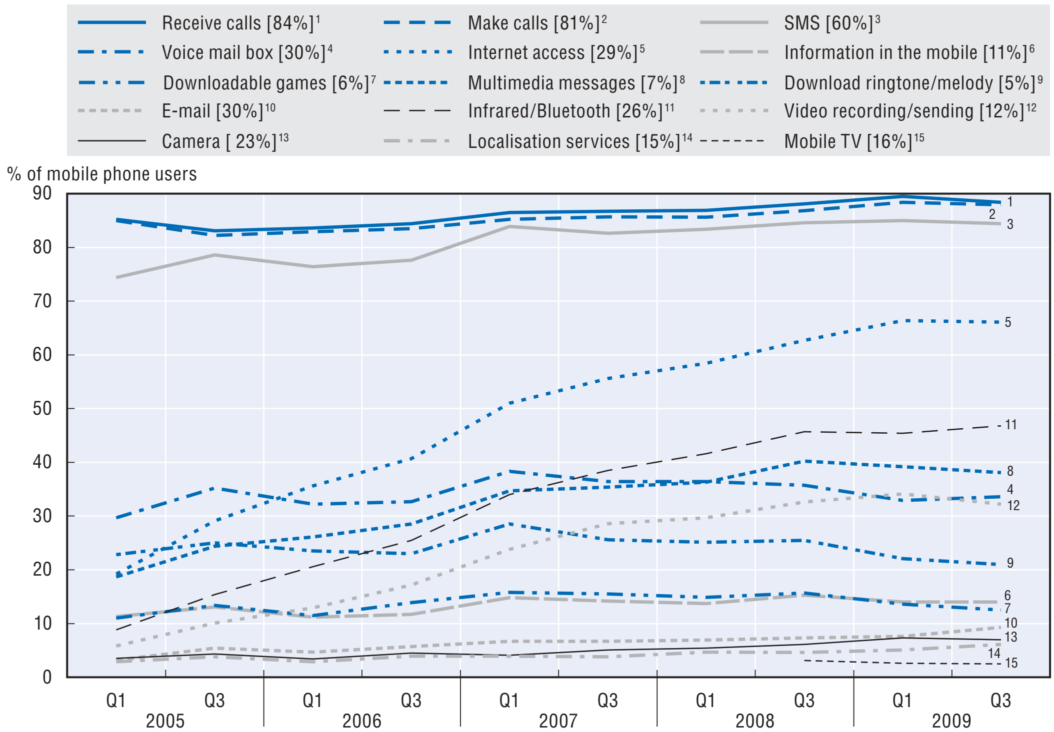
StatLink http://dx.doi.org/10.1787/888932396827

In Spain, as in other countries and as might be expected, the use of mobile telephones is led by telephony (calls made and received). In 2009, most mobile-phone users (around 90%) undertook this activity, and more than 80% daily or weekly (as opposed to monthly or sporadically). This share, as a daily or weekly activity, has increased by 10% since 2005. People receiving or sending SMS in Spain has increased from 75% to 85% of mobile users in four years, 60% of which were undertaking this activity on a daily or weekly basis (Figure 8.25).

Several mobile activities have dramatically increased since 2005. Two out of three mobile users in Spain now use their mobile as a camera, as against one in five at the beginning of 2005. More than one in five is now doing this on a daily or weekly basis.

Mobile telephones are also increasingly used within ICT environments. Almost one in two mobile users now use infrared bluetooth capabilities, against less than one in 10 in 2005. A significant number of mobile users also send video recordings (38%) or multimedia messages (32%). Ringtone/melody downloads have remained stable at 20% of Spain's mobile-user population, most probably the youngest share of users – similar to the level observed in France.

Figure 8.25. **Main use of mobile telephony in Spain, 2005-09**



Note: Main use includes daily, weekly, monthly or sporadic use. During the third quarter of 2009, among mobile phone users who used their mobile to make calls, 81% did it daily or weekly.

Sources: ICTs in Households Survey Panel, 2005-09 issues, ONTSI (Spanish Observatory for Telecommunications and the Information Society).

StatLink http://dx.doi.org/10.1787/888932396846

Several activities remain marginal either because mobile, to date, is not the preferred platform, or because the activities are still in their infancy (downloadable games, e-mail, Internet access, localization services and mobile television). Nevertheless, e-mail on mobile has increased during the recent, observed period in Spain, and is nearing 10% take-up – again, similar to the observed level in France for the overall population of mobile owners.

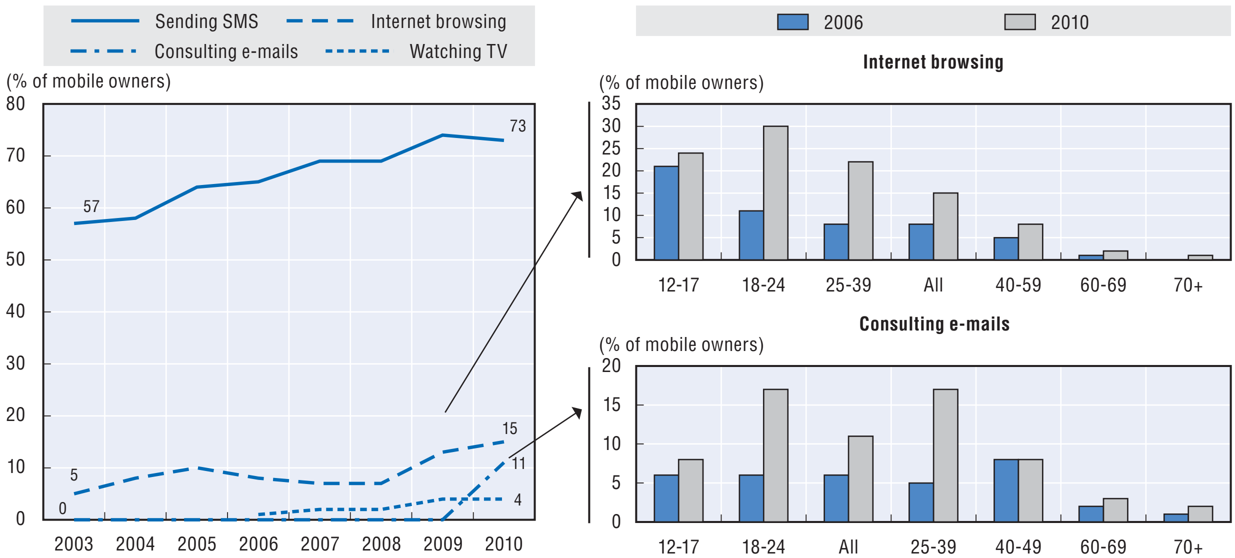
In France, mobile telephones are used, aside from phone calls, primarily to send SMS. Internet browsing and consulting of e-mails are, at present, emerging activities; television on mobile, although still marginal, is starting to grow. In general, Internet-related activities are undertaken by few mobile users, and mostly by the youngest generations (Figure 8.26).

Overall, age is the main factor influencing uptake of most mobile-related activities. As in the case of SMS, usage was spread among young generations in 2003, but reached the oldest generations only progressively (Figure 8.27).

Australia has shown similar patterns concerning non-voice activities undertaken by mobile phone users. SMS comes first, followed by photos or videos. Bluetooth applications are already used by 40% of users. One user out of four plays games or listens to music and 10% use GPS. Around 55% of Australian mobile users are estimated to have a mobile phone capable of accessing 3G services such as mobile Internet, but only one-third of these report using their mobile to access non-voice content and services online (ACMA, 2009).

The sending and receiving of SMS is now widespread among mobile users, and its intensity has increased significantly during recent years. In France, for example, between 2003

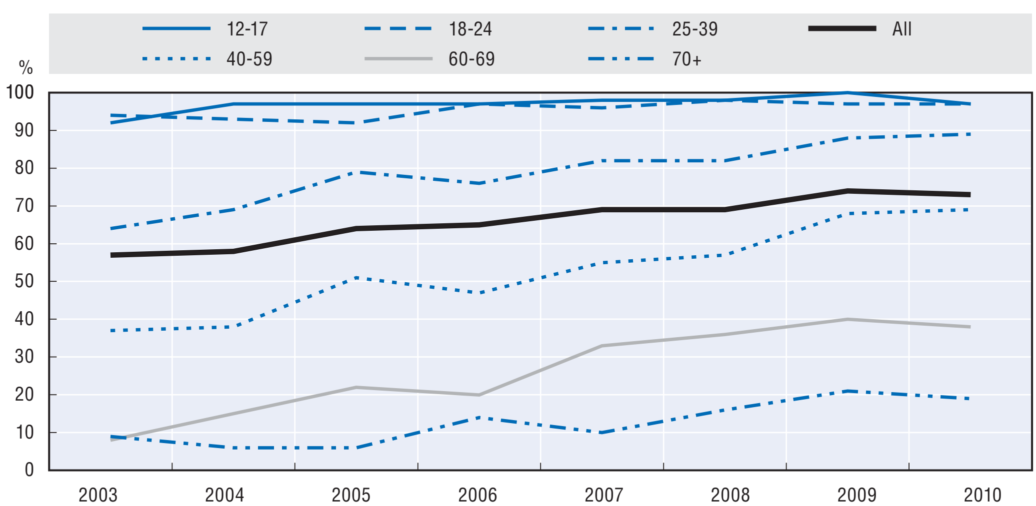
Figure 8.26. **Selected mobile phone usages in France, 2003-10**



Source: OECD, compiled from CREDOC, various issues.

StatLink http://dx.doi.org/10.1787/888932396865

Figure 8.27. **Mobile phone users sending SMS by age in France, 2003-10**

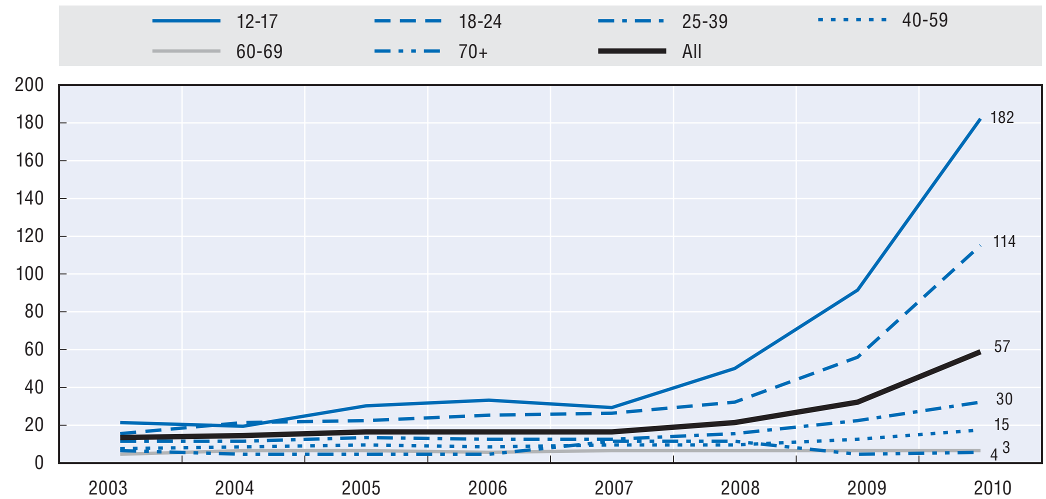


Source: OECD, compiled from CREDOC, various issues.

StatLink http://dx.doi.org/10.1787/888932396884

and 2010 the average number of SMS sent weekly by individuals increased by a factor of six, jumping from 10 to 57. In the same country, between 2009 and 2010, the volume of SMS doubled. The real acceleration started in 2007, mainly driven by younger generations (Figure 8.28). Age is the main factor, but recently low-income groups have also increased their propensity to send SMS. This might be an effect of the financial crisis, leading users to benefit from “unlimited” subscription formulas proposed by mobile service suppliers. Nevertheless, the strong increases observed in 2009 among low-income, blue collar workers and people staying at home or retired was not repeated in 2010 (CREDOC, 2010). In Germany and the United Kingdom, there are also clear signs of increases in SMS volumes (Figure 8.29).

Figure 8.28. **Average number of SMS sent weekly by age in France, 2003-10**[1]

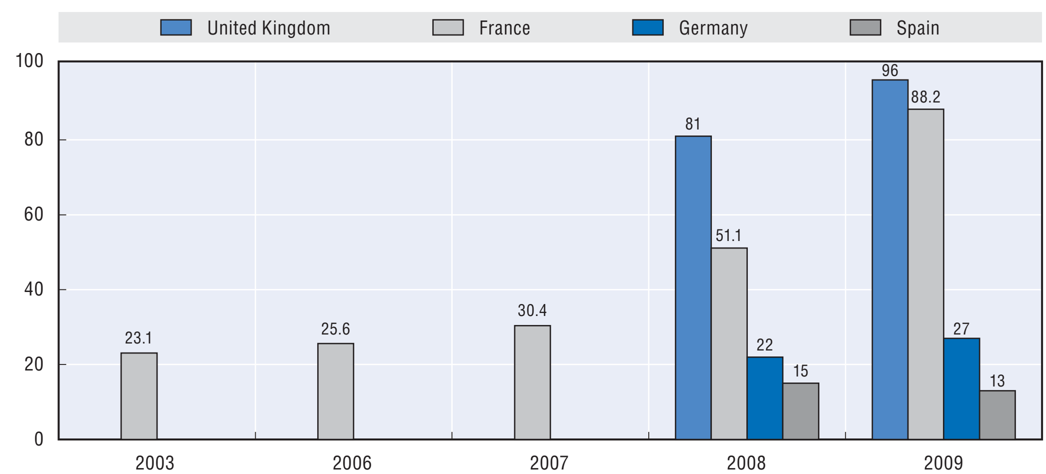


1. June of each year.

Source: CREDOC, various years.

StatLink http://dx.doi.org/10.1787/888932396903

Figure 8.29. **Yearly average number of SMS/MMS sent by month by consumer[1] in selected European countries**



1. A consumer is measured by active SIM card.

Source: IDATE, as quoted in AFOM (2010b).

StatLink http://dx.doi.org/10.1787/888932396922

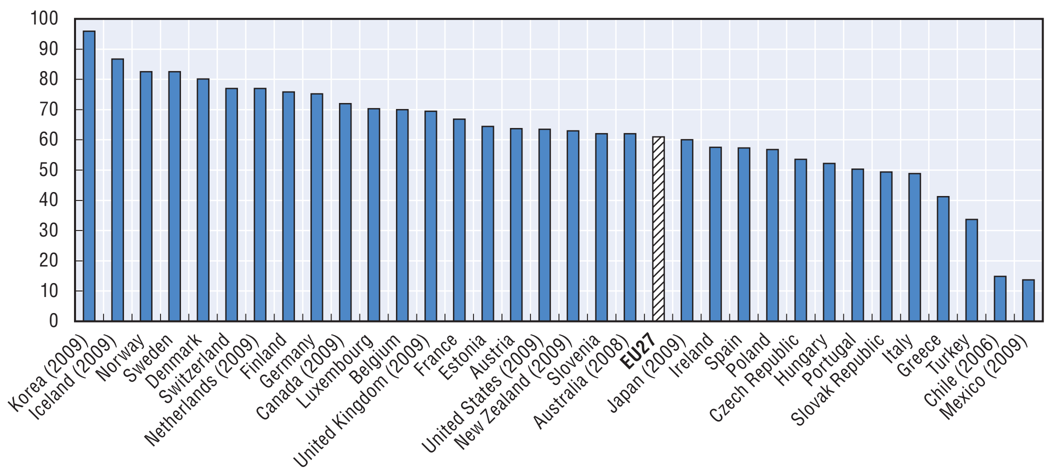
In the United Kingdom, the numbers of text messages sent by mobile users has continued to climb, growing by nearly one-third to 104.4 billion messages in 2009. This growth likely reflects the increasing availability of tariff plans with unlimited text allowances at lower price points. An increasing proportion of mobile users, particularly in younger age groups, rely on SMS via a mobile handset as their main means of communication, rather than voice on mobile (OFCOM, 2010).

The broadband age and the development of the mobile Internet

Households and individuals in many OECD countries are now accustomed to using broadband (high-speed) connections at home. Historically, the development of broadband access in the home started in the late 1990s and expanded rapidly during the following decade (OECD 2007, and Table 8.3). At present, more than one household out of two has broadband Internet access in three-quarters of OECD countries (Figure 8.30). A significant share of households now use a mobile broadband connection (3G/UMTS, etc.). In 2010, this share was above 30% in four European countries (Austria, Finland, Portugal, Sweden) and above 15% in eight other European countries (Eurostat).

Figure 8.30. **Households with broadband access, 2010 or latest available year**[1]

Percentage of all households



1. See the notes for Table 8.4.

Sources: OECD, *ICT Database* and Eurostat, Community Survey on ICT usage in households and by individuals, February 2011.

StatLink http://dx.doi.org/10.1787/888932396941

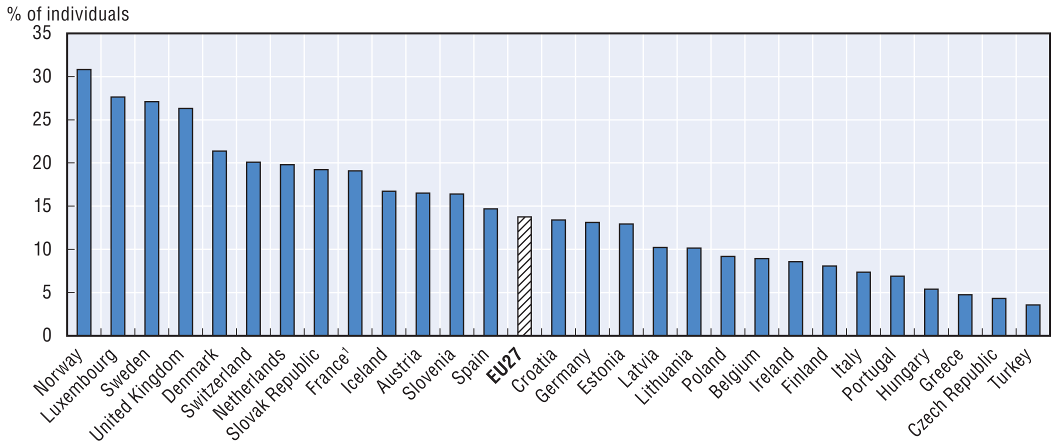
Any new connection to the Internet from home, if implemented via a fixed line, is now most likely to be broadband. The share of home-Internet-access households having a broadband connection is now above 90% in more than half of OECD countries, and above 80% in most of them.

In the year 2000, individuals connected to the Internet almost exclusively from home or the workplace, using fixed connections. In 2009, connecting to the Internet while on the move is a reality for an increasing number of users, and mobile Internet access is growing. A large range of handheld devices are now being used to connect to the Internet, as well as laptops, netbooks or other portable computers. The success of smartphones and tablet computers is one example, strongly linked to tremendous growth of Internet applications specifically developed for those devices.

The use of mobile phones to access the Internet remains limited in European countries (Figure 8.31), but is expected to grow in the coming years due to new generations of smartphones and increasing capacities of mobile networks (*e.g.* 3G and 4G). In the 27 European Union countries, the use of mobile phones to access the Internet by individuals jumped from 7.4% in 2008 to 13.8% in 2010.

In France, the use of mobile Internet is no longer restricted to a small section of the population and is starting to diffuse more broadly (Figure 8.26). In 2009, the two main reasons why people did not use mobile Internet was lack of need (among adults) and cost, which was judged too high among teenagers (CREDOC, 2010).

Figure 8.31. **Individuals using their mobile phone to access the Internet in selected OECD countries, 2010**

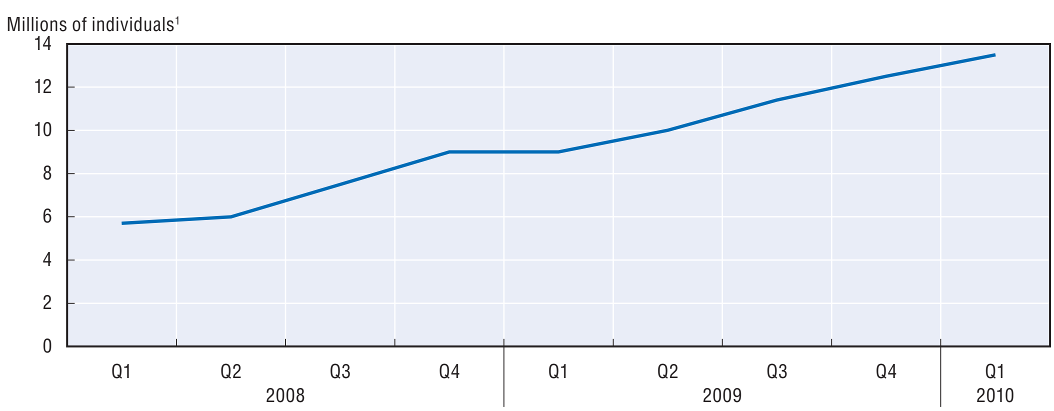


1. 2009 instead of 2010.

Source: EUROSTAT and Swiss Federal Statistical Office. StatLink http://dx.doi.org/10.1787/888932396960

In the United Kingdom, the number of people using the Internet on mobile phones has almost tripled in just three years, reaching 13.5 million for the first quarter of 2010 (Figure 8.32).

Figure 8.32. **Internet use on mobile phones in the United Kingdom, 2008-10**



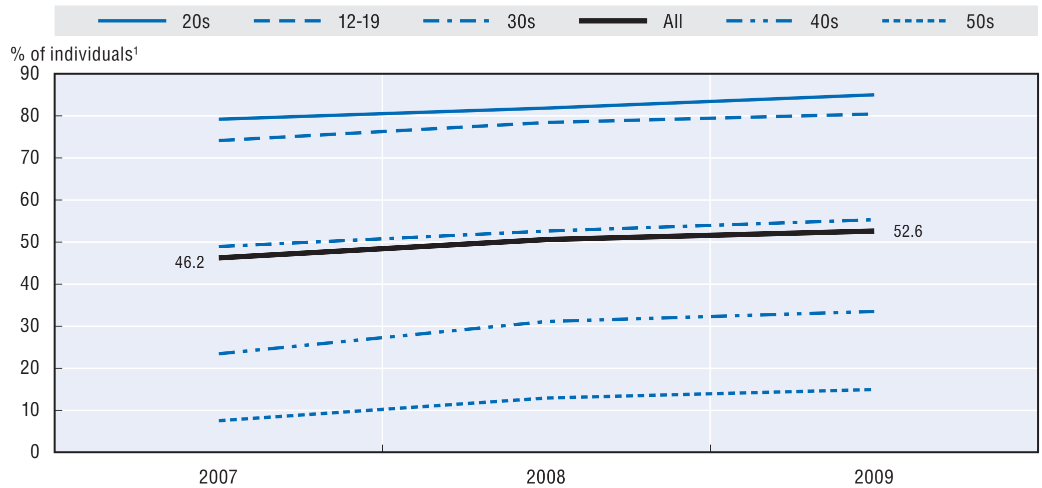
1. Individuals aged 15+ who declared having visited any site on the Internet on their mobile phone in the past 30 days.

Source: The Nielsen Company, as quoted in OFCOM (2010). StatLink http://dx.doi.org/10.1787/888932396979

Internet access using mobile telephones has also increased significantly in Korea in recent years (Figure 8.33). In 2009, more than half of individuals aged 12 to 59, who are mobile telephone wireless Internet users, reported using mobile phone wireless Internet in the last year. The main reasons given were availability, ubiquity and convenience, as needed.

Mobile phone Internet access is also a growing trend In the United States. In 2007, 19% of mobile phone owners used their phone to access the Internet. By May 2010, the share had doubled to 38% (PEW, 2010b). Moreover, the frequency of Internet access has clearly increased, mirroring the growing intensity of Internet presence via smartphones in the daily life of the country (Figure 8.34).

Figure 8.33. **Mobile phone wireless Internet usage by age in Korea, 2007-09**

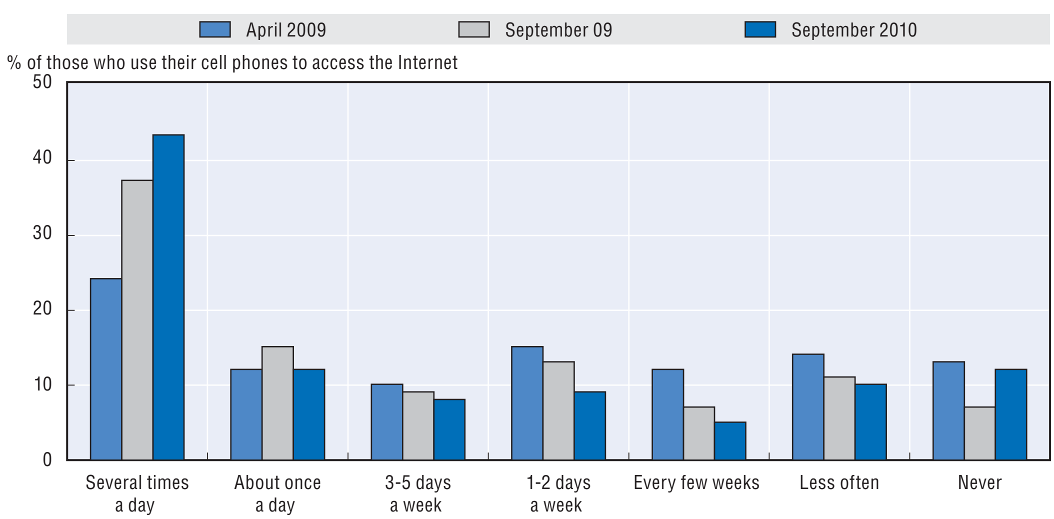


1. Aged 12-59.

Source: KISA, 2009.

StatLink http://dx.doi.org/10.1787/888932396998

Figure 8.34. **Access to the Internet or email using cellphones in the United States, 2009-10**



Source: PEW (2010b).

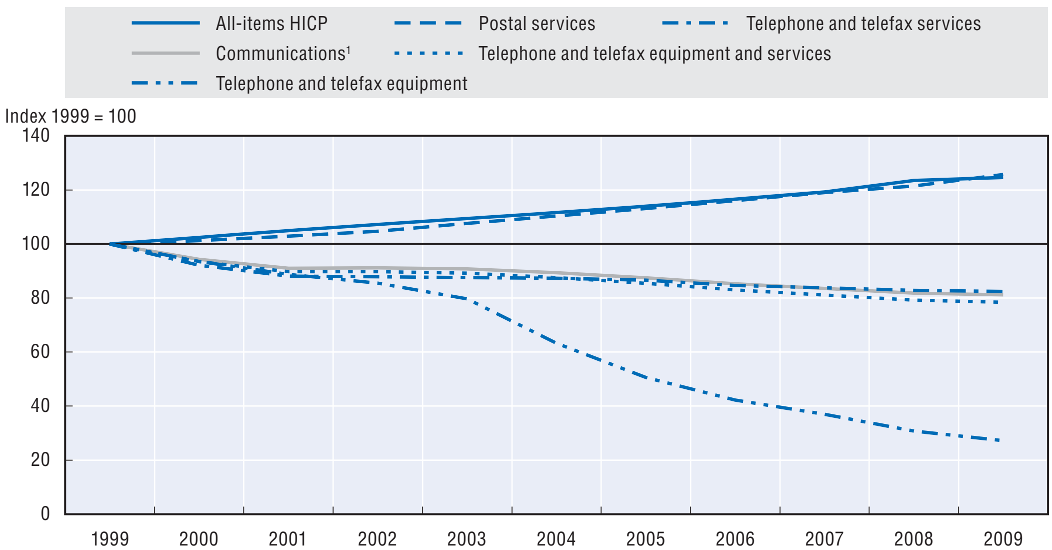
StatLink http://dx.doi.org/10.1787/888932397017

Consumer prices recent trends in communication services

The evolution of harmonized price indices in the European Union shows that while the general index for all items has increased by 25% over the last decade, the indices for communication have declined by 18.8% (Figure 8.35). Indices of equipment are declining over the period much more rapidly (72.8%) than those related to services (21.6%). The price of consumer communication equipment is influenced by Moore's law, as such equipment includes electronic components and, increasingly, digital processors. However, as with services, it is the level of competition that determines whether these gains are brought to the market and which country benefits to a greater relative extent.

Figure 8.35. **Trend of harmonized indices of consumer prices (HICP) for communication, EU25**

Index 1999 = 100



1. Communications includes: telephone and telefax equipment and services, telephone and telefax equipment and postal services.

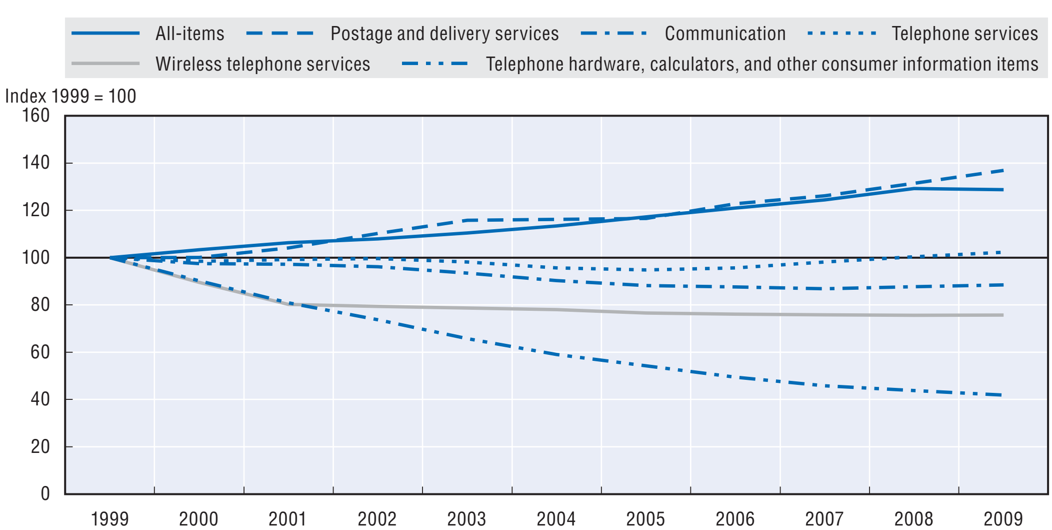
Source: Eurostat.

StatLink http://dx.doi.org/10.1787/888932397036

In the United States, during the same decade, the general index for all items increased by 28.7%, while the communication index declined by 11.5% (Figure 8.36). As observed in Europe, the indices of communication equipment in the United States are declining much more rapidly (58.2%) than those for communication services (11.5%). This decline is due uniquely to wireless telephone services (24.3%), as telephone services have shown a slight increase (2.3%).

Figure 8.36. **Trend of indices of consumer prices for communication, United States**

Index 1999 = 100



1. Communications includes: postage and delivery services and information and information processing.
2. Telephone services includes wireless telephone services and landline telephone services.

Source: US Bureau of Labor Statistics.

StatLink http://dx.doi.org/10.1787/888932397055

Box 8.1. Definition of communication expenditures*

Postal services

- Payments for the delivery of letters, postcards and parcels.
- Private mail and parcel delivery.
- Includes: all purchases of new postage stamps, pre-franked postcards and aerogrammes.
- Excludes: purchase of used or cancelled postage stamps; financial services of post offices.

Telephone and fax equipment

- Purchases of telephones, radio-telephones, telefax machines, telephone-answering machines and telephone loudspeakers.
- Repair of such equipment.
- Excludes: telefax and telephone-answering facilities provided by personal computers.

Telephone and telefax services

- Installation and subscription costs of personal telephone equipment.
- Telephone calls from a private line or from a public line (public telephone box, post office cabin, etc.); telephone calls from hotels, cafés, restaurants and the like.
- Telegraphy, telex and telefax services.
- Information-transmission services; Internet-connection services.
- Hire of telephones, telefax machines, telephone-answering machines and telephone loudspeakers.
- Includes: radio-telephony, radio-telegraphy and radiotelex services. Excludes: telefax and telephone-answering facilities provided by personal computers.

* Definitions based on COICOP classifications.

Box 8.2. Definition of audio-visual, photographic and information-processing equipment*

- Equipment for the reception, recording and reproduction of sound and pictures
- Photographic and cinematographic equipment and optical instruments
- Information-processing equipment
- Recording media
- Repair of audio-visual, photographic and information-processing equipment

* Definitions based on COICOP classifications.

Note

1. It should be noted that these shares have been calculated based on national accounts data using the COICOP classification (see Boxes 8.1 and 8.2 for details). Using other national sources, such as the National Household Budget Surveys, to calculate those shares may provide different results.

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Table 8.1. **Communication expenditures as a share of disposable income in OECD countries, 1990-2009**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009[2]
Australia	1.4	1.5	1.7	1.8	1.9	2.1	2.2	2.3	2.4	2.4	2.7	2.7	2.8	2.8	2.9	2.9	2.8	2.8	2.7	2.5
Austria	1.8	1.8	1.8	1.8	1.9	1.8	1.9	2.1	2.2	2.5	2.7	2.7	2.7	2.8	2.8	2.7	2.6	2.5	2.4	2.4
Belgium	..	..	..	..	..	1.6	1.7	1.9	2.0	2.2	2.3	2.5	2.7	2.9	2.9	2.9	2.6	2.5	2.3	2.4
Canada	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.1	2.0	2.1	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3
Chile	..	..	..	..	..	..	..	..	..	..	..	..	..	3.1	3.2	3.1	3.2	3.4	3.6	3.1
Czech Republic	..	..	..	..	..	1.5	1.9	1.9	1.9	1.8	2.0	2.4	3.0	3.4	3.4	3.5	3.8	3.6	3.5	3.6
Denmark	1.6	1.6	1.8	1.8	1.8	1.8	1.7	1.9	1.8	1.9	2.0	2.0	1.9	2.1	2.1	2.0	2.0	1.9	1.9	1.8
Estonia	..	..	..	..	..	1.8	2.0	2.0	2.2	2.7	3.0	3.1	3.0	3.2	3.2	3.0	3.0	3.6	3.5	2.6
Finland	1.4	1.4	1.5	1.5	1.6	1.6	1.9	2.2	2.5	3.0	3.1	3.3	3.3	3.2	3.3	2.8	2.7	2.6	2.4	2.2
France	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	2.2	2.3	2.5	2.6	2.7	2.7	2.8	2.7	2.7	2.7	2.7
Germany	..	1.7	1.8	1.9	1.9	2.0	2.0	2.1	2.2	2.3	2.5	2.8	2.8	2.8	2.9	2.9	2.8	2.8	2.8	2.8
Greece	..	..	..	..	..	..	..	..	..	..	1.6	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.2	1.2
Hungary	..	..	..	..	..	1.9	2.5	2.9	3.3	3.9	4.1	4.4	4.8	4.5	4.3	4.5	4.2	4.0	4.0	3.7
Iceland	1.4	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.4	1.9	2.1	2.4	2.7	2.8	2.7	2.6	2.5	2.7	2.7	2.7
Ireland	..	..	..	..	..	1.9	2.0	2.1	2.0	2.0	2.2	2.4	2.6	2.9	3.3	3.4	3.5	3.3	3.2	3.4
Israel	..	..	..	..	..	2.9	3.0	3.2	3.4	3.7	3.9	4.0	4.3	4.3	4.3	4.3	4.2	4.5	4.1	4.4
Italy	1.6	1.7	1.7	1.7	1.8	1.8	2.0	2.1	2.3	2.5	2.7	2.7	2.8	2.8	2.8	2.8	2.7	2.7	2.6	2.5
Japan	1.3	1.3	1.3	1.5	1.5	1.7	1.9	2.0	2.2	2.4	2.5	2.6	2.8	2.9	3.1	3.1	3.1	3.2	3.3	3.3
Korea	1.5	1.5	1.6	1.7	1.9	2.2	2.6	3.2	4.0	4.8	5.4	5.6	5.6	5.3	5.3	5.1	4.8	4.6	4.5	4.4
Luxembourg	..	..	..	..	..	1.3	1.5	1.6	1.9	1.8	1.7	1.8	1.7	1.9	1.9	1.8	1.8	1.8	1.7	1.8
Mexico	2.2	2.6	2.9	3.1	3.3	3.2	3.1	3.0	2.9	3.1	3.1	3.3	3.3	3.3	3.6	3.8	4.1	4.4	4.2	4.6
Netherlands	1.9	1.9	1.9	2.1	2.1	2.2	2.6	2.8	3.2	3.5	3.9	4.2	4.5	4.7	4.6	4.6	4.7	4.5	4.3	4.2
New Zealand	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Norway	..	1.9	1.6	1.8	1.7	1.8	1.9	1.9	2.1	2.5	2.6	2.7	2.8	2.8	3.2	3.2	3.2	2.9	2.8	2.7
Poland	..	..	..	..	..	2.2	2.1	1.6	2.1	2.6	2.7	2.9	3.0	3.1	3.1	3.4	3.3	3.2	3.2	3.0
Portugal	..	..	..	..	..	..	..	..	..	..	2.6	3.1	3.2	3.2	3.3	3.2	3.2	3.1	2.9	2.6
Slovak Republic	..	..	..	..	..	2.1	2.1	2.1	2.5	3.0	3.2	3.8	3.7	3.7	3.6	3.6	3.7	3.7	3.6	3.8
Slovenia	..	..	..	..	..	1.8	1.9	1.9	2.0	2.2	2.2	2.4	2.9	2.9	3.2	3.5	3.6	3.1	3.1	3.2
Spain	..	..	..	..	..	1.8	1.9	2.0	2.1	2.3	2.4	2.6	2.7	2.5	2.6	2.6	2.6	2.6	2.7	2.8
Sweden	..	..	..	1.9	2.0	2.2	2.5	2.7	3.0	3.2	3.1	3.4	3.6	3.7	3.7	3.6	3.4	3.3	3.3	3.2
Switzerland	1.9	2.0	2.0	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.4	2.4	2.5	2.6	2.7	2.8	2.7	2.6	2.5
Turkey	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.2
United States	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.5	2.4	2.3	2.2	2.3	2.3	2.3	2.4
OECD 29[3]	..	..	..	..	..	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7

Notes:

1. See detailed definition of communication expenditures in Box 8.1. As indicated at the beginning of this chapter, it should be noted that those shares have been calculated based on national accounts data using the COICOP classification (see Box 8.1 and 8.2). The use of other national sources, such as National Households Budget Surveys, to calculate those shares, may provide different results.

2. OECD estimates for Australia, Chile, Japan, Portugal, Switzerland and OECD 29.

3. OECD 29: Chile, Greece, New Zealand, Portugal and Turkey are not included.

Source: OECD, based on SNA database, March 2011.

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Table 8.2. **Index[1] of average relative propensity for communication expenditures[2] by households in OECD countries, selected years**

	1995		2000		2009	
	Rank	Index	Rank	Index	Rank	Index
Australia	9	1.035	12	1.051	20	0.924
Austria	19	0.924	10	1.067	25	0.879
Belgium	27	0.810	21	0.903	24	0.879
Canada	17	0.930	26	0.834	26	0.856
Czech Republic	28	0.777	28	0.782	7	1.302
Denmark	23	0.889	29	0.761	29	0.667
Estonia	20	0.923	9	1.158	19	0.968
Finland	26	0.814	7	1.216	27	0.820
France	16	0.941	20	0.909	17	0.979
Germany	13	0.988	17	0.970	13	1.036
Hungary	14	0.967	2	1.584	6	1.366
Iceland	30	0.564	27	0.824	18	0.971
Ireland	15	0.955	23	0.854	8	1.255
Israel	2	1.478	3	1.526	3	1.602
Italy	18	0.930	13	1.031	22	0.915
Japan	25	0.839	16	0.977	9	1.194
Korea	4	1.116	1	2.109	2	1.607
Luxembourg	29	0.664	30	0.679	30	0.650
Mexico	1	1.595	6	1.217	1	1.671
Netherlands	3	1.117	4	1.513	4	1.531
Norway	21	0.920	14	1.023	16	0.990
Poland	6	1.088	11	1.055	12	1.109
Slovak Republic	8	1.047	5	1.250	5	1.377
Slovenia	22	0.907	22	0.865	11	1.158
Spain	24	0.882	19	0.919	14	1.021
Sweden	5	1.089	8	1.199	10	1.185
Switzerland	7	1.085	25	0.846	21	0.919
United Kingdom	10	1.017	24	0.852	28	0.792
United States	11	1.015	18	0.943	23	0.881
OECD 29[3]	12	1.000	15	1.000	15	1.000

1. Defined, for a country I, as the share of household expenditure in communication of this country I, divided by the share of household expenditures in communication of the 29 OECD countries as a whole.

2. Detailed definition of communication expenditures at the end of Box 8.1.

3. Chile, Greece, New Zealand, Portugal and Turkey are not included.

Source: OECD, based on SNA database, March 2011.

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Table 8.3. **Pace of diffusion for selected goods/services in selected OECD countries**

Estimated number of years to move from …

… 20 to 50% of households	**Canada**	**Finland**	**France**	**Japan**	**Netherlands**	**United Kingdom**
TV	2	..	..	..	..	..
Colour TV	..	7	4	3	4	..
PC	7	5	7	5	8	7
VCR	3	6	5	5	6	..
Mobile phone	4	2	2	..	..	3
Mobile phone[1]	..	3	3	4	2	..
Internet at home	3.75	5.3	5.8	..	2.5	4.2
Broadband at home	4	2	2.75[1]	..	2.2	..
… 20 to 40% of households						
Internet at home	2.25	2.9	4.33	..	1.5	2
Broadband at home	2.6	1.6	2[1]	..	2.4	1.6

1. Percentage of individuals.

Source: OECD estimates, based on data from the OECD Telecom database, Statistics Canada, Cabinet Office (Japan), Statistics Finland, Statistics Netherlands, INSEE and CREDOC (France), and the Office of National Statistics (United Kingdom).

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Table 8.4. **Households with broadband access, 2000-10**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Australia	..	..	..	..	16.3	28.3	43.0	52.0	62.0	..	..
Austria	..	..	..	10.3	15.9	23.1	33.1	46.1	54.5	57.8	63.7
Belgium	..	..	..	..	..	40.6	48.0	56.4	60.3	63.4	70.0
Canada	..	21.6	29.3	35.5	44.1	50.1	57.9	64.2	66.9	72.0	..
Chile	..	..	..	6.2	..	..	14.8	..	..	..	
Czech Republic	..	..	..	1.5	4.5	5.1	16.6	28.1	36.4	48.9	53.6
Denmark	..	..	..	25.1	35.8	51.2	63.3	69.5	74.1	76.0	80.1
Estonia	..	..	..	..	20.3	29.8	36.6	47.6	54.4	62.0	64.5
EU27	..	..	..	..	14.9	23.0	30.4	41.6	48.6	56.0	61.0
Finland	..	..	..	12.4	21.3	36.1	52.9	62.9	66.1	73.7	75.8
France	..	..	..	..	..	..	30.3	42.9	57.1	57.5	66.8
Germany	..	..	..	9.3	18.0	23.2	33.5	49.6	54.9	64.6	75.2
Greece	..	..	..	0.6	0.2	0.6	3.8	7.5	22.5	33.1	41.2
Hungary	..	..	..	..	5.8	10.9	22.0	33.0	42.3	50.9	52.2
Iceland	..	..	..	..	45.4	63.5	72.1	76.1	83.2	86.7	..
Ireland	..	..	..	0.6	2.9	7.4	13.1	30.7	42.9	53.7	57.5
Italy	..	..	..	..	..	12.9	16.2	25.3	30.8	39.0	48.9
Japan	..	..	..	32.7	43.0	44.3	40.7	51.7	58.5	60.0	..
Korea	30.3	56.4	68.0	66.0	85.7	90.8	94.0	94.1	94.3	95.9	..
Luxembourg	..	..	..	7.4	16.3	33.4	44.1	57.8	61.0	71.1	70.3
Mexico	..	0.3	0.4	..	1.8	2.3	4.1	6.1	9.6	13.7	..
Netherlands	..	..	..	20.0	31.3	53.9	66.2	73.8	74.0	77.0	..
New Zealand	..	..	..	..	..	..	33.0	..	..	63.0	..
Norway	..	..	..	22.9	30.0	41.4	57.1	66.7	73.0	77.8	82.6
Poland	..	..	..	..	8.3	15.6	21.6	29.6	37.9	51.1	56.8
Portugal	..	..	..	7.9	12.3	19.7	24.0	30.4	39.3	46.2	50.3
Slovak Republic	..	..	..	..	3.6	7.1	11.4	26.5	35.3	41.7	49.4
Slovenia	..	..	..	..	10.2	19.4	33.6	43.6	49.7	56.1	62.0
Spain	..	..	..	..	15.0	20.8	29.3	39.2	44.6	51.3	57.4
Sweden	..	..	..	..	..	40.2	51.0	66.6	70.7	79.5	82.6
Switzerland	..	..	..	..	..	..	52.8	63.0	70.8	..	77.0
Turkey	..	..	..	..	0.2	1.7	..	16.5	..	26.2	33.7
United Kingdom	..	..	..	10.7	15.8	31.5	43.9	56.7	61.5	69.5	..
United States	4.4	9.1	..	19.9	..	..	..	50.8	..	63.5	..

Notes:

Generally, data from the EU Community Survey on household use of ICT, which covers EU countries plus Iceland, Norway and Turkey, relate to the first quarter of the reference year.

For Australia: data for '2000', '2002 and 2003' is based on a calendar year, data provided relate to the reference year.

For Australia: data for '2001' and for' 2004' onwards is based on a financial year, data provided relate to the second half of the reference year and the first half of the following year.

For Australia: data was based on a multi-staged area sample of private and non-private dwellings, and covers the civilian population only.

For Australia: data for '2005-06' to '2008-09' includes persons aged 15 years and over except members of the permanent defence forces, certain diplomatic personnel of overseas governments customarily excluded from census and estimated population counts, overseas residents in Australia, and members of non-Australian defence forces (and their dependants) stationed in Australia.

For Australia: data for '2000' to '2004-05' includes persons aged 18 years and over except members of the permanent defence forces, certain diplomatic personnel of overseas governments customarily excluded from census and estimated population counts, overseas residents in Australia, and members of non-Australian defence forces (and their dependants) stationed in Australia.

For Canada: Statistics for 2001 and every other year thereafter include the territories (Northwest Territories, Yukon Territory and Nunavut). For the even years, statistics include the 10 provinces only.

For the Czech Republic, data relate to the fourth quarter of the reference year.

For Japan: Households with Internet access via FTTx, ADSL, cable and fixed wireless broadband.

For Korea: For 2000 to 2003, data included broadband access modes such as xDSL, cable and other fixed and wireless broadband via computers. As of 2004, data also included mobile phone access.

For Luxembourg: For 2004, data include wireless access.

For Mexico: For 2001 and 2002, households with Internet access via cable. From 2004, households with Internet access via cable, ADSL or fixed wireless.

For New Zealand: The information is based on households in private occupied dwellings. Visitor-only dwellings, such as hotels, are excluded.

For Norway: For 2003, data include LAN (wireless or cable).

Source: OECD, ICT database and Eurostat, *Community Survey on ICT usage in households and by individuals*, February 2011.

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Chapter 9

Trade in Communication Equipment and Services

This chapter focuses on major trends in communication equipment, ICT goods and communication services trade among OECD countries and the rest of the world. During 2009, the global financial crisis (GFC) significantly disturbed trade worldwide, and while ICT has not escaped its influence, ongoing demand has to some extent softened the blow.

Part of this chapter covers recent changes in ICT product definitions, examining the classifications used to measure trade and the techniques used to bridge the different classifications (Box 9.1).

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.

Trends in communication equipment trade

Total exports and imports sharply declined for almost all OECD countries in 2009. The effects of the crisis are evident when looking at statistics for world and OECD trade for all commodities, or for ICT goods in that year (Figures 9.1 and 9.2).

Figure 9.1. **World trade, 1996-2009**

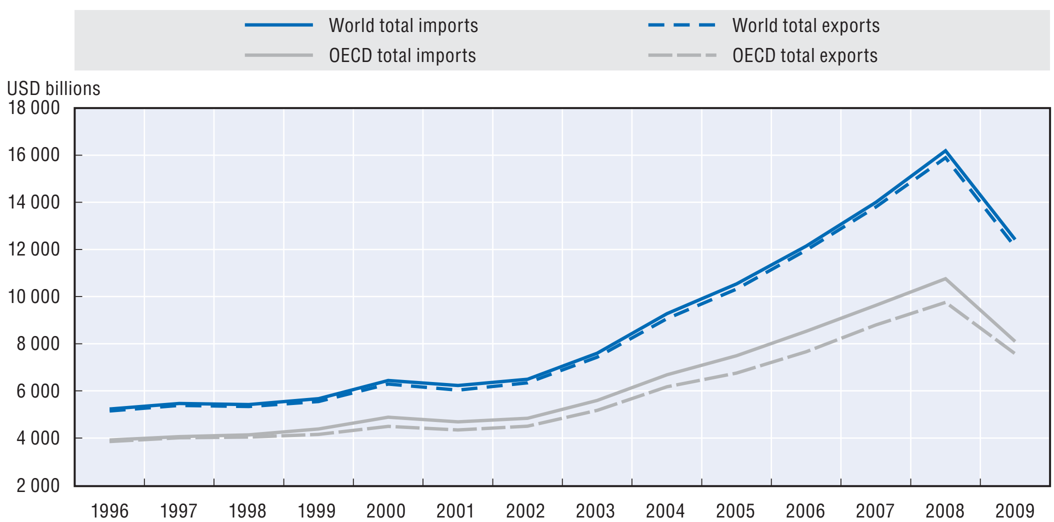

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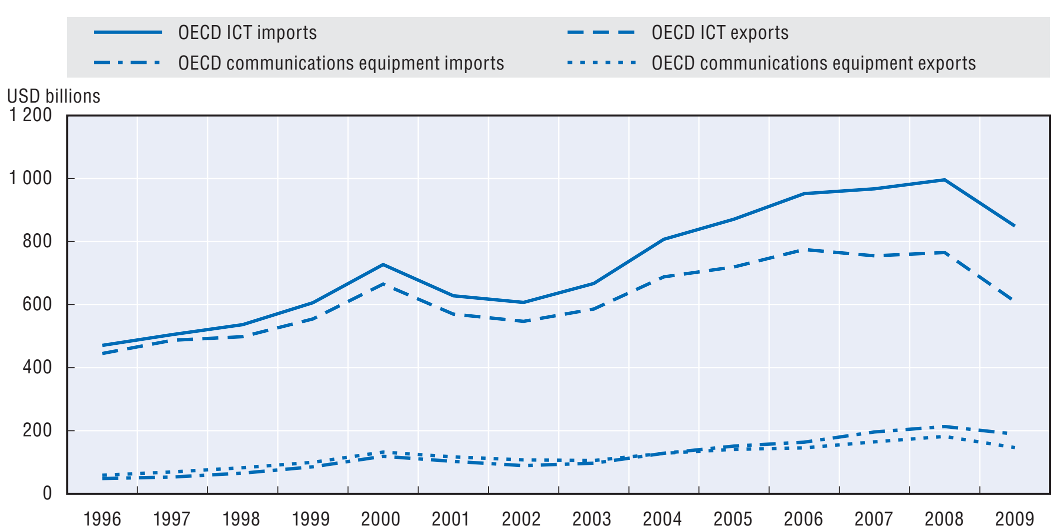
Figure 9.2. **OECD trade in ICT goods and communications equipments**



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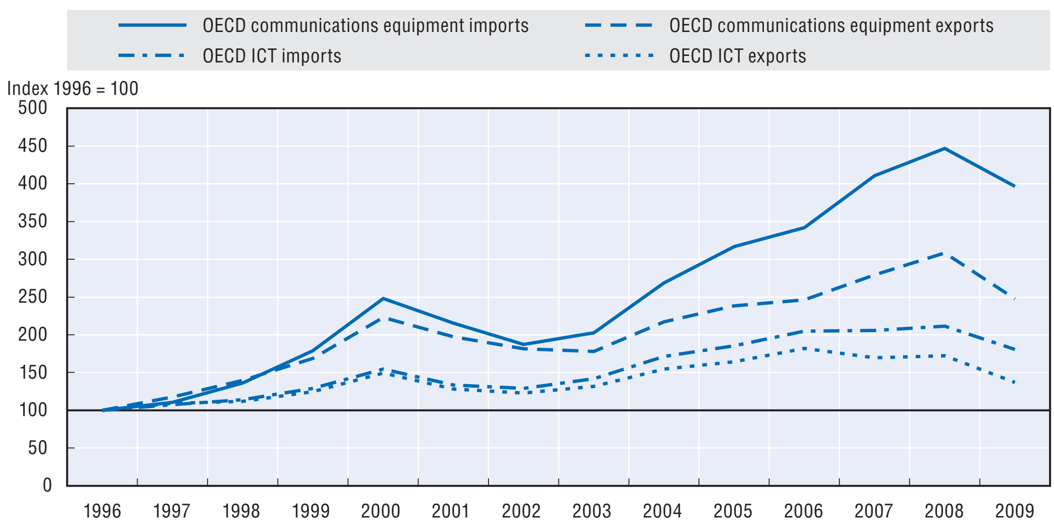
The crisis created a sharp downturn in the world's demand for imported goods. For ICT, the experience was similar to that of the dotcom bubble, following which ICTs recovered and grew strongly. In short, while ICT goods experienced a decline in 2009, trade remained at historically high levels. For communications equipment trade the decline was slightly less precipitous relative to the period that followed the dotcom bubble (Figure 9.2).

The index of OECD trends in ICT goods and communication equipment trade (Figure 9.3) recorded more dynamic growth for communication equipment over the 1996-2009 period than for the whole ICT group. Exports and imports in communication equipment multiplied by 3 and 4.5 respectively during the 1996-2008 period, prior to the crisis. Conversely, communication equipment was more affected by the crisis, with decreases of 61% and 50% in exports and imports respectively compared to 35% and 31% for the whole ICT group.

Figure 9.3. **Index of the OECD trade in ICT goods and communications equipments**



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Box 9.1. A new ICT product definition and measurement issues

In 2008, the OECD adopted a new ICT products definition. This was designed using the second version of the Central Product Classification (CPC Rev. 2) and was published in the *Guide to Measuring Information Society* (2009). A correspondence for the definition of ICT goods was found for the Harmonised System (2002 and 2007) – a classification used in trade analysis, and also recently adopted by the OECD. Consistency problems created by the use of these two versions of the HS classification were dealt with by grouping time series to create a more aggregated six-digit time series called "blocs of time series".

In previous editions of the *Communications Outlook* this chapter has typically focused on communication equipment. While these data are covered, other data concerning the broader ICT market are also included on the basis that a number of ICT devices now incorporate communication capabilities. The ICT goods group comprises: electronic components, computers and peripheral equipment, communication equipment, consumer electronic equipment and miscellaneous categories.

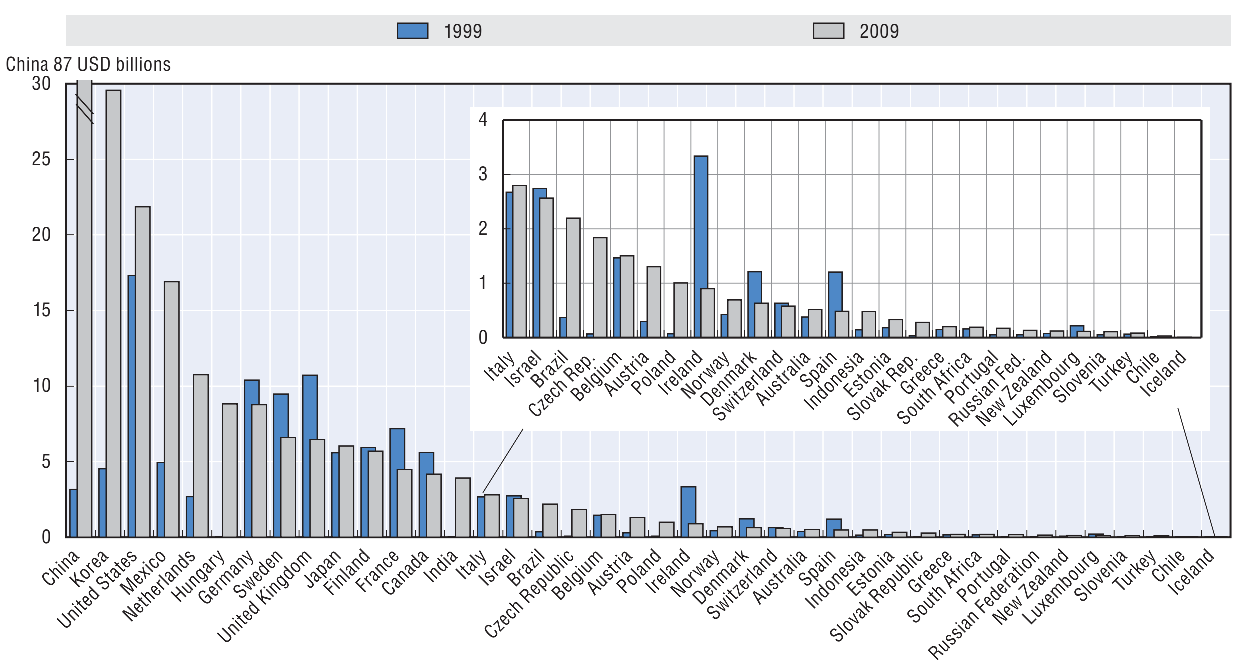
Box 9.1. **A new ICT product definition and measurement issues** *(cont.)*

A further measurement issue concerns the use of estimates for United Kingdom exports of mobile phones for 2005 and 2006. Due to the United Kingdom's experience with "missing-trader fraud", the available data are misleading. Furthermore, three additional member countries joined the OECD in the course of 2010: Chile, Israel and Slovenia. As a consequence, these countries need to be added to the trade time series for the period 1996-2009. Finally, but not least, the data for China are not adjusted for re-exports and re-imports for Hong Kong, China. In terms of international trade, Hong Kong, China, has a special status and is not included within China's trade. As Hong Kong, China, is a major shipping port, double counting of exports from China and re-exports from Hong Kong would modify Chinese figures. Work is underway to develop a methodology to deduct re-exports from China's total exports. For the time being, data for China do not include data for Hong Kong, China. Due to these measurement issues, trade data published in this edition of *Communications Outlook* differ from previous editions.

The major players

The leading OECD exporters of communications equipment are Korea, Mexico, the Netherlands and the United States (Figure 9.4). China is the world's largest player. In 2004, China overtook the United States in telecommunication equipment exports. The OECD exporters mentioned above managed to develop their leading position in the export of communications equipment over the previous decade.

Figure 9.4. **Top exporters of communications equipment, OECD area and others, USD billions**



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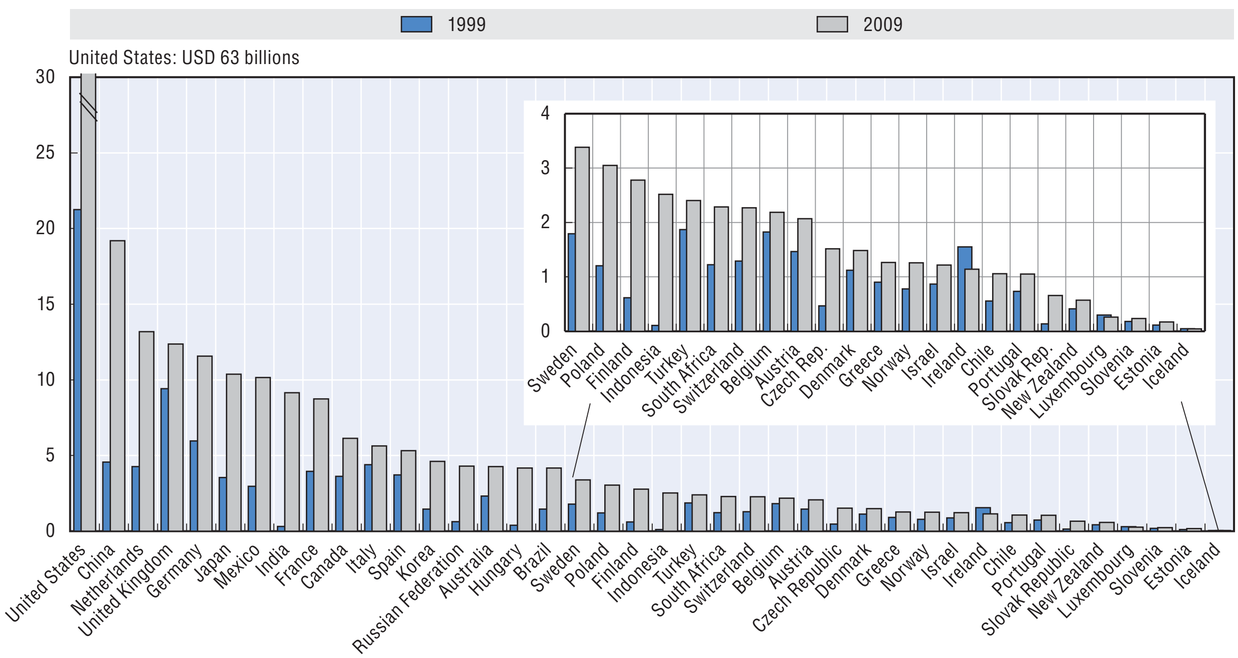
Countries that were historically large communication equipment exporters, such as Canada, Finland, France, Germany, Sweden or the United Kingdom, have a lower export value than 10 years ago. These countries are now found among the biggest importers of communications equipment. Germany, Japan, the Netherlands and the United Kingdom follow the United States and China, which hold, respectively, first and second place (Figure 9.5). It is likely that a shift occurred in the production pattern of the former countries, through offshoring a bigger share of production to China. This situation may also reflect shifts in demand for certain types of equipment in line with technological change (*e.g.* telecommunication exchanges for Internet routers).

Figure 9.5. **Top importers of communications equipment, OECD area and others, USD billions**



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When looking at trade balances (Figure 9.6) Hungary, Korea and Mexico have an impressive trade surplus. Only four other OECD countries have a positive trade balance: the Czech Republic, Finland, Israel and Sweden. All other OECD countries have a negative trade balance for communications equipment. That being said, it is likely that the situation is significantly different for the headquarters of some of the firms involved given the use of outsourcing. In addition, the software used on devices (*e.g.* smartphone applications) are frequently added at different stages of value chains. These data would likely be counted as services.

The same pattern is applied for the value of communication equipment exports as a percentage of all exports (Figure 9.7). The most specialised countries in the production of communication equipment are: Finland, Hungary, Korea and Mexico. Some of these countries gained specialisation in this field, while others chose to diversify their exports strategies in the previous decade (Finland, Israel and Sweden). The revealed comparative advantage (RCA) measures the intensity of trade specialisation of a country within the world, and lists the following OECD countries as being the most specialised in exporting

Figure 9.6. **Communications equipment trade balance, 2009, USD millions**

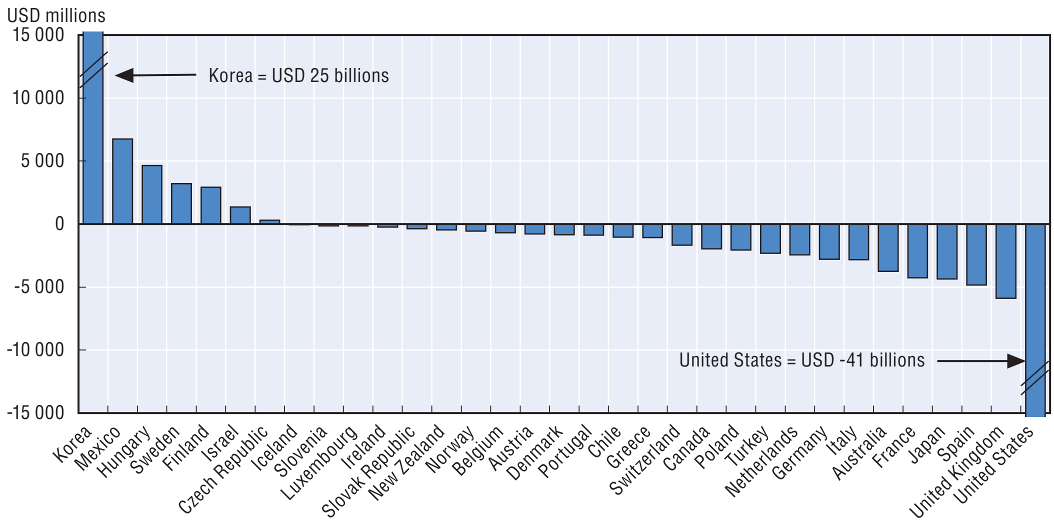

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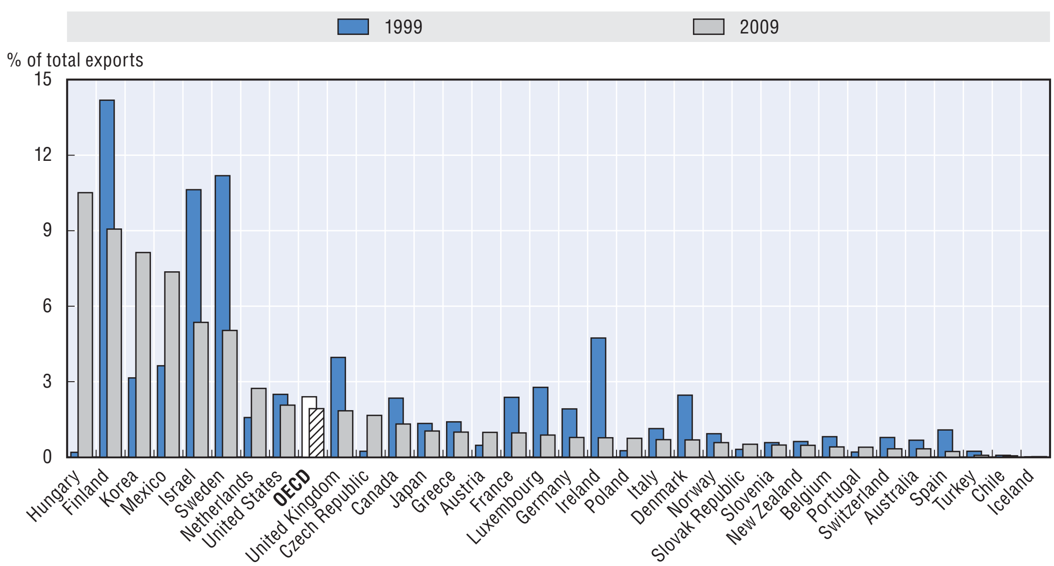
Figure 9.7. **Ratio of communications equipment exports to total exports**



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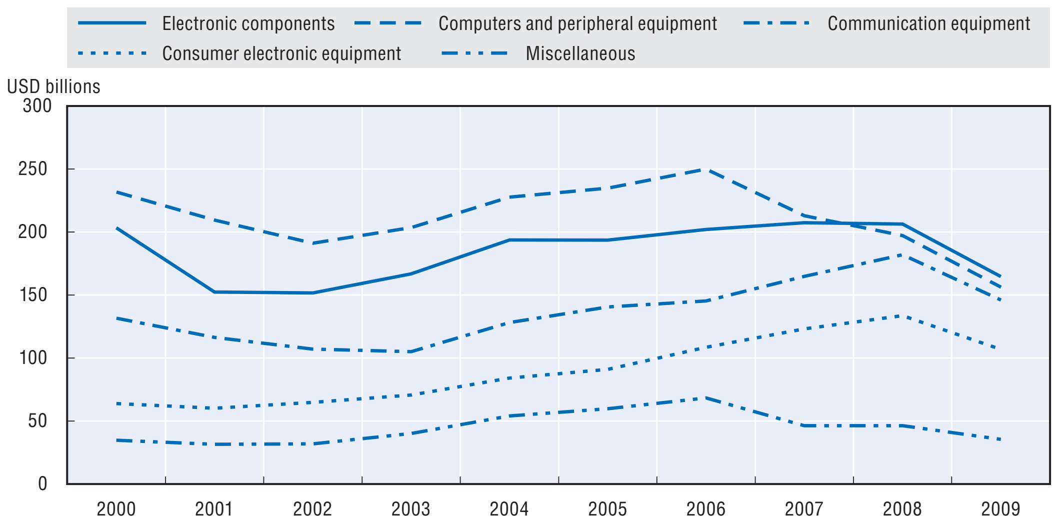
communication equipment: Estonia, Finland, Hungary, Korea, Mexico, Israel and Sweden (Table 9.10). This is very similar to the list of OECD countries with high levels of communication equipment exports as a percentage of their GDP: the Czech Republic, Estonia, Finland, Hungary, Israel, Korea, Mexico, the Netherlands and Sweden.

The ICT goods group

The ICT goods group was formed following the adoption of the new ICT product definition in 2008 and its transcription into the Harmonised System classification (HS) in 2010. There are five components of this group: computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components and miscellaneous. All categories declined sharply in value terms in 2009 (Figure 9.8) with the exception of the computers and peripheral equipment category, which began to decline in 2006. This is mainly due to the growing competitiveness of China in the most value-added segment of the computer market. It is likely that the other OECD countries, with the exception of Korea, may continue to lose ground in this market, specialising instead in services. The communication equipment category has remained in third position within the ICT group in terms of value of exports.

Figure 9.8. **OECD ICT sector exports, 2000-09**



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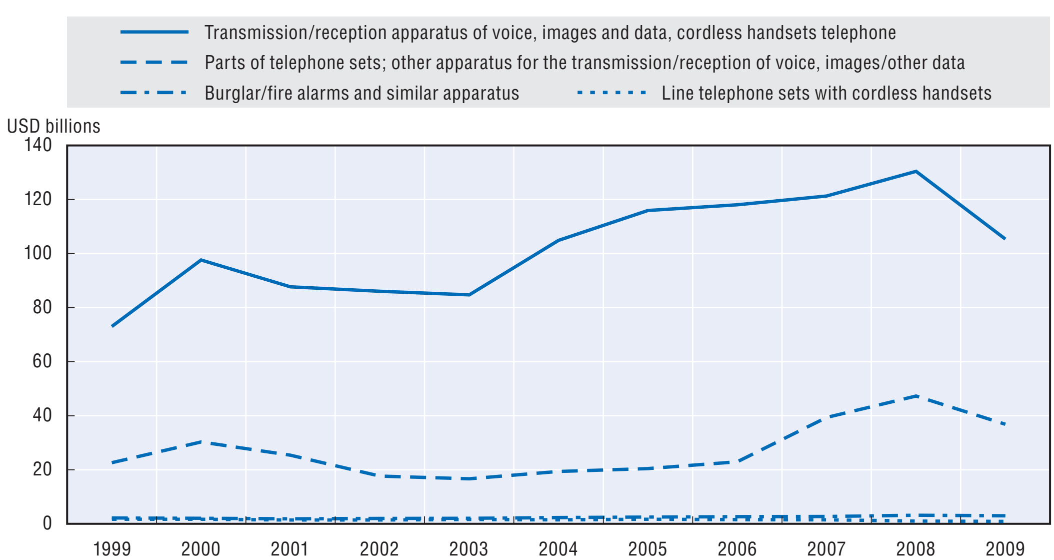
The leading communication series

Within the communication equipment category, the product group that accounts for the most exports falls under the heading "Transmission/reception apparatus of voice, images and data, cordless handsets telephone" and includes cell phone handsets (Figure 9.9).

Figure 9.9. **OECD Communication equipment exports, 1999-2009**



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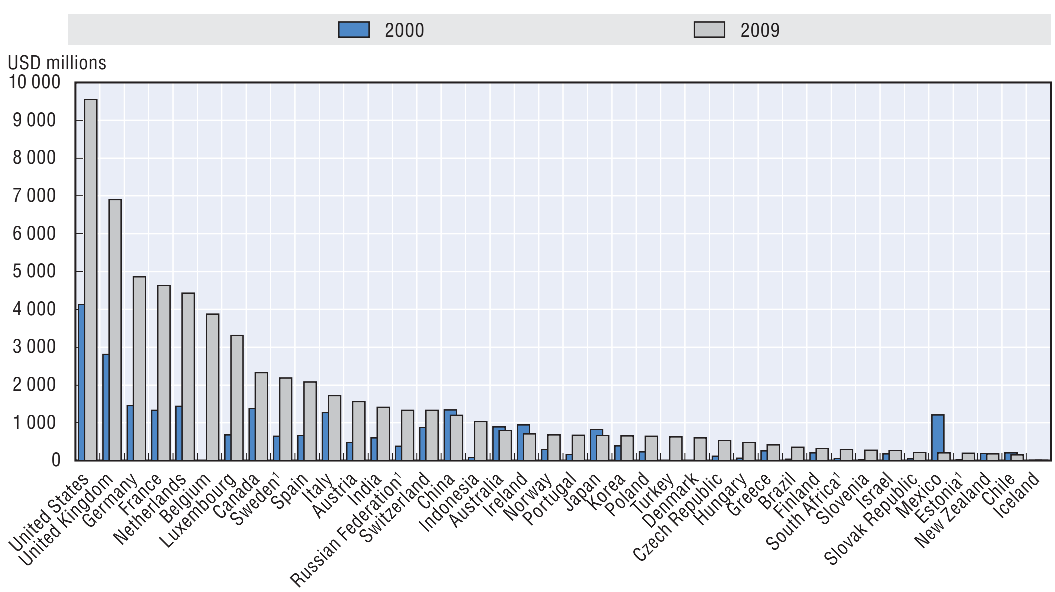
This product group alone accounts for 72% of all telecommunication equipment exports and has contributed to export growth for the entire telecommunication equipment category, increasing sixfold the value of exports in 10 years, until 2008. This product group includes seven different six-digit codes, among them the code for cellphone handsets. The grouping of these seven codes into one time series was undertaken to ensure consistency, as the time series have to cover two different HS classification versions (HS 2002 and HS 2007), which do not offer straight correspondence at the six-digit level.

Trade in communication services

Data on trade in services are being developed and are more complete than in previous years. Nevertheless, the indicators are still quite aggregated and only two indicators are available: communication services and telecommunication services. The first, which has more countries available, is covered here. Communication services (245) have generally been used as an indicator rather than the sub-category telecommunication services (247). The latter would normally be better suited to the subject of this chapter, however, the sub-category does not contain sufficient detailed data for all countries, nor is its time series long enough. (See Box 9.2 for the definition of communication services.)

Growth in trade in communication services has been fairly substantial for the past eight years (Figures 9.10 and 9.11): total trade in communication services grew by 125% and exports by 149%, while imports grew by 104% over the same period.

Figure 9.10. **Exports of communication services for 2000 and 2009, USD millions**



1. Data for 2008 instead of 2009.

StatLink http://dx.doi.org/10.1787/888932397245

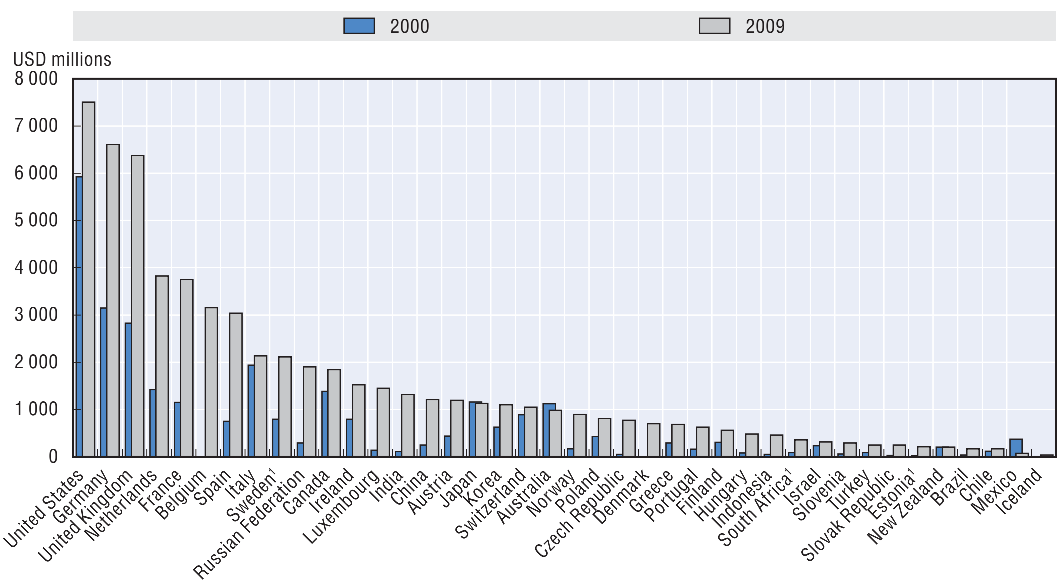
Almost the same countries are leading in both exports and imports of communication services: Belgium, France, Germany, the Netherlands, Spain, the United Kingdom and the United States. When considering the trade balance, Belgium, France, Luxembourg, the Netherlands and the United States are the largest exporters. The largest importers are Germany, Ireland, Italy and Spain.

Box 9.2. **Definition of communication services (EBOPS 245)**

Communication services comprise two major categories of transactions relating to international communications between residents and non-residents:

- Telecommunications (247): transmission of sounds, images or other information via telephone, telex, telegram, cable, radio or television, satellite, electronic mail, facsimile, etc., including network communications, teleconferences and support services.
- Postal and courier services (246): the collection, transport and distribution of post (letters, newspapers, periodicals, brochures and other printed matter) and parcels by national postal authorities or other operators, as well as postal window services and postbox rentals.

Figure 9.11. **Imports of communication services for 2000 and 2009, USD millions**



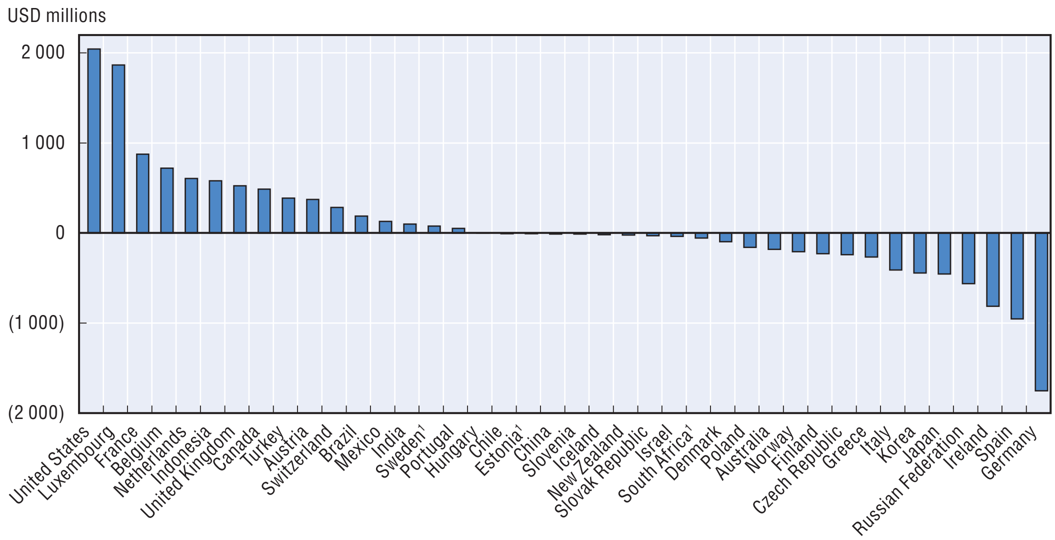
1. Data for 2008 instead of 2009.

StatLink http://dx.doi.org/10.1787/888932397264

It is important to emphasise, however, that a substantial percentage of telephone traffic cannot be measured if it is carried over leased lines. These circuits, which are reserved for a particular group of users, do not pass through a single international gateway and are thus not counted in international traffic statistics. Moreover, telecommunication services increasingly make use of technologies that use types of Internet protocol (IP), such as voice over Internet protocol (VoIP), where transmission takes the form of "IP packets" sent over the Internet that are not necessarily included in measurements of trade in services.

International telephony forms part of the total for trade in communication services – although for some countries the absolute amount of exports and imports may not be closely correlated with overall population size. In terms of trade balance, Luxembourg is second only to the United States (Figure 9.12). Luxembourg's ranking, relative to many much larger countries, may be related to a number of factors: international satellite services may be a driver in terms of the country's relatively large amount of exports and imports, while a further candidate is Skype (based in Luxembourg), which may influence these data.

Figure 9.12. **Trade balance of communication services, 2009, USD millions**



1. Data for 2008 instead of 2009.

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Prior to the liberalisation of telecommunication markets, telecommunication carriers used a settlement system (*i.e.* the use of accounting rates). Following liberalisation this system is rarely, if at all, used between OECD countries, with international services to fixed and mobile networks – as well as all types of Internet traffic including VoIP – being carried by carriers over their own networks or terminated by partner networks.

Where there has been a significant decline in exports – as for example in Mexico – this probably indicates a reduction in previously high settlements (in other words, exports included net settlement revenue for calls coming into Mexico from, for example, the United States). By way of contrast, increased exports and imports may be influenced by exchange of Internet traffic. A country such as the Netherlands has one of the world's largest Internet Exchange Points (IXP). That being said, the amount of revenue associated with transit traffic between Internet networks is unknown. It is more likely that the increase in exports and imports is due to other communication services such as postal services.

Table 9.1. **Communication equipment exports, USD millions, 1996-2009**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 1999-2009
Australia	356	423	310	378	549	468	194	318	402	430	436	474	575	514	3.1
Austria	209	475	271	295	412	402	728	856	1 081	1 882	1 930	2 215	2 057	1 302	16.0
Belgium	1 069	1 062	1 505	1 464	2 272	2 795	1 445	1 378	1 402	1 701	1 320	1 819	2 102	1 504	0.3
Canada	3 360	3 893	4 059	5 615	10 497	4 806	3 751	3 500	4 419	5 776	6 898	6 955	5 573	4 171	-2.9
Chile	2	4	4	11	10	8	11	12	8	14	17	27	30	28	9.6
Czech Republic	65	54	96	64	176	467	535	813	905	632	605	1 901	2 583	1 837	39.8
Denmark	558	877	1 095	1 211	1 296	1 250	2 173	1 561	1 524	2 513	1 685	1 224	818	631	-6.3
Estonia	9	78	157	179	689	474	253	325	440	491	527	494	506	330	6.3
Finland	3 389	4 052	5 504	5 931	8 259	6 808	7 185	8 130	7 737	10 606	10 572	12 083	12 834	5 698	-0.4
France	3 480	4 166	5 795	7 180	9 751	7 253	6 445	5 679	6 814	6 661	9 505	5 472	4 989	4 473	-4.6
Germany	7 017	8 663	8 508	10 386	12 297	12 753	12 847	12 102	17 463	19 891	18 899	17 165	11 514	8 766	-1.7
Greece	60	96	132	150	303	218	203	226	312	267	353	283	307	200	2.9
Hungary	18	39	58	49	756	1 608	2 828	4 027	6 843	6 077	6 249	9 586	11 091	8 827	68.1
Iceland	0.002	0.02	0.06	0.07	0.35	0.39	0.41	0.35	0.8	1.0	2.5	1.6	3.0	1.1	31.3
Ireland	795	1 208	1 747	3 337	2 828	2 986	2 168	1 184	1 215	1 133	961	1 257	1 493	898	-12.3
Israel	1 609	1 991	2 354	2 745	3 741	3 219	2 367	2 224	2 690	2 146	2 505	207	3 453	2 566	-0.7
Italy	1 792	2 175	2 520	2 672	2 841	3 395	2 401	2 349	3 116	3 644	3 778	3 966	3 651	2 799	0.5
Japan	4 570	5 016	4 891	5 600	7 719	5 726	4 052	4 506	4 338	3 458	2 995	7 147	7 312	6 037	0.8
Korea	1 325	1 833	2 302	4 527	6 559	8 325	10 823	14 650	20 357	20 493	18 336	28 928	34 488	29 574	20.6
Luxembourg	..	..	..	217	450	721	533	263	222	228	170	174	146	113	-6.3
Mexico	1 767	2 537	3 483	4 946	8 595	8 805	7 222	5 816	7 563	8 855	10 367	9 485	17 752	16 899	13.1
Netherlands	1 296	1 300	1 558	2 692	4 416	4 342	1 945	3 011	4 213	4 397	4 572	14 049	13 500	10 744	14.8
New Zealand	77	103	93	75	71	58	69	95	98	95	96	117	140	119	4.8
Norway	412	484	491	425	412	414	361	418	578	611	634	671	851	693	5.0
Poland	42	69	75	69	87	105	152	153	183	476	613	805	1 260	1 003	30.6
Portugal	48	37	30	49	53	67	64	79	88	145	119	154	165	172	13.4
Slovak Republic	..	65	51	32	32	44	23	22	46	123	372	248	352	280	24.3
Slovenia	106	85	85	50	73	123	120	150	171	117	115	161	164	107	7.9
Spain	820	929	956	1 204	1 131	1 166	1 049	1 459	1 346	1 292	1 087	671	607	483	-8.7
Sweden	5 426	6 726	7 748	9 479	10 220	4 753	5 344	5 805	7 817	7 900	7 166	8 873	9 685	6 606	-3.5
Switzerland	619	653	672	632	700	671	524	529	693	1 269	842	648	654	579	-0.9
Turkey	66	54	89	63	83	96	64	55	48	42	53	91	119	82	2.7
United Kingdom	6 284	5 167	10 569	10 720	14 145	14 870	15 558	11 033	8 787	10 657	13 124	6 081	6 505	6 471	-4.9
United States	12 373	15 156	15 293	17 307	20 904	17 710	13 973	12 660	15 648	17 025	18 881	21 937	25 202	21 863	2.4
OECD	59 010	69 390	82 346	99 573	131 639	116 432	107 154	105 064	128 127	140 557	145 257	164 877	181 972	146 039	3.9
Brazil	62	197	227	367	1 065	1 260	1 320	1 294	1 079	2 721	2 990	2 212	2 412	2 197	19.6
China	1 772	2 049	2 499	3 164	5 907	7 813	9 723	13 269	23 730	33 084	47 747	79 394	90 410	86 950	39.3
India	40	46	30	32	34	46	50	67	77	107	186	262	315	3 915	61.9
Indonesia	257	195	234	142	288	115	125	209	226	363	288	301	410	479	12.9
Russian Federatio	44	53	32	49	51	31	52	57	89	73	315	233	124	133	10.5
South Africa	68	103	182	159	183	180	157	161	197	157	165	225	196	188	1.7
World	71 110	82 652	96 637	115 368	156 025	142 672	135 974	141 278	179 757	210 004	234 995	298 017	331 027	289 192	9.6

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399107

Table 9.2. **Communication equipment imports, USD millions, 1996-2009**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 1999-2009
Australia	1 332	1 331	1 268	2 327	2 999	2 071	1 710	2 174	2 956	3 164	3 764	4 125	4 228	4 271	6.3
Austria	518	591	1 105	1 465	1 549	1 165	1 288	1 624	1 872	2 576	2 077	2 422	2 575	2 069	3.5
Belgium	953	1 141	1 423	1 825	2 049	2 649	1 758	1 655	1 788	2 571	1 936	2 762	2 911	2 187	1.8
Canada	2 310	2 778	2 992	3 630	5 469	4 220	3 605	3 533	4 095	4 255	5 111	6 074	6 678	6 133	5.4
Chile	337	453	613	555	573	506	475	413	615	785	1 089	1 202	1 327	1 058	6.7
Czech Republic	558	485	442	466	730	585	606	794	959	683	886	1 785	2 186	1 517	12.5
Denmark	787	903	1 068	1 122	1 430	1 440	2 110	1 664	2 104	3 882	2 646	1 936	1 540	1 484	2.8
Estonia	60	96	96	113	115	128	135	275	181	188	193	306	291	172	4.3
Finland	441	457	564	616	1 180	1 072	710	869	1 138	2 185	2 450	4 417	5 423	2 779	16.3
France	2 151	2 781	3 267	3 959	4 862	5 145	3 910	4 371	5 432	6 724	10 163	8 273	9 151	8 746	8.2
Germany	3 234	3 859	4 970	5 956	8 045	9 225	8 432	7 847	13 285	16 530	17 364	14 739	12 932	11 566	6.9
Greece	254	457	817	903	820	690	555	906	1 068	933	1 125	1 492	1 655	1 266	3.4
Hungary	351	333	363	392	604	665	1 006	1 746	2 402	1 814	1 674	4 524	4 904	4 181	26.7
Iceland	31	32	47	47	64	39	36	45	46	70	62	97	75	44	-0.6
Ireland	345	565	890	1 551	1 846	2 386	1 535	991	1 247	1 386	1 486	1 488	1 537	1 140	-3.0
Israel	759	621	673	869	995	805	736	588	785	865	897	1 149	1 236	1 217	3.4
Italy	2 074	3 080	3 816	4 387	5 046	4 224	3 966	4 430	7 294	7 083	6 853	6 871	7 076	5 626	2.5
Japan	3 553	3 117	3 177	3 543	4 870	3 854	2 886	2 557	2 807	3 086	3 737	9 266	10 482	10 380	11.3
Korea	1 467	1 448	698	1 453	3 005	1 773	1 531	1 423	1 424	1 852	2 610	4 540	5 342	4 610	12.2
Luxembourg	..	..	..	299	512	738	499	358	348	459	354	304	301	262	-1.3
Mexico	1 144	1 768	2 359	2 962	4 496	4 092	2 646	2 669	3 528	3 731	5 695	5 596	11 781	10 149	13.1
Netherlands	1 502	1 785	2 323	4 272	5 771	6 062	3 165	3 740	5 755	6 254	5 669	16 309	15 462	13 181	11.9
New Zealand	336	327	306	414	450	320	248	327	458	542	488	584	647	572	3.3
Norway	641	672	756	780	809	711	634	775	1 059	1 001	1 101	1 397	1 562	1 260	4.9
Poland	565	848	994	1 204	1 359	1 314	1 212	1 307	1 360	1 808	2 131	2 989	3 578	3 050	9.7
Portugal	345	472	639	735	682	718	687	740	877	959	911	1 261	1 368	1 053	3.7
Slovak Republic	..	268	231	136	136	188	228	275	364	485	757	821	770	657	17.1
Slovenia	75	106	112	180	181	143	146	157	234	167	197	289	336	235	2.7
Spain	2 189	1 743	2 224	3 716	4 076	3 233	2 708	3 413	4 720	5 587	5 787	6 398	6 245	5 324	3.7
Sweden	1 017	1 259	1 688	1 793	2 255	1 560	1 357	1 717	2 737	2 623	2 549	4 174	4 325	3 384	6.6
Switzerland	905	1 091	1 234	1 289	1 498	1 198	1 109	1 245	1 541	2 108	1 811	2 195	2 528	2 270	5.8
Turkey	459	698	1 104	1 868	2 354	847	659	840	1 441	1 739	2 023	2 725	2 524	2 402	2.5
United Kingdom	5 962	4 923	7 742	9 416	12 721	9 622	8 016	9 674	13 332	14 788	15 795	15 089	14 644	12 365	2.8
United States	11 128	12 261	14 970	21 258	34 891	29 595	29 270	31 797	39 202	48 531	52 050	58 631	65 906	62 898	11.5
OECD	47 725	52 653	64 875	85 387	118 328	102 853	89 437	96 664	128 273	151 224	163 249	195 923	213 235	189 338	8.3
Brazil	1 105	1 807	1 645	1 463	1 700	1 847	502	463	782	1 021	1 091	3 090	4 603	4 173	11.0
China	2 660	2 260	4 193	4 573	5 797	6 906	6 299	7 285	5 752	5 234	6 807	18 972	19 072	19 196	15.4
India	121	225	250	306	406	487	1 187	2 441	3 293	4 576	6 000	7 785	5 390	9 157	40.5
Indonesia	1 215	1 401	386	106	225	235	347	455	917	1 085	981	1 430	2 940	2 517	37.2
Russian Federation	903	1 347	1 029	629	697	1 037	1 251	1 310	2 064	3 627	6 074	6 919	8 126	4 296	21.2
South Africa	651	1 112	1 880	1 223	1 352	1 100	1 157	1 148	1 662	2 200	2 478	2 678	2 831	2 284	6.4
World	69 242	80 865	93 270	111 827	153 373	141 002	125 222	137 271	179 045	219 059	244 527	306 729	335 119	299 820	10.4

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399126

Table 9.3. **Communication equipment balance, USD millions, 1996-2009**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	- 976	- 908	- 958	- 1 950	- 2 450	- 1 602	- 1 516	- 1 856	- 2 555	- 2 734	- 3 328	- 3 651	- 3 653	- 3 757
Austria	- 310	- 116	- 834	- 1 169	- 1 137	- 764	- 560	- 768	- 791	- 695	- 147	- 207	- 518	- 767
Belgium	116	- 80	82	- 361	223	147	- 313	- 276	- 385	- 869	- 615	- 944	- 810	- 683
Canada	1 050	1 115	1 068	1 986	5 029	586	146	- 33	324	1 520	1 787	880	- 1 104	- 1 962
Chile	- 335	- 449	- 609	- 544	- 563	- 497	- 464	- 402	- 607	- 770	- 1 072	- 1 175	- 1 297	- 1 030
Czech Republic	- 494	- 432	- 345	- 401	- 554	- 118	- 71	19	- 54	- 51	- 281	115	396	320
Denmark	- 229	- 26	27	89	- 133	- 191	63	- 103	- 581	- 1 368	- 961	- 712	- 722	- 853
Estonia	- 51	- 18	61	66	574	346	118	50	259	302	334	188	215	158
Finland	2 948	3 595	4 940	5 315	7 079	5 736	6 474	7 261	6 599	8 421	8 122	7 667	7 411	2 919
France	1 329	1 385	2 528	3 221	4 889	2 108	2 535	1 307	1 382	- 63	- 658	- 2 801	- 4 162	- 4 274
Germany	3 784	4 804	3 538	4 430	4 252	3 529	4 415	4 255	4 178	3 361	1 534	2 426	- 1 418	- 2 800
Greece	- 194	- 361	- 684	- 753	- 517	- 472	- 352	- 680	- 756	- 667	- 772	- 1 209	- 1 348	- 1 066
Hungary	- 333	- 294	- 305	- 343	152	943	1 822	2 281	4 441	4 263	4 574	5 062	6 187	4 646
Iceland	- 31	- 32	- 47	- 47	- 64	- 39	- 36	- 45	- 45	- 69	- 59	- 95	- 72	- 43
Ireland	450	643	857	1 786	982	600	633	193	- 33	- 253	- 526	- 231	- 43	- 242
Israel	849	1 370	1 681	1 876	2 745	2 414	1 632	1 636	1 905	1 281	1 608	- 942	2 217	1 350
Italy	- 282	- 904	- 1 296	- 1 715	- 2 205	- 828	- 1 565	- 2 081	- 4 178	- 3 439	- 3 075	- 2 905	- 3 425	- 2 828
Japan	1 017	1 899	1 714	2 056	2 849	1 872	1 165	1 949	1 531	372	- 741	- 2 119	- 3 170	- 4 343
Korea	- 141	385	1 605	3 074	3 554	6 552	9 292	13 227	18 933	18 641	15 726	24 387	29 146	24 964
Luxembourg	..	..	..	- 83	- 62	- 17	33	- 95	- 126	- 230	- 184	- 129	- 156	- 149
Mexico	623	769	1 125	1 984	4 099	4 714	4 576	3 147	4 036	5 124	4 672	3 889	5 971	6 750
Netherlands	- 206	- 485	- 766	- 1 580	- 1 354	- 1 721	- 1 221	- 730	- 1 542	- 1 858	- 1 096	- 2 259	- 1 962	- 2 437
New Zealand	- 260	- 224	- 214	- 339	- 379	- 262	- 179	- 232	- 361	- 447	- 392	- 467	- 508	- 453
Norway	- 229	- 188	- 265	- 354	- 397	- 297	- 273	- 357	- 481	- 390	- 467	- 726	- 710	- 567
Poland	- 524	- 779	- 919	- 1 135	- 1 273	- 1 208	- 1 060	- 1 155	- 1 177	- 1 332	- 1 519	- 2 184	- 2 318	- 2 047
Portugal	- 297	- 435	- 609	- 686	- 630	- 651	- 623	- 661	- 789	- 813	- 793	- 1 107	- 1 203	- 882
Slovak Republic	..	- 204	- 180	- 104	- 105	- 144	- 205	- 253	- 319	- 361	- 385	- 573	- 419	- 377
Slovenia	31	- 22	- 26	- 130	- 108	- 20	- 25	- 7	- 63	- 50	- 82	- 128	- 172	- 129
Spain	- 1 369	- 814	- 1 269	- 2 512	- 2 945	- 2 066	- 1 659	- 1 954	- 3 375	- 4 295	- 4 700	- 5 727	- 5 638	- 4 840
Sweden	4 409	5 468	6 060	7 686	7 965	3 193	3 987	4 089	5 080	5 277	4 617	4 699	5 359	3 222
Switzerland	- 285	- 438	- 562	- 658	- 798	- 527	- 585	- 716	- 848	- 839	- 969	- 1 547	- 1 874	- 1 691
Turkey	- 393	- 644	- 1 015	- 1 805	- 2 271	- 751	- 595	- 785	- 1 392	- 1 697	- 1 970	- 2 634	- 2 405	- 2 320
United Kingdom	322	244	2 827	1 304	1 424	5 248	7 542	1 359	- 4 545	- 4 131	- 2 671	- 9 008	- 8 139	- 5 894
United States	1 245	2 895	323	- 3 952	- 13 986	- 11 885	- 15 297	- 19 137	- 23 554	- 31 505	- 33 169	- 36 694	- 40 704	- 41 035
OECD	11 286	16 738	17 471	14 186	13 312	13 579	17 717	8 400	- 146	- 10 666	- 17 992	- 31 046	- 31 262	- 43 299
Brazil	- 1 044	- 1 609	- 1 418	- 1 096	- 635	- 588	818	831	297	1 700	1 899	- 877	- 2 191	- 1 976
China	- 887	- 211	- 1 694	- 1 409	111	907	3 423	5 984	17 978	27 851	40 940	60 422	71 338	67 754
India	- 81	- 180	- 219	- 274	- 372	- 441	- 1 137	- 2 373	- 3 215	- 4 469	- 5 814	- 7 523	- 5 075	- 5 242
Indonesia	- 958	- 1 206	- 152	36	62	- 120	- 222	- 246	- 691	- 722	- 693	- 1 130	- 2 530	- 2 038
Russian Federati	- 860	- 1 293	- 997	- 580	- 647	- 1 006	- 1 199	- 1 253	- 1 975	- 3 555	- 5 759	- 6 686	- 8 002	- 4 163
South Africa	- 583	- 1 010	- 1 698	- 1 064	- 1 169	- 920	- 1 000	- 987	- 1 466	- 2 043	- 2 313	- 2 453	- 2 635	- 2 096
World	1 868	1 788	3 368	3 541	2 652	1 671	10 752	4 007	713	- 9 055	- 9 532	- 8 711	- 4 092	- 10 628

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399145

Table 9.4. **Communication equipment total trade, USD millions, 1996-2009**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 1999-2009
Australia	1 688	1 754	1 578	2 705	3 549	2 539	1 904	2 492	3 358	3 594	4 200	4 598	4 803	4 785	5.9
Austria	727	1 066	1 376	1 760	1 961	1 567	2 016	2 480	2 952	4 458	4 006	4 637	4 632	3 371	6.7
Belgium	2 021	2 203	2 929	3 289	4 321	5 444	3 203	3 033	3 190	4 272	3 256	4 581	5 013	3 691	1.2
Canada	5 670	6 671	7 051	9 245	15 966	9 026	7 356	7 033	8 514	10 031	12 010	13 029	12 251	10 304	1.1
Chile	340	457	618	566	583	514	486	425	623	799	1 105	1 229	1 356	1 086	6.7
Czech Republic	623	539	538	530	906	1 052	1 140	1 607	1 863	1 315	1 490	3 686	4 769	3 355	20.3
Denmark	1 345	1 779	2 163	2 332	2 726	2 690	4 282	3 226	3 628	6 395	4 331	3 161	2 358	2 115	-1.0
Estonia	69	174	253	293	804	601	388	600	621	679	720	800	797	503	5.6
Finland	3 830	4 509	6 069	6 547	9 439	7 879	7 895	8 999	8 874	12 791	13 022	16 500	18 256	8 477	2.6
France	5 632	6 947	9 062	11 139	14 613	12 398	10 355	10 050	12 246	13 386	19 668	13 745	14 140	13 219	1.7
Germany	10 251	12 522	13 479	16 342	20 342	21 978	21 278	19 949	30 748	36 421	36 263	31 904	24 445	20 332	2.2
Greece	315	553	949	1 053	1 124	907	758	1 133	1 381	1 200	1 478	1 774	1 962	1 466	3.4
Hungary	369	372	420	441	1 360	2 273	3 834	5 773	9 245	7 891	7 923	14 109	15 995	13 007	40.3
Iceland	31	32	47	47	64	40	36	45	47	71	64	98	78	45	-0.4
Ireland	1 140	1 773	2 638	4 888	4 674	5 372	3 703	2 176	2 462	2 519	2 447	2 745	3 030	2 037	-8.4
Israel	2 368	2 611	3 027	3 613	4 736	4 024	3 103	2 812	3 475	3 012	3 403	1 356	4 689	3 783	0.5
Italy	3 867	5 255	6 336	7 060	7 888	7 619	6 367	6 779	10 410	10 728	10 631	10 837	10 726	8 425	1.8
Japan	8 123	8 133	8 068	9 143	12 589	9 580	6 938	7 063	7 144	6 544	6 732	16 413	17 794	16 417	6.0
Korea	2 792	3 281	3 000	5 981	9 564	10 097	12 354	16 073	21 781	22 345	20 947	33 468	39 830	34 184	19.0
Luxembourg	..	..	..	516	961	1 459	1 032	621	571	687	523	478	447	374	-3.2
Mexico	2 910	4 304	5 842	7 908	13 091	12 897	9 867	8 486	11 091	12 586	16 062	15 081	29 533	27 048	13.1
Netherlands	2 797	3 084	3 881	6 964	10 187	10 404	5 110	6 751	9 968	10 651	10 241	30 358	28 962	23 926	13.1
New Zealand	413	430	399	488	521	378	318	422	556	637	584	702	787	691	3.5
Norway	1 054	1 156	1 248	1 205	1 221	1 125	995	1 193	1 637	1 612	1 736	2 068	2 413	1 952	4.9
Poland	607	917	1 068	1 273	1 446	1 419	1 364	1 460	1 543	2 284	2 744	3 794	4 838	4 053	12.3
Portugal	393	509	669	784	735	786	750	819	965	1 104	1 030	1 415	1 533	1 225	4.6
Slovak Republic	..	333	282	168	168	231	250	297	410	608	1 130	1 069	1 122	937	18.8
Slovenia	181	191	197	229	253	266	266	307	405	284	311	451	499	342	4.1
Spain	3 009	2 671	3 180	4 921	5 208	4 399	3 757	4 873	6 066	6 879	6 874	7 069	6 852	5 807	1.7
Sweden	6 443	7 985	9 437	11 273	12 475	6 312	6 701	7 522	10 555	10 523	9 715	13 047	14 010	9 990	-1.2
Switzerland	1 524	1 744	1 906	1 921	2 199	1 870	1 633	1 774	2 235	3 376	2 652	2 843	3 182	2 849	4.0
Turkey	525	753	1 193	1 931	2 437	942	722	895	1 489	1 781	2 077	2 816	2 644	2 484	2.6
United Kingdom	12 246	10 090	18 312	20 136	26 866	24 492	23 574	20 706	22 119	25 445	28 919	21 171	21 150	18 836	-0.7
United States	23 502	27 417	30 262	38 565	55 795	47 305	43 243	44 457	54 850	65 556	70 931	80 568	91 108	84 761	8.2
OECD	106 735	122 043	147 221	184 961	249 967	219 285	196 591	201 729	256 401	291 781	308 506	360 800	395 207	335 377	6.1
Brazil	1 167	2 004	1 872	1 831	2 764	3 107	1 821	1 758	1 861	3 742	4 082	5 302	7 015	6 370	13.3
China	4 432	4 309	6 692	7 736	11 704	14 720	16 022	20 554	29 481	38 318	54 554	98 366	109 482	106 146	30
India	161	271	280	337	440	533	1 237	2 508	3 370	4 683	6 185	8 047	5 704	13 072	44.2
Indonesia	1 472	1 596	621	248	513	350	472	664	1 143	1 448	1 269	1 731	3 351	2 996	28.3
Russian Federation	947	1 400	1 061	678	748	1 068	1 304	1 367	2 154	3 700	6 390	7 152	8 251	4 429	20.6
South Africa	719	1 215	2 062	1 382	1 535	1 280	1 314	1 309	1 859	2 357	2 644	2 902	3 027	2 473	6.0
World	140 353	163 517	189 907	227 195	309 398	283 674	261 196	278 549	358 802	429 063	479 522	604 746	666 146	589 012	10.0

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399164

Table 9.5. **Communication equipment exports as a percentage of all goods exports, 1996-2009**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 1999-2009
Australia	0.59	0.67	0.56	0.67	0.86	0.74	0.30	0.45	0.46	0.41	0.35	0.34	0.31	0.34	-6.7
Austria	0.37	0.84	0.45	0.47	0.66	0.62	1.02	0.96	0.98	1.60	1.44	1.41	1.19	0.99	7.7
Belgium	0.63	0.62	0.84	0.82	1.23	1.47	0.67	0.54	0.46	0.51	0.36	0.42	0.44	0.41	-6.8
Canada	1.77	1.81	1.89	2.35	3.78	1.84	1.49	1.29	1.39	1.60	1.78	1.66	1.22	1.32	-5.6
Chile	0.01	0.02	0.03	0.07	0.06	0.04	0.06	0.05	0.03	0.04	0.03	0.04	0.04	0.05	-3.2
Czech Republic	0.30	0.24	0.34	0.24	0.61	1.40	1.39	1.67	1.38	0.81	0.64	1.57	1.81	1.66	21.3
Denmark	1.10	1.82	2.28	2.47	2.61	2.50	3.90	2.42	2.04	3.02	1.84	1.12	0.71	0.68	-12.1
Estonia	0.43	2.67	4.84	5.94	17.99	11.85	5.82	5.77	6.74	5.95	5.25	4.21	3.69	3.17	-6.1
Finland	8.36	9.89	12.74	14.19	18.04	15.90	16.09	15.48	12.70	16.26	13.68	13.41	13.25	9.06	-4.4
France	1.23	1.47	1.93	2.37	3.30	2.50	2.11	1.59	1.65	1.53	1.98	1.01	0.84	0.96	-8.6
Germany	1.37	1.69	1.56	1.91	2.23	2.23	2.09	1.62	1.92	2.04	1.68	1.29	0.79	0.78	-8.6
Greece	0.53	0.86	1.22	1.40	2.77	2.11	1.89	1.66	2.05	1.52	1.69	1.20	1.20	1.00	-3.3
Hungary	0.14	0.20	0.25	0.20	2.69	5.27	8.24	9.36	12.34	9.76	8.44	10.13	10.25	10.51	48.9
Iceland	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.01	0.03	0.03	0.07	0.03	0.06	0.03	22.4
Ireland	1.65	2.25	2.72	4.73	3.71	3.86	2.46	1.28	1.16	1.03	0.88	1.03	1.17	0.77	-16.6
Israel	7.84	8.85	10.10	10.62	11.91	11.08	8.02	7.00	6.96	5.02	5.35	0.38	5.63	5.35	-6.6
Italy	0.71	0.91	1.04	1.14	1.18	1.39	0.94	0.78	0.88	0.98	0.91	0.79	0.68	0.69	-4.8
Japan	1.11	1.19	1.26	1.34	1.61	1.42	0.97	0.95	0.77	0.58	0.46	1.00	0.94	1.04	-2.5
Korea	1.06	1.35	1.74	3.15	3.81	5.53	6.66	7.56	8.02	7.21	5.63	7.79	8.17	8.14	9.9
Luxembourg	..	..	..	2.77	5.71	8.72	6.20	2.63	1.83	1.80	1.20	1.08	0.82	0.88	-10.8
Mexico	1.85	2.30	2.97	3.63	5.20	5.59	4.49	3.53	4.02	4.13	4.15	3.49	6.09	7.36	7.3
Netherlands	0.72	0.75	0.93	1.58	2.45	2.47	1.11	1.32	1.45	1.37	1.24	2.95	2.67	2.74	5.7
New Zealand	0.54	0.75	0.78	0.63	0.56	0.44	0.50	0.58	0.48	0.44	0.43	0.44	0.46	0.48	-2.7
Norway	0.83	1.00	1.22	0.94	0.69	0.70	0.61	0.62	0.70	0.59	0.52	0.49	0.48	0.58	-4.7
Poland	0.17	0.27	0.26	0.25	0.27	0.29	0.37	0.29	0.25	0.53	0.56	0.58	0.73	0.75	11.5
Portugal	0.20	0.15	0.12	0.20	0.22	0.28	0.25	0.25	0.25	0.38	0.27	0.30	0.30	0.40	7.1
Slovak Republic		0.67	0.48	0.32	0.27	0.35	0.16	0.10	0.16	0.39	0.89	0.43	0.50	0.51	5.0
Slovenia	1.28	1.01	0.94	0.58	0.83	1.33	1.16	1.17	1.08	0.65	0.55	0.61	0.56	0.48	-2.0
Spain	0.80	0.87	0.86	1.08	1.00	1.00	0.83	0.93	0.74	0.67	0.51	0.26	0.22	0.22	-14.6
Sweden	6.55	8.26	9.12	11.18	11.70	6.23	6.44	5.67	6.34	6.07	4.86	5.25	5.27	5.04	-7.7
Switzerland	0.78	0.86	0.85	0.79	0.87	0.82	0.60	0.53	0.59	0.97	0.57	0.38	0.33	0.34	-8.2
Turkey	0.28	0.21	0.33	0.24	0.30	0.30	0.18	0.12	0.08	0.06	0.06	0.08	0.09	0.08	-10.2
United Kingdom	2.43	1.84	3.87	3.96	5.00	5.46	5.54	3.59	2.52	2.77	2.93	1.38	1.42	1.84	-7.4
United States	1.99	2.20	2.25	2.50	2.68	2.42	2.02	1.75	1.91	1.88	1.82	1.89	1.94	2.07	-1.9
OECD	1.53	1.73	2.04	2.40	2.93	2.68	2.38	2.03	2.07	2.08	1.89	1.87	1.86	1.93	-2.2
Brazil	0.13	0.37	0.44	0.77	1.93	2.16	2.18	1.77	1.12	2.30	2.17	1.38	1.22	1.48	6.8
China	1.17	1.12	1.36	1.62	2.37	2.94	2.99	3.03	4.00	4.34	4.93	6.51	6.32	7.24	16.1
India	0.12	0.13	0.09	0.09	0.08	0.11	0.10	0.11	0.10	0.11	0.15	0.18	0.17	2.21	38.4
Indonesia	0.52	0.36	0.48	0.29	0.46	0.20	0.22	0.34	0.32	0.42	0.29	0.26	0.30	0.41	3.5
Russian Federation	0.05	0.06	0.04	0.07	0.05	0.03	0.05	0.04	0.05	0.03	0.10	0.07	0.03	0.05	-3.6
South Africa	0.29	0.46	0.93	0.69	0.70	0.69	0.68	0.51	0.49	0.33	0.31	0.35	0.26	0.35	-6.5

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399183

Table 9.6. **Communication equipment exports as a percentage of GDP, 1996-2009**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 1999-2009
Australia	0.08	0.10	0.08	0.09	0.13	0.12	0.04	0.06	0.06	0.06	0.05	0.05	0.05	0.05	-5.2
Austria	0.09	0.23	0.13	0.14	0.22	0.21	0.35	0.34	0.38	0.62	0.60	0.59	0.49	0.34	9.3
Belgium	0.39	0.43	0.59	0.58	0.98	1.21	0.57	0.44	0.39	0.45	0.33	0.40	0.41	0.32	-5.7
Canada	0.55	0.61	0.66	0.85	1.45	0.67	0.51	0.40	0.45	0.51	0.54	0.49	0.37	0.31	-9.6
Chile	0.00	0.00	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	1.1
Czech Republic	0.10	0.09	0.16	0.11	0.31	0.76	0.71	0.89	0.83	0.51	0.42	1.09	1.20	0.97	24.6
Denmark	0.30	0.51	0.63	0.70	0.81	0.78	1.25	0.73	0.62	0.98	0.61	0.39	0.24	0.20	-11.6
Estonia	0.19	1.55	2.81	3.14	12.13	7.59	3.45	3.30	3.66	3.53	3.14	2.28	2.15	1.71	-5.9
Finland	2.63	3.29	4.25	4.56	6.81	5.48	5.31	4.98	4.12	5.39	5.11	4.91	4.73	2.39	-6.2
France	0.22	0.29	0.39	0.49	0.74	0.54	0.44	0.32	0.33	0.31	0.42	0.21	0.17	0.17	-10.2
Germany	0.29	0.40	0.39	0.49	0.65	0.68	0.64	0.50	0.64	0.71	0.65	0.52	0.32	0.26	-5.9
Greece	0.04	0.07	0.10	0.11	0.24	0.17	0.14	0.12	0.14	0.11	0.13	0.09	0.09	0.06	-5.3
Hungary	0.04	0.08	0.12	0.10	1.59	3.01	4.23	4.80	6.66	5.52	5.54	6.95	7.13	6.85	52.6
Iceland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.02	0.01	27.0
Ireland	1.07	1.49	1.98	3.47	2.94	2.85	1.76	0.75	0.66	0.56	0.43	0.48	0.56	0.40	-19.3
Israel	1.53	1.83	2.14	2.48	3.00	2.62	2.10	1.87	2.12	1.60	1.72	0.12	1.71	1.31	-6.2
Italy	0.14	0.18	0.21	0.22	0.26	0.30	0.20	0.16	0.18	0.20	0.20	0.19	0.16	0.13	-5.1
Japan	0.10	0.12	0.13	0.13	0.17	0.14	0.10	0.11	0.09	0.08	0.07	0.16	0.15	0.12	-0.7
Korea	0.23	0.34	0.64	0.98	1.23	1.65	1.88	2.28	2.82	2.43	1.93	2.76	3.70	3.55	13.7
Luxembourg	..	..	..	1.02	2.23	3.58	2.35	0.91	0.66	0.60	0.40	0.34	0.25	0.21	-14.5
Mexico	0.48	0.58	0.75	0.94	1.35	1.29	1.02	0.83	1.00	1.05	1.09	0.93	1.63	1.94	7.5
Netherlands	0.31	0.34	0.39	0.66	1.15	1.09	0.44	0.56	0.69	0.69	0.68	1.79	1.54	1.35	7.5
New Zealand	0.11	0.15	0.17	0.13	0.13	0.11	0.11	0.12	0.10	0.08	0.09	0.09	0.11	0.10	-2.2
Norway	0.26	0.31	0.33	0.27	0.24	0.24	0.19	0.19	0.22	0.20	0.19	0.17	0.19	0.18	-3.7
Poland	0.03	0.04	0.04	0.04	0.05	0.06	0.08	0.07	0.07	0.16	0.18	0.19	0.24	0.23	18.9
Portugal	0.04	0.03	0.02	0.04	0.05	0.06	0.05	0.05	0.05	0.08	0.06	0.07	0.07	0.07	6.6
Slovak Republic		0.30	0.23	0.16	0.16	0.21	0.09	0.07	0.11	0.26	0.67	0.33	0.37	0.32	7.4
Slovenia	0.50	0.42	0.39	0.23	0.37	0.60	0.52	0.51	0.51	0.33	0.30	0.34	0.30	0.22	-0.4
Spain	0.13	0.16	0.16	0.20	0.20	0.19	0.15	0.17	0.13	0.11	0.09	0.05	0.04	0.03	-16.3
Sweden	1.96	2.66	3.04	3.66	4.13	2.09	2.13	1.85	2.16	2.13	1.80	1.92	1.99	1.63	-7.8
Switzerland	0.20	0.25	0.25	0.24	0.28	0.26	0.19	0.16	0.19	0.34	0.21	0.15	0.13	0.12	-6.7
Turkey	0.03	0.02	0.03	0.03	0.03	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.01	-6.2
United Kingdom	0.51	0.38	0.72	0.72	0.96	1.00	0.97	0.59	0.40	0.47	0.53	0.22	0.24	0.30	-8.4
United States	0.16	0.18	0.17	0.19	0.21	0.17	0.13	0.11	0.13	0.14	0.14	0.16	0.18	0.16	-1.8
OECD	0.24	0.29	0.34	0.39	0.50	0.45	0.39	0.34	0.38	0.39	0.38	0.40	0.41	0.35	-0.9
Brazil	0.01	0.02	0.03	0.06	0.17	0.23	0.26	0.23	0.16	0.31	0.28	0.16	0.15	0.14	8.4
China	0.20	0.21	0.24	0.29	0.49	0.59	0.67	0.81	1.23	1.48	1.80	2.35	2.09	1.77	19.7
India	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.30	45.9
Indonesia	0.11	0.09	0.25	0.10	0.17	0.07	0.06	0.09	0.09	0.13	0.08	0.07	0.08	0.09	-1.3
Russian Federation	0.01	0.01	0.01	0.03	0.02	0.01	0.02	0.01	0.02	0.01	0.03	0.02	0.01	0.01	-8.1
South Africa	0.05	0.07	0.14	0.12	0.14	0.15	0.14	0.10	0.09	0.06	0.06	0.08	0.07	0.07	-5.5

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399202

Table 9.7. **OECD telecommunication equipment exports and imports to/from China**

USD millions

	1996		1998		2000		2002		2004		2006		2007		2008		2009	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
Australia	3.8	22.3	10.4	50.8	9.9	79.0	13.1	167.8	8.5	542.0	8.9	993.8	8.9	1 561.2	12.0	1 904.8	17.2	2 053.9
Austria	5.4	6.4	27.1	5.9	4.2	11.9	4.4	54.7	4.7	117.0	2.1	457.2	0.2	17.6	8.3	791.4	3.8	665.9
Belgium	122.1	27.9	46.8	20.4	52.5	62.8	31.7	45.9	15.3	107.7	15.2	265.9	14.9	399.8	24.3	439.3	16.5	309.3
Canada	188.8	41.4	79.6	69.9	36.0	201.5	59.1	317.4	76.6	546.8	155.0	1 312.4	111.1	1 404.3	54.6	1 903.7	49.0	1 985.5
Chile	..	..	..	10.0	0.3	6.2	0.7	20.4	0.0	41.8	0.0	71.3	0.0	193.1	0.3	306.7	0.0	380.9
Czech Republic		2.7	0.0	3.7	0.1	6.9	0.1	162.5	0.7	288.8	2.7	184.2	1.5	458.4	4.3	593.2	3.3	470.9
Denmark	5.2	9.0	11.1	10.6	3.0	10.0	2.6	13.2	11.2	47.2	11.7	163.1	12.7	104.7	14.5	54.8	12.1	61.9
Estonia	..	0.2	0.1	0.7	..	0.8	0.7	3.1	0.0	4.6	170.9	21.9	18.1	70.2	11.0	65.2	10.0	37.8
Finland	129.5	5.0	507.6	8.1	182.2	76.9	110.6	39.7	225.6	168.9	457.9	1 099.7	655.3	2 322.5	276.3	2 227.3	209.2	1 514.2
France	64.0	116.1	242.5	134.2	162.5	295.9	87.5	233.8	215.5	965.0	108.4	1 695.2	149.5	2 480.8	147.3	2 994.3	150.9	3 940.1
Germany	270.3	142.4	477.4	141.4	494.0	806.7	262.5	1 112.5	271.2	3 520.5	266.5	6 407.4	259.2	4 462.6	281.5	3 323.7	241.8	3 392.6
Greece	..	4.3	0.0	4.6	0.3	5.6	0.1	10.5	0.3	23.1	1.4	37.7	2.1	81.0	0.1	131.9	0.1	138.0
Hungary	..	1.1	..	4.3	0.0	71.6	12.4	296.8	31.9	798.4	14.8	350.3	191.4	1 140.1	105.2	2 103.4	..	..
Iceland	..	0.4	..	0.6	0.1	0.6	0.0	1.1	..	7.6	0.0	7.4	0.0	13.1	..	11.3	..	7.1
Ireland	1.9	2.0	3.5	6.1	18.3	45.3	37.3	44.4	7.5	56.4	5.0	35.8	8.0	128.1	13.1	303.3	9.0	252.2
Israel	22.1	0.6	39.2	0.8	68.4	1.1	43.8	7.9	69.7	11.3	64.2	45.2	1.3	53.9	116.4	83.9	83.5	115.8
Italy	52.0	52.2	71.1	55.6	79.4	90.4	67.6	89.8	107.5	381.7	75.0	479.4	80.0	642.9	73.3	963.4	57.0	979.6
Japan	294.9	246.0	366.2	228.8	577.7	237.4	560.4	623.2	397.4	1 090.2	113.1	1 594.6	1 746.2	4 082.4	1 654.0	5 091.3	1 687.1	5 428.3
Korea	38.9	14.8	55.7	16.3	103.0	93.1	1 442.3	191.7	603.0	259.9	337.7	832.5	5 141.2	1 858.9	6 003.7	2 296.5	5 871.6	1 886.3
Luxembourg	..	..	..	..	0.0	0.0	..	0.3	0.0	0.0	0.1	0.4	0.2	1.8	0.4	0.4	0.0	1.5
Mexico	0.2	0.3	1.7	34.1	14.5	2.9	0.2	127.0	4.3	364.3	22.9	1 411.8	17.2	1 649.0	196.4	4 505.9	182.2	4 547.0
Netherlands	78.9	21.9	24.9	31.8	11.0	71.0	15.9	272.0	17.1	1 302.0	20.4	1 687.8	37.9	4 175.7	40.0	2 450.2	..	..
New Zealand	0.4	14.4	0.5	16.3	1.4	15.8	2.0	29.4	2.5	77.4	1.8	118.9	1.8	185.5	1.1	239.8	1.6	271.3
Norway	4.4	7.9	4.4	15.0	5.8	10.0	13.4	21.3	12.0	158.2	9.3	164.9	21.6	299.0	22.0	323.1	21.2	363.1
Poland	0.1	9.5	0.4	25.5	2.6	22.9	0.8	71.2	1.1	150.9	2.9	644.6	2.9	1 098.8	7.6	1 431.0	..	..
Portugal	..	6.3	..	5.4	0.0	7.6	..	7.6	0.0	16.7	0.0	48.5	0.3	179.9	0.2	196.1	0.6	177.8
Slovak Republic	..	..	0.0	0.4	..	0.6	0.0	6.4	0.3	16.2	0.1	66.2	0.0	114.0	0.2	140.3	..	..
Slovenia	..	0.1	..	0.4	..	1.3	0.0	5.0	..	3.2	0.0	7.0	0.2	9.4	0.4	12.7	0.1	6.8
Spain	12.3	31.5	6.7	31.2	16.8	49.6	4.7	58.4	2.8	269.7	4.3	702.2	5.0	734.9	8.2	769.1	..	..
Sweden	533.7	9.3	650.7	25.3	662.9	95.0	317.8	67.8	536.2	221.2	268.4	467.9	312.3	856.8	335.8	747.8	408.5	628.7
Switzerland	10.8	14.8	8.0	16.6	7.8	13.1	11.9	11.5	6.1	22.2	8.2	46.0	9.6	60.3	6.6	143.1	12.0	269.3
Turkey		5.0	10.5	9.5	0.0	21.7	0.1	34.4	0.0	185.6	0.0	353.3	0.1	760.3	4.5	983.7	1.8	907.2
United Kingdom	26.9	126.0	137.3	219.9	198.3	422.0	114.3	325.9	82.4	635.5	75.5	1 236.2	69.7	1 904.7	99.7	2 155.8	75.1	2 538.9
United States	440.5	1 181.9	440.7	1 775.1	599.5	3 042.0	695.7	4 535.6	678.5	9 362.9	826.0	17 758.6	973.2	21 887.0	1 255.6	24 722.8	1 205.2	24 587.5
Brazil	..	..	0.3	11.4	0.7	16.1	1.0	16.2	2.7	104.8	9.7	362.0	11.9	1 291.6	26.9	2 000.3	..	..
India	0.1	2.0	1.0	12.5	2.8	12.3	..	..	4.7	949.9	7.0	2 152.3	..	..	..	..	88.6	5 323.4
Indonesia	0.04	1.3	3.2	0.6	0.1	1.2	..	..	..	..	..	..	..	..	..	..	..	..
Russian Federation	..	..	0.6	2.0	1.1	4.8	17.4	72.3	27.7	189.6	2.0	1 321.1	0.5	1 854.8	1.0	2 568.1	2.5	1 590.6
South Africa	..	..	1.6	4.7	0.04	11.8	1.6	79.8	0.9	79.7	1.1	258.5	1.9	469.3	1.0	818.5	1.9	718.3

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China as a partner country are not corrected for re-exports and re-imports.

Source : OECD, ITCS database

StatLink http://dx.doi.org/10.1787/888932399221

Table 9.8. **Trade in communication and telecommunication services, 2000, 2008 and 2009**

USD millions

	Export						Import					
	Communication services			Telecommunication services			Communication services			Telecommunication services		
	2000	2008	2009	2000	2008	2009	2000	2008	2009	2000	2008	2009
Australia	889	795	800	718	254	..	1 120	978	980	962	447	..
Austria	478	1 757	1 563	384	1 201	..	432	1 330	1 190	358	1 025	..
Belgium	..	3 899	3 871	..	3 207	3 276	..	3 034	3 150	..	2 515	2 697
Canada	1 379	2 421	2 325	821	1 344*	..	1 381	1 910	1 839	879	1 035*	..
Chile	207	165	153	..	..	..	110	170	161	..	..	..
Czech Republic	122	588	528	104	533	479	46	620	767	29	491	585
Denmark	..	890	601	..	714	..	..	922	697	..	794	..
Estonia	21	195	..	17	176	..	19	205	..	18	188	..
Finland	211	494	325	171	187	169	299	540	556	277	437	449
France	1 328	4 533	4 630	1 098	4 465	..	1 148	3 135	3 753	989	2 938	..
Germany	1 454	5 281	4 856	1 277	3 895	3 330	3 148	7 104	6 610	2 780	5 102	4 488
Greece	257	496	418	253	471	388	288	653	684	266	592	639
Hungary	69	545	477	..	486	398	75	567	475	..	484	398
Iceland	10	11	10	..	..	..	2	31	30	..	..	..
Ireland	941	879	705	297	879	705	794	1 569	1 518	761	1 569	1 518
Israel	176	275	267	176	275	267	232	283	306	232	283	306
Italy	1 274	2 442	1 719	1 037	2 283	1 576	1 935	2 972	2 131	1 524	2 866	2 079
Japan	822	654	666	..	..	..	1 152	1 075	1 123	..	..	..
Korea	387	724	655	..	550	488	623	1 149	1 100	..	782	768
Luxembourg	683	2 833	3 316	..	2 842	..	138	1 389	1 451	..	1 348	..
Mexico	1 213	336	203	1 213	336	203	366	94	72	366	94	72
Netherlands	1 441	4 512	4 430	..	2024*	..	1 416	3 963	3 823	..	..	..
New Zealand	193	217	179	..	..	..	202	217	201	..	..	..
Norway	291	787	683	205	602	522	165	1 146	891	149	1 038	825
Poland	234	655	647	..	584	..	423	821	805	..	763	..
Portugal	162	845	672	161	807	622	154	762	620	140	717	559
Slovak Republic	51	312	216	42	163	148	25	229	246	22	156	196
Slovenia	25	304	276	20	304	268	51	320	288	43	319	280
Spain	668	2 192	2 080	562	2 067	1 963	744	3 233	3 035	605	2 647	2 551
Sweden	647	2 188	..	559	1 933	..	793	2 112	..	701	1 846	..
Switzerland	879	1 226	1 331	..	..	..	885	972	1 045	..	..	..
Turkey	..	725	633	..	725	633	84	298	247	..	289	241
United Kingdom	2 812	7 881	6 902	2 598	7 398	..	2 823	8 012	6 377	2 404	6 488	..
United States	4 128	9 726	9 548	3 884	9 424	9 284	5 926	7 849	7 503	5 429	7 254	7 048
OECD	23 453	61 781	..	..	..	..	27 000	59 661	..	..	..	..
Brazil	36	466	353	1	452	329	32	299	166	30	296	165
China	1 345	1 570	1 198	..	..	..	242	1 510	1 210	..	..	..
India	599	2 423	1 412	299	1 212	706	105	1 046	1 314	..	523	657
Indonesia	86	1 096	1 031	82	..	..	49	776	452	15	..	..
Russian Federation**	385	1 493	1 337	520	1 401	1 260	288	1 879	1 898	535	1 846	1 867
South Africa	57	293	..	50	186	193	83	350	..	77	232	356

* Data for 2007 instead of 2008.

** Data for the Russian Federation's telecommunications services are for 2002 and 2007 instead.

Source: OECD Database on International Trade in Services

StatLink http://dx.doi.org/10.1787/888932399240

Table 9.9. **Total OECD exports of communication equipment by category**

USD millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Communications equipment (HS 1996, HS 2002 and HS 2007)	**59 010**	**69 390**	**82 346**	**99 573**	**131 639**	**116 432**	**107 154**	**105 064**	**128 127**	**140 557**	**145 257**	**164 877**	**181 972**	**151 841**
Burglar/fire alarms & similar apparatus	1 650	1 793	1 944	2 232	2 076	1 875	1 979	2 041	2 339	2 511	2 673	2 732	3 228	3 093
Transmission/reception apparatus of voice,images and data, cordless handsets telephone	40 491	48 277	59 568	72 992	97 607	87 669	86 034	84 703	104 881	115 890	117 996	121 277	130 407	109 866
Line telephone sets with cordless handsets	1 327	1 634	1 917	1 697	1 686	1 458	1 459	1 614	1 514	1 708	1 596	1 510	1 078	939
Parts of telephone sets; other apparatus for the transmission/reception of voice,	15 542	17 686	18 918	22 653	30 270	25 430	17 682	16 706	19 394	20 448	22 991	39 359	47 259	37 943

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399259

Table 9.10. **Revealed comparative advantages for communication equipment trade**

Balassa index

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	0.43	0.44	0.31	0.32	0.35	0.31	0.14	0.24	0.23	0.20	0.18	0.16	0.15	0.14
Austria	0.26	0.54	0.25	0.23	0.27	0.26	0.48	0.51	0.49	0.79	0.73	0.66	0.57	0.42
Belgium	0.45	0.40	0.46	0.39	0.49	0.62	0.31	0.28	0.23	0.25	0.18	0.20	0.21	0.17
Canada	1.27	1.17	1.04	1.13	1.52	0.78	0.69	0.68	0.70	0.79	0.91	0.77	0.59	0.55
Chile	0.01	0.02	0.02	0.03	0.02	0.02	0.03	0.03	0.01	0.02	0.01	0.02	0.02	0.02
Czech Republic	0.22	0.15	0.19	0.12	0.24	0.59	0.65	0.88	0.69	0.40	0.32	0.73	0.87	0.70
Denmark	0.79	1.18	1.26	1.19	1.05	1.06	1.82	1.27	1.03	1.48	0.94	0.52	0.34	0.29
Estonia	0.31	1.73	2.66	2.86	7.24	5.01	2.71	3.04	3.40	2.92	2.68	1.95	1.77	1.33
Finland	6.02	6.41	7.00	6.82	7.27	6.72	7.50	8.14	6.40	7.99	6.97	6.22	6.36	3.79
France	0.88	0.95	1.06	1.14	1.33	1.06	0.99	0.83	0.83	0.75	1.01	0.47	0.40	0.40
Germany	0.99	1.10	0.86	0.92	0.90	0.94	0.97	0.85	0.97	1.00	0.86	0.60	0.38	0.33
Greece	0.39	0.56	0.67	0.67	1.11	0.89	0.88	0.87	1.04	0.75	0.86	0.56	0.58	0.42
Hungary	0.10	0.13	0.14	0.09	1.08	2.23	3.84	4.93	6.22	4.79	4.30	4.70	4.92	4.40
Iceland	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.04	0.02	0.03	0.01
Ireland	1.19	1.46	1.50	2.27	1.49	1.63	1.15	0.67	0.59	0.51	0.45	0.48	0.56	0.32
Israel	5.65	5.73	5.55	5.10	4.80	4.68	3.74	3.68	3.51	2.47	2.73	0.18	2.70	2.24
Italy	0.51	0.59	0.57	0.55	0.48	0.59	0.44	0.41	0.45	0.48	0.46	0.37	0.33	0.29
Japan	0.80	0.77	0.69	0.65	0.65	0.60	0.45	0.50	0.39	0.29	0.24	0.46	0.45	0.44
Korea	0.77	0.87	0.96	1.51	1.53	2.34	3.11	3.98	4.04	3.54	2.87	3.61	3.93	3.41
Luxembourg	..	..	..	1.33	2.30	3.69	2.89	1.38	0.92	0.88	0.61	0.50	0.40	0.37
Mexico	1.33	1.49	1.63	1.74	2.09	2.36	2.10	1.86	2.03	2.03	2.11	1.62	2.93	3.08
Netherlands	0.52	0.49	0.51	0.76	0.99	1.05	0.52	0.70	0.73	0.68	0.63	1.37	1.28	1.15
New Zealand	0.39	0.49	0.43	0.30	0.23	0.19	0.23	0.30	0.24	0.22	0.22	0.20	0.22	0.20
Norway	0.60	0.65	0.67	0.45	0.28	0.30	0.28	0.32	0.35	0.29	0.26	0.23	0.23	0.24
Poland	0.12	0.17	0.15	0.12	0.11	0.12	0.17	0.15	0.13	0.26	0.29	0.27	0.35	0.32
Portugal	0.14	0.10	0.07	0.10	0.09	0.12	0.12	0.13	0.13	0.19	0.14	0.14	0.14	0.17
Slovak Republic	..	0.43	0.26	0.15	0.11	0.15	0.07	0.05	0.08	0.19	0.46	0.20	0.24	0.22
Slovenia	0.92	0.66	0.52	0.28	0.34	0.56	0.54	0.62	0.54	0.32	0.28	0.28	0.27	0.20
Spain	0.58	0.57	0.47	0.52	0.40	0.43	0.39	0.49	0.37	0.33	0.26	0.12	0.10	0.09
Sweden	4.71	5.35	5.01	5.37	4.71	2.63	3.01	2.98	3.20	2.98	2.48	2.43	2.53	2.11
Switzerland	0.56	0.56	0.47	0.38	0.35	0.35	0.28	0.28	0.30	0.48	0.29	0.17	0.16	0.14
Turkey	0.20	0.13	0.18	0.11	0.12	0.13	0.08	0.06	0.04	0.03	0.03	0.04	0.04	0.03
United Kingdom	1.75	1.19	2.13	1.90	2.01	2.31	2.59	1.89	1.27	1.36	1.49	0.64	0.68	0.77
United States	1.43	1.43	1.24	1.20	1.08	1.02	0.94	0.92	0.97	0.93	0.93	0.87	0.93	0.87
Russian Federation	0.04	0.04	0.02	0.03	0.02	0.01	0.02	0.02	0.03	0.02	0.05	0.03	0.01	0.02
Brazil	0.09	0.24	0.24	0.37	0.78	0.91	1.02	0.93	0.56	1.13	1.11	0.64	0.59	0.62
China	0.85	0.73	0.75	0.78	0.96	1.24	1.39	1.59	2.02	2.13	2.51	3.02	3.04	3.03
India	0.09	0.09	0.05	0.04	0.03	0.04	0.05	0.06	0.05	0.05	0.08	0.08	0.08	0.93
Indonesia	0.37	0.24	0.26	0.14	0.19	0.09	0.10	0.18	0.16	0.21	0.15	0.12	0.14	0.17
South Africa	0.21	0.30	0.51	0.33	0.28	0.29	0.32	0.27	0.25	0.16	0.16	0.16	0.13	0.15

Notes: The revealed comparative advantage (RCA) here measures the intensity of trade specialisation of a country within the world. Calculation: Export share of communication equipment of the total exports (of goods) of a country divided by the export share of communication equipment of the world. If the RCA takes a value less than 1 this implies that the country is not specialised in exporting communication equipment. The share of communication equipment within the total exports of goods of this country is less than the corresponding world share. Similarly, if the index exceeds 1 this implies that the country is specialised in exporting communication equipment. Luxembourg is included in Belgium prior 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399278

Table 9.11. **Total ICT total exports, 1996-2009**

USD millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 1999-2009
Australia	1 920	1 967	1 562	1 562	1 727	1 619	1 372	1 571	1 713	1 781	1 788	1 943	2 076	1 647	0.5
Austria	2 092	2 460	2 774	3 176	3 941	4 006	4 533	5 002	5 908	6 467	6 710	7 318	7 494	5 271	5.2
Belgium	7 770	7 604	8 619	8 963	10 825	11 453	9 734	11 591	12 527	13 458	12 300	11 603	12 388	9 296	0.4
Canada	10 995	13 606	13 218	14 317	20 967	13 094	10 163	10 052	11 845	13 990	14 878	15 065	14 129	10 944	-2.7
Chile	20	26	26	31	30	33	36	32	33	44	52	76	90	72	8.8
Czech Republic	644	575	991	752	1 334	2 582	4 148	5 207	7 907	8 668	12 330	16 806	20 614	16 305	36.0
Denmark	2 855	3 105	3 250	3 385	3 654	3 470	4 692	4 282	4 662	5 783	5 248	5 089	3 936	3 108	-0.8
Estonia	150	319	427	408	967	853	579	820	1 126	1 405	1 310	730	743	494	1.9
Finland	5 266	6 157	7 849	8 499	10 781	8 526	8 944	10 026	10 412	13 238	13 243	14 047	14 419	6 746	-2.3
France	22 335	24 526	28 446	29 015	31 939	26 310	23 629	23 277	26 864	27 331	31 584	26 122	25 360	19 762	-3.8
Germany	32 289	34 389	36 554	39 677	48 717	46 634	48 601	55 200	72 250	77 168	82 809	78 319	74 643	54 601	3.2
Greece	116	178	233	280	466	347	338	389	511	490	629	562	667	496	5.9
Hungary	491	3 065	4 335	5 521	7 231	7 244	8 804	10 899	15 694	15 944	17 841	21 301	24 522	19 517	13.5
Iceland	1	0	1	1	2	2	2	3	2	3	5	8	9	3	14.9
Ireland	15 657	17 357	21 152	25 589	27 697	31 638	27 430	22 524	23 482	24 675	24 140	22 784	19 989	12 801	-6.7
Israel	3 008	3 665	4 044	4 745	6 668	5 842	4 367	4 228	5 133	3 210	3 527	1 470	6 299	7 854	5.2
Italy	10 742	9 571	9 742	9 712	10 675	10 612	9 239	9 851	11 455	11 581	11 376	11 143	10 340	8 092	-1.8
Japan	93 237	95 373	85 710	92 974	108 795	81 953	82 922	91 436	104 335	100 814	103 139	94 022	92 513	70 164	-2.8
Korea	29 710	34 563	32 273	43 453	59 426	44 871	53 500	65 323	84 555	85 314	86 167	94 694	90 337	79 508	6.2
Luxembourg	..	..	..	707	889	1 179	945	720	859	998	840	757	524	408	-5.3
Mexico	15 023	18 630	22 599	27 472	34 771	34 943	33 345	31 845	37 003	38 533	46 916	48 149	56 897	50 499	6.3
Netherlands	24 392	26 773	30 136	33 805	38 160	34 286	28 578	42 666	53 615	58 717	62 308	67 740	63 156	50 265	4.0
New Zealand	199	183	227	148	158	141	152	284	351	369	374	414	402	348	8.9
Norway	970	1 112	1 149	1 149	1 104	1 165	952	1 015	1 169	1 268	1 471	1 669	2 245	1 757	4.3
Poland	588	833	1 185	1 162	1 290	1 619	1 980	2 339	2 819	3 558	5 519	7 858	11 949	9 510	23.4
Portugal	1 110	1 107	1 155	1 472	1 492	1 701	1 711	2 364	2 545	2 972	3 673	4 041	3 843	1 757	1.8
Slovak Republic	0	232	323	354	388	487	492	852	1 698	2 991	5 267	8 454	11 823	9 410	38.8
Slovenia	186	161	170	130	169	204	220	251	275	229	291	384	618	519	14.9
Spain	4 201	4 392	5 032	5 367	5 355	5 270	5 000	6 523	7 014	7 197	7 347	6 688	6 820	5 428	0.1
Sweden	10 309	11 722	12 295	14 079	15 487	8 485	9 228	10 153	13 640	14 613	15 115	14 533	15 734	11 788	-1.8
Switzerland	2 529	2 327	2 476	2 816	3 080	2 680	1 910	2 204	2 595	3 408	3 015	3 034	3 368	2 746	-0.2
Turkey	347	497	904	840	1 024	1 056	1 603	1 988	2 933	3 227	3 178	2 884	2 407	2 032	9.2
United Kingdom	38 149	38 851	43 215	44 529	50 419	47 999	46 747	37 280	37 736	53 881	86 007	29 493	27 856	23 411	-6.2
United States	107 890	121 872	116 598	128 678	156 670	128 513	111 448	114 860	124 097	128 943	140 314	136 219	138 001	113 157	-1.3
OECD	445 041	486 880	498 242	554 359	665 331	569 962	546 763	586 237	687 636	730 860	809 403	754 690	765 469	609 222	0.9
Brazil	868	1 021	995	1 243	2 232	2 329	2 178	2 106	2 013	3 701	3 969	2 975	3 139	2 859	8.7
China	17 287	21 626	25 646	30 522	44 135	53 221	78 243	121 365	177 742	234 086	297 653	357 974	396 424	356 301	27.9
India	736	656	441	501	714	858	781	957	1 082	1 113	1 344	1 567	1 770	6 099	28.4
Indonesia	3 219	2 862	2 313	3 069	7 573	6 095	6 301	5 687	6 527	6 944	6 138	6 025	6 517	6 921	8.5
Russian Federation	436	547	299	441	411	284	311	324	451	423	771	778	784	838	6.6
South Africa	294	314	375	432	417	442	390	462	578	587	745	846	805	677	4.6
World	649 909	706 335	724 270	814 904	988 402	866 765	891 307	1 008 327	1 230 507	1 367 256	1 549 265	1 584 881	1 636 573	1 402 808	5.6

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399297

Table 9.12. **Total ICT total imports, 1996-2009**

USD millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	CAGR 1999-2009
Australia	7 723	8 516	7 921	9 292	10 488	8 179	8 545	10 280	13 253	13 985	15 464	16 883	17 500	16 699	6.0
Austria	4 487	4 855	5 777	6 463	6 339	6 111	6 217	7 127	8 196	9 181	9 305	9 678	9 978	8 148	2.3
Belgium	8 653	8 928	9 693	10 799	11 752	12 809	11 418	12 877	14 444	15 743	14 597	15 709	16 557	13 595	2.3
Canada	21 302	23 583	23 664	25 878	31 412	24 229	21 280	21 720	25 550	28 515	30 695	31 585	32 467	27 012	0.4
Chile	1 274	1 524	1 665	1 573	1 694	1 468	1 318	1 257	1 747	2 213	2 855	3 098	3 328	2 689	5.5
Czech Republic	2 239	2 056	2 316	2 272	3 118	4 017	5 022	6 219	8 147	8 555	12 665	17 214	20 119	16 458	21.9
Denmark	4 849	4 851	4 775	5 130	5 505	5 167	6 281	6 387	7 319	9 838	9 328	9 009	7 932	6 561	2.5
Estonia	319	446	487	464	659	761	607	974	1 075	1 436	1 444	1 112	1 088	636	3.2
Finland	3 808	4 044	4 655	4 665	5 671	4 932	4 829	5 376	6 394	8 357	9 264	10 224	10 180	6 193	2.9
France	25 970	27 221	31 613	31 979	36 020	30 899	28 357	31 760	38 584	40 674	46 322	43 843	45 480	38 233	1.8
Germany	42 548	43 315	50 065	54 058	61 880	60 653	59 507	66 159	80 830	89 709	100 766	93 855	94 718	78 036	3.7
Greece	1 058	1 470	2 040	2 400	2 216	1 888	1 891	2 620	3 272	3 155	3 614	4 453	4 613	3 659	4.3
Hungary	1 212	3 049	3 917	4 753	6 482	6 954	7 639	9 118	12 799	12 357	14 159	18 175	19 002	16 199	13.0
Iceland	140	143	184	195	234	161	162	201	237	318	292	384	244	143	-3.0
Ireland	9 367	10 502	13 089	14 241	16 625	16 996	17 298	13 444	15 163	16 735	17 764	16 784	14 229	8 294	-5.3
Israel	3 161	2 925	3 081	3 686	5 050	3 825	3 252	3 156	4 262	4 389	4 578	4 799	5 113	4 605	2.3
Italy	16 131	16 490	17 879	19 206	20 898	19 035	18 423	21 195	27 009	27 134	27 645	27 762	27 948	24 560	2.5
Japan	43 431	41 950	36 697	44 166	61 478	53 140	50 047	55 621	65 960	69 497	71 704	71 321	73 841	62 726	3.6
Korea	16 674	21 064	16 844	25 130	34 644	26 878	28 937	33 343	37 369	39 836	42 925	47 331	49 953	41 855	5.2
Luxembourg	..	..	..	1 027	1 226	1 501	1 168	1 124	1 287	1 470	1 368	1 354	1 128	978	-0.5
Mexico	12 334	15 059	18 209	22 880	31 218	31 834	29 405	29 662	36 232	38 026	44 920	38 085	49 720	45 938	7.2
Netherlands	24 228	27 927	32 024	37 677	40 774	36 246	28 501	42 440	55 645	58 219	62 727	64 915	64 351	54 858	3.8
New Zealand	1 513	1 485	1 304	1 538	1 644	1 343	1 421	1 782	2 246	2 515	2 401	2 643	2 661	2 202	3.7
Norway	2 973	3 192	3 404	3 355	3 388	3 254	3 200	3 607	4 595	4 866	5 480	6 236	6 796	5 247	4.6
Poland	2 508	3 054	3 799	4 172	4 535	4 516	4 576	5 236	6 660	8 041	10 856	12 690	17 137	14 609	13.4
Portugal	2 364	2 348	2 762	3 232	3 087	3 405	3 252	4 005	4 526	5 150	5 840	6 395	6 738	4 367	3.1
Slovak Republic	0	823	898	693	758	949	1 102	1 482	2 025	2 856	4 149	7 834	9 888	8 429	28.4
Slovenia	443	457	513	591	559	525	598	659	892	848	995	1 170	1 445	1 109	6.5
Spain	9 334	9 088	10 625	12 529	12 957	12 041	11 657	14 676	18 773	20 946	24 223	28 892	33 124	28 238	8.5
Sweden	7 978	8 510	9 774	9 231	10 521	7 935	7 679	9 093	11 642	12 408	13 921	14 988	15 198	12 677	3.2
Switzerland	6 577	6 482	6 992	7 668	8 128	7 226	6 631	7 334	8 347	9 374	9 104	9 528	10 365	8 896	1.5
Turkey	2 094	2 759	3 320	4 271	5 534	2 833	3 277	4 228	6 241	7 147	7 732	8 555	7 898	7 078	5.2
United Kingdom	41 618	42 395	47 400	51 555	62 676	50 168	45 433	49 831	60 777	63 587	77 080	63 692	59 450	47 596	-0.8
United States	142 397	154 454	159 229	179 826	218 859	176 974	178 216	183 439	216 151	236 788	258 371	258 287	256 235	230 627	2.5
OECD	470 387	504 518	536 129	606 132	727 371	628 088	606 539	666 456	806 574	872 432	963 108	967 372	995 335	848 515	3.4
Brazil	6 103	6 952	6 122	5 871	7 583	6 800	4 621	4 897	6 966	8 902	11 312	12 055	15 919	14 433	9.4
China	14 092	16 812	22 573	31 263	45 454	51 171	68 401	99 255	133 664	166 849	206 325	234 686	239 961	220 214	21.6
India	1 114	1 677	1 786	2 276	2 886	3 008	4 044	6 096	8 223	10 757	13 633	16 133	12 907	20 749	24.7
Indonesia	2 360	2 334	736	391	701	783	922	1 144	1 782	2 078	2 137	3 688	11 711	8 619	36.2
Russian Federation	2 191	2 377	1 614	1 097	1 246	2 134	2 762	3 049	4 850	7 663	11 993	17 184	20 810	12 435	27.5
South Africa	3 066	3 253	3 916	3 228	3 291	2 906	2 862	3 479	5 110	6 105	6 916	6 995	6 846	5 533	5.5
World	656 939	714 197	742 146	834 045	1 016 092	899 967	921 750	1 046 806	1 295 332	1 451 538	1 631 598	1 703 739	1 758 301	1 528 840	6.2

Notes: Luxembourg is included in Belgium prior to 1999. Trade data for China are not corrected for re-exports.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/888932399316

Glossary

. .	Data not available
2G	Second generation of mobile communications technology
3G	Third generation of mobile communications technology
ACCC	Australian Competition and Consumer Commission
ACMA	Australian Communications and Media Authority
ADSL	Asymmetric digital subscriber line
AFRINIC	African Network Information Centre
ANACOM	National Communications Authority (Portugal)
APNIC	Asia-Pacific Network Information Centre
ARIN	American Registry for Internet Numbers
AS (ASes)	Autonomous systems
ASEAN	Association of Southeast Asian Nations
ASN	Autonomous systems numbers
ASR	Answer seizure ratio
ATVoD	Association for Television on Demand
AV	Audio-visual
BB	Broadband
BGP	Border Gateway Protocol
BIPT	Belgian Institute for Postal Services and Telecommunications
BLS	Bureau of Labor Statistics (United States)
BRICS	Group of countries including Brazil, Russia, India, China and South Africa
CAGR	Compound annual growth rate (expressed as a percentage)
CAIDA	Cooperative Association for Internet Data Analysis
ccTLD	Country code top level domain
CDMA	Code division multiple access
CIDR	Classless Inter-Domain Routing
CIS	Commonwealth of Independent States
CPE	Customer premises equipment
CPI	Consumer price index
CPP	Calling party pays
CPP	Calling party-pays
DBS	Direct broadcast satellite
DNS	Domain name system
DOCSIS 3.0	Data over cable service interface specification
DSL	Digital subscriber lines
DTT	Digital terrestrial television
DTV	Digital television

DVB	Digital video broadcasting
DVB-H	Digital video broadcasting – handheld
EAO	European Audiovisual Observatory
EBOPS	Extended Balance of Payments Services Classification
EC	European Commission
EDGE	Enhanced data rates for GSM evolution
ENUM	Electronic number mapping
EPG	Electronic programming guide
EPO	European Patent Office
EU	European Union
FCC	Federal Communications Commission (United States)
FTA	Free-to-air
FTP	File transfer protocol
FTTN	Fibre-to-the-node
FTTP	Fibre-to-the-premises
GDP	Gross domestic product
GFC	Global financial crisis
GFCF	Gross fixed capital formation
GPRS	GSM packet radio service
GSM	Global system for mobile communications
gTLD	Generic top level domain
HDTV	High definition television
HDTV	High-definition television
HFC	Hybrid fibre coaxial
HFC	Hybrid fibre/cable networks
HICP	Harmonised indices of consumer prices
HS	Harmonised system
HTML	Hypertext mark-up language
HTTP	Hypertext transfer protocol
IANA	Internet Assigned Numbers Authority
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and communication technology
IDN	Internationalised domain names
IEEE (802 Standards)	Institute of Electrical and Electronics Engineers
IETV	Internet-enabled televisions
IMT-2000	International Mobile Telecommunications 2000
IP	Internet protocol
IP-PBX	Internet protocol – private branch exchange
IPTV	Internet protocol television
IPv4	Internet protocol version 4
IPv6	Internet protocol version 6
IR	Internet registries
ISC	Internet System Consortium
ISDN	Integrated services digital network
ISO	International Organization for Standardization
ISP	Internet service provider
IT	Information technologies

ITCS	International trade by commodity statistics
ITU	International Telecommunication Union
Kbit/s	Kilobits per second (Kbps)
LACNIC	Latin American and Caribbean Internet Addresses Registry
LAN	Local area network
LLU	Local loop unbundling
LTE	Long Term Evolution
M2M	Machine-to-machine
Mbit/s	Megabits per second (Mbps)
MDF	Main distribution frames
MiTT	Minutes of international telecommunication traffic
MMS	Multimedia messaging service
MTR	Mobile termination rates
MVNO	Mobile virtual network operators
NAT	Network Address Translation
NGA	Next Generation Access networks
NRAs	National regulatory authorities
NVoD	Near video on demand
OCN	Open computer network
OFCOM	Office of Communications (United Kingdom)
OMB	United States' Office of Management Budget
P2P	Peer-to-peer
PB	Petabytes
PBX	Private branch exchange
PC	Personal computer
PCB	Public call boxes
PCS	Personal communications service
PDA	Personal digital assistant
PPI	Producers price index
PPP	Purchasing power parities
PPV	Pay-per-view
PSB	Public service broadcasters
PSP	Public service publisher
PSTN	Public switched telecommunication network
PTO	Public telecommunications operator
PVR	Personal video recorder
R&D	Research and development
RIPE NCC	Réseaux IP Européens Network Co-ordination Centre
RIR	Regional Internet registry
RPP	Receiving party pays
S-DMB	Satellite digital media broadcasting
SDTV	Standard definition television
SETC	State Economic and Trade Commission (China)
SIC	Standard industrial classification
SIM (card)	Subscriber identity module
SITC	Standard industrial trade classification
SMEs	Small and medium-sized enterprises

SMP	Significant market power
SMS	Short message service
SNA	Statistics of national accounts
SOE	State-owned enterprises
SOHO	Small offices/home offices
SSL	Secure sockets layer
TCP/IP	Transmission control protocol/Internet protocol
T-DMB	Terrestrial digital media broadcasting
TLCS	Television licensable content service
TLD	Top-level domain
TRAI	Telecom Regulatory Authority of India
TVHH	Television households
TWF	European Union Television without Frontiers Directive
UMTS	Universal mobile telecommunications system
URL	Uniform resource locator
USO	Universal service obligations
USPTO	United States Patents and Trademark Office
VAT	Value-added tax
VDSL	Very high data rate digital subscriber line
VNI	Cisco's Visual Networking Index
VoBB	Voice over broadband
VoD	Video on demand
VoIP	Voice over Internet protocol
W-CDMA	Wideband code division multiple access
WIDE	Widely integrated distributed environment
Wi-Fi	Wireless fidelity
WiMAX	Wireless interoperability for microwave access
WLAN	Wireless local area network
WLL	Wireless local loop

Annex Tables

Annex Table A.1. **Average annual exchange rates**

In national currency units per USD

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	1.36	1.47	1.37	1.35	1.28	1.35	1.59	1.55	1.72	1.93	1.84	1.54	1.36	1.31	1.33	1.20	1.19	1.28
Austria	0.80	0.85	0.83	0.73	0.77	0.89	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Belgium	0.80	0.86	0.83	0.73	0.77	0.89	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Canada	1.21	1.29	1.37	1.37	1.36	1.38	1.48	1.49	1.49	1.55	1.57	1.40	1.30	1.21	1.13	1.07	1.07	1.14
Chile	..	..	..	397	412	419	460	509	540	635	689	691	610	560	530	522	522	561
Czech Republic	28.37	29.15	28.79	26.54	27.14	31.70	32.28	34.57	38.60	38.04	32.74	28.21	25.70	23.96	22.60	20.29	17.07	19.06
Denmark	6.04	6.48	6.36	5.60	5.80	6.60	6.70	6.98	8.08	8.32	7.89	6.59	5.99	6.00	5.95	5.44	5.10	5.36
Estonia	..	13.22	12.99	11.46	12.04	13.88	14.07	14.68	16.97	17.48	16.61	13.86	12.60	12.58	12.47	11.43	10.69	11.26
Finland	0.75	0.96	0.88	0.73	0.77	0.87	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
France	0.81	0.86	0.85	0.76	0.78	0.89	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Germany	0.80	0.85	0.83	0.73	0.77	0.89	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Greece	0.56	0.67	0.71	0.68	0.71	0.80	0.87	0.90	1.07	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Hungary	79	92	105	126	153	187	214	237	282	286	258	224	203	200	210	184	172	202
Iceland	58	68	70	65	67	71	71	72	79	97	92	77	70	63	70	64	88	124
Ireland	0.75	0.86	0.85	0.79	0.79	0.84	0.89	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Israel	..	..	..	3.01	3.19	3.45	3.80	4.14	4.08	4.21	4.74	4.55	4.48	4.49	4.46	4.11	3.59	3.93
Italy	0.64	0.81	0.83	0.84	0.80	0.88	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Japan	127	111	102	94	109	121	131	114	108	122	125	116	108	110	116	118	103	94
Korea	781	803	803	771	804	951	1401	1189	1131	1291	1251	1192	1145	1024	955	929	1 102	1 277
Luxembourg	0.80	0.86	0.83	0.73	0.77	0.89	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Mexico	3.09	3.12	3.38	6.42	7.60	7.92	9.14	9.56	9.46	9.34	9.66	10.79	11.29	10.90	10.90	10.93	11.13	13.51
Netherlands	0.80	0.84	0.83	0.73	0.77	0.89	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
New Zealand	1.86	1.85	1.69	1.52	1.45	1.51	1.87	1.89	2.20	2.38	2.16	1.72	1.51	1.42	1.54	1.36	1.42	1.60
Norway	6.21	7.09	7.06	6.34	6.45	7.07	7.55	7.80	8.80	8.99	7.98	7.08	6.74	6.44	6.41	5.86	5.64	6.29
Poland	1.36	1.81	2.27	2.42	2.70	3.28	3.48	3.97	4.35	4.09	4.08	3.89	3.66	3.24	3.10	2.77	2.41	3.12
Portugal	0.67	0.80	0.83	0.75	0.77	0.87	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Slovak Republic	..	30.77	32.04	29.71	30.65	33.62	35.23	41.36	46.23	48.35	45.30	36.76	32.23	31.04	29.65	24.68	21.37	30.13
Slovenia	0.34	0.47	0.54	0.49	0.56	0.67	0.69	0.76	0.93	1.01	1.00	0.86	0.80	0.80	0.80	0.73	0.68	0.72
Spain	0.62	0.76	0.81	0.75	0.76	0.88	0.90	0.94	1.09	1.12	1.06	0.89	0.81	0.80	0.80	0.73	0.68	0.72
Sweden	5.82	7.78	7.72	7.13	6.71	7.63	7.95	8.26	9.16	10.33	9.74	8.09	7.35	7.47	7.38	6.76	6.59	7.65
Switzerland	1.41	1.48	1.37	1.18	1.24	1.45	1.45	1.50	1.69	1.69	1.56	1.35	1.24	1.25	1.25	1.20	1.08	1.09
Turkey	0.01	0.01	0.03	0.05	0.08	0.15	0.26	0.42	0.63	1.23	1.51	1.50	1.43	1.34	1.43	1.30	1.30	1.55
United Kingdom	0.57	0.67	0.65	0.63	0.64	0.61	0.60	0.62	0.66	0.69	0.67	0.61	0.55	0.55	0.54	0.50	0.54	0.64
United States	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: Data for EMU member countries are given in euros (EUR). Data for years prior to 1999 have been converted from national currencies into EUR by applying the irrevocable EUR/national currency conversion rates. The new Turkish lira was introduced on 1 January 2005, equivalent to 1 000 000 old Turkish lira.

Source: OECD Main Economic Indicators.

StatLink http://dx.doi.org/10.1787/888932402242

Annex Table A.2. **Purchasing power parities**

In national currency units per USD

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	1.35	1.34	1.33	1.32	1.33	1.32	1.31	1.3	1.31	1.33	1.34	1.35	1.37	1.39	1.41	1.42	1.48	1.46
Austria	0.92	0.93	0.94	0.93	0.93	0.92	0.92	0.92	0.9	0.92	0.9	0.89	0.87	0.89	0.86	0.87	0.85	0.85
Belgium	0.9	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.89	0.89	0.87	0.88	0.9	0.9	0.88	0.89	0.87	0.87
Canada	1.23	1.23	1.21	1.22	1.21	1.21	1.19	1.19	1.23	1.22	1.23	1.23	1.23	1.21	1.21	1.21	1.23	1.19
Chile	..	..	..	264	266	273	275	278	285	289	296	307	320	334	363	372	366	377
Czech Republic	7.8	9.24	10.26	11.08	11.96	12.71	13.89	14.14	14.21	14.22	14.32	14.04	14.29	14.32	14.04	13.94	13.7	13.7
Denmark	8.72	8.59	8.55	8.48	8.45	8.43	8.39	8.47	8.41	8.47	8.3	8.54	8.4	8.59	8.33	8.33	8.2	8.17
Estonia	..	..	..	4.76	5.79	6.27	6.71	6.95	7.12	7.46	7.47	7.53	7.6	7.85	8.14	8.63	8.67	8.24
Finland	0.98	0.98	0.97	1	1	1	1	1	0.99	1.01	1	1.01	0.98	0.98	0.95	0.94	0.92	0.92
France	1.02	1.01	1	0.99	0.99	0.97	0.97	0.96	0.94	0.92	0.9	0.94	0.94	0.92	0.9	0.89	0.88	0.88
Germany	0.99	1.01	1.01	1.01	0.99	0.99	0.99	0.97	0.97	0.96	0.94	0.92	0.9	0.87	0.84	0.83	0.82	0.81
Greece	0.44	0.49	0.53	0.57	0.61	0.63	0.66	0.68	0.68	0.67	0.66	0.69	0.7	0.71	0.7	0.71	0.7	0.71
Hungary	35.78	42.46	49.69	61.7	73.19	85.02	94.16	101.07	107.89	110.65	114.88	120.59	126.28	128.59	128.51	131.55	127.86	131.74
Iceland	72.37	72.11	72.47	73.13	75.02	74.45	77.23	79.68	84.31	88.93	91.34	94.54	94.23	99.08	107.2	112.39	119.34	125.06
Ireland	0.8	0.82	0.82	0.82	0.83	0.85	0.88	0.93	0.96	0.99	1	1.01	1.01	1.01	0.98	0.96	0.94	0.89
Israel	..	..	..	3.11	3.36	3.57	3.79	3.5	3.44	3.42	3.46	3.63	3.53	3.72	3.69	3.6	3.59	3.72
Italy	0.74	0.76	0.77	0.79	0.81	0.82	0.81	0.82	0.82	0.81	0.85	0.85	0.87	0.87	0.83	0.82	0.8	0.79
Japan	186	183	179	175	170	168	167	162	155	149	144	140	134	130	125	120	117	115
Korea	598	622	657	691	713	733	767	755	745	757	770	794	796	789	774	768	786	803
Luxembourg	0.9	0.93	0.95	0.95	0.95	0.96	0.95	0.94	0.94	0.95	0.93	0.94	0.92	0.95	0.91	0.92	0.91	0.9
Mexico	1.91	2.05	2.17	2.93	3.76	4.35	4.96	5.63	6.1	6.31	6.55	6.81	7.21	7.13	7.21	7.32	7.45	7.68
Netherlands	0.92	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.89	0.91	0.9	0.93	0.91	0.9	0.87	0.86	0.84	0.85
New Zealand	1.47	1.48	1.46	1.46	1.47	1.46	1.45	1.43	1.44	1.47	1.47	1.5	1.51	1.54	1.49	1.5	1.49	1.5
Norway	9.29	9.3	9.09	9.17	9.05	9.09	9.39	9.33	9.13	9.18	9.11	9.12	8.99	8.9	8.69	8.79	8.68	8.93
Poland	0.55	0.7	0.94	1.18	1.36	1.52	1.66	1.74	1.84	1.86	1.83	1.84	1.86	1.87	1.84	1.85	1.84	1.85
Portugal	0.58	0.61	0.64	0.65	0.66	0.67	0.69	0.7	0.7	0.71	0.71	0.71	0.72	0.68	0.66	0.66	0.64	0.64
Slovak Republic	0.32	0.36	0.4	0.43	0.44	0.45	0.47	0.5	0.53	0.52	0.53	0.56	0.57	0.57	0.56	0.55	0.54	0.52
Slovenia	..	..	..	0.4	0.43	0.46	0.48	0.51	0.53	0.57	0.59	0.62	0.61	0.61	0.61	0.63	0.63	0.63
Spain	0.66	0.68	0.69	0.71	0.72	0.72	0.72	0.73	0.73	0.74	0.73	0.75	0.76	0.76	0.74	0.73	0.72	0.7
Sweden	9.09	9.18	9.23	9.38	9.26	9.3	9.37	9.29	9.14	9.35	9.35	9.34	9.1	9.38	9.09	8.89	8.84	8.81
Switzerland	2.02	2.02	2.01	1.98	1.94	1.89	1.88	1.87	1.85	1.84	1.77	1.78	1.75	1.74	1.66	1.6	1.57	1.53
Turkey	..	0.01	0.01	0.02	0.04	0.08	0.13	0.2	0.28	0.43	0.61	0.77	0.81	0.83	0.85	0.88	0.91	0.92
United Kingdom	0.64	0.64	0.64	0.64	0.64	0.63	0.65	0.65	0.64	0.63	0.63	0.64	0.63	0.64	0.63	0.64	0.63	0.62
United States	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: Data for EMU member countries are given in euros (EUR). Data for years prior to 1999 have been converted from national currencies into EUR by applying the irrevocable EUR/national currency conversion rates. The new Turkish lira was introduced on 1 January 2005, equivalent to 1 000 000 old Turkish lira.

Source: OECD Main Economic Indicators.

StatLink http://dx.doi.org/10.1787/888932402261

Annex Table A.3. **Gross domestic product**

USD millions

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	331 538	321 607	364 807	394 093	436 922	438 159	391 632	428 301	412 145	393 370	437 153	561 659	680 782	763 960	820 547	984 792	1 053 043	994 521
Austria	192 759	187 247	201 217	239 196	233 961	206 157	212 057	210 616	190 394	189 731	206 460	250 901	287 385	304 481	321 189	372 616	416 301	381 000
Belgium	230 748	221 073	241 407	284 453	274 539	248 542	255 211	253 797	231 391	231 637	253 072	309 793	359 043	378 556	397 688	459 021	507 362	471 058
Canada	578 909	563 709	562 681	591 552	615 341	639 662	618 225	659 356	722 535	714 870	734 334	866 554	993 005	1 135 409	1 283 544	1 429 522	1 494 961	1 339 701
Chile	..	..	..	71 487	75 797	82 878	79 499	73 171	75 390	68 759	67 473	73 990	95 653	118 250	146 773	164 318	170 851	163 305
Czech Republic	31 539	37 167	43 626	55 257	62 022	57 132	61 849	60 191	56 714	61 835	75 273	91 354	109 524	124 535	142 583	174 246	216 110	190 234
Denmark	150 099	140 711	153 608	182 062	184 394	170 552	173 674	173 850	160 144	160 530	173 984	212 548	244 771	257 543	274 228	310 932	340 676	310 143
Estonia	..	1 735	2 426	3 777	4 725	5 052	5 596	5 711	5 679	6 240	7 325	9 843	12 027	13 907	16 802	21 666	23 575	19 261
Finland	110 628	87 386	100 390	131 488	128 656	123 347	129 498	130 023	121 202	124 284	135 416	163 389	187 837	196 634	207 054	246 167	271 543	237 938
France	1 367 668	1 296 162	1 358 509	1 571 842	1 573 399	1 424 073	1 470 727	1 455 283	1 322 360	1 336 772	1 460 901	1 791 926	2 049 616	2 157 585	2 258 038	2 596 279	2 865 457	2 648 813
Germany	2 058 275	1 993 376	2 145 518	2 532 123	2 436 597	2 152 337	2 183 756	2 140 426	1 892 202	1 886 750	2 021 868	2 431 236	2 729 506	2 802 750	2 908 125	3 332 055	3 648 824	3 329 306
Greece	111 723	105 145	112 523	131 699	138 587	136 108	136 090	140 172	127 365	130 739	147 750	193 743	228 723	243 524	262 399	308 958	346 587	323 675
Hungary	38 131	39 506	42 484	45 721	46 601	47 190	48 755	49 084	47 377	53 430	66 816	83 983	102 700	110 085	112 791	137 894	155 447	128 765
Iceland	6 976	6 127	6 295	7 018	7 331	7 423	8 292	8 742	8 697	7 923	8 907	10 968	13 234	16 302	16 651	20 426	16 804	12 138
Ireland	54 003	50 866	55 349	67 272	74 395	80 949	88 175	96 149	96 347	104 586	123 079	157 312	184 375	202 893	221 679	259 416	264 690	221 731
Israel	..	..	..	96 124	105 293	108 530	109 847	110 717	124 603	122 819	112 956	118 836	126 927	134 189	146 057	167 918	202 190	195 506
Italy	1 258 878	1 024 393	1 057 480	1 127 785	1 254 723	1 191 780	1 212 623	1 199 033	1 092 713	1 114 864	1 221 911	1 500 398	1 717 938	1 786 849	1 856 721	2 118 051	2 305 663	2 112 319
Japan	3 796 153	4 349 926	4 778 890	5 264 358	4 642 506	4 261 874	3 856 889	4 368 612	4 667 253	4 095 447	3 918 273	4 229 225	4 606 049	4 552 118	4 362 552	4 378 093	4 886 919	5 068 890
Korea	338 171	372 210	435 587	531 142	573 003	532 239	357 509	461 807	533 384	504 586	575 929	643 762	721 975	844 863	951 773	1 049 236	931 402	832 512
Luxembourg	15 330	15 747	17 539	20 699	20 516	18 451	19 350	21 156	20 184	20 154	22 634	29 027	33 896	37 853	42 400	51 358	58 294	52 840
Mexico	399 263	441 406	460 634	313 700	364 320	439 395	461 358	526 911	636 432	681 933	710 805	700 260	758 309	845 931	949 260	1 022 661	1 086 415	872 276
Netherlands	335 374	328 587	349 455	418 166	415 266	384 536	402 738	410 844	383 450	399 760	438 881	535 893	606 400	641 759	675 270	783 251	876 803	794 415
New Zealand	41 200	44 790	52 591	62 201	68 394	68 116	55 956	58 678	53 257	52 892	61 308	82 385	100 464	112 868	109 304	133 279	130 142	116 847
Norway	128 392	118 237	124 477	148 807	160 153	158 299	151 041	159 029	168 323	170 955	192 018	225 117	258 611	302 130	336 907	387 646	446 241	378 492
Poland	92 505	94 200	108 534	139 348	156 458	157 120	172 673	167 680	171 121	190 602	198 181	216 750	252 606	303 488	341 945	424 815	529 225	430 659
Portugal	106 579	93 886	98 014	116 993	120 892	116 070	122 338	125 926	116 520	119 765	132 209	160 691	183 737	192 160	200 341	231 147	252 824	232 824
Slovak Republic	..	13 508	15 661	19 504	21 093	21 296	22 354	20 501	20 361	21 028	24 520	33 265	42 176	47 845	55 602	75 057	94 677	87 961
Slovenia	12 818	13 072	14 691	21 008	21 189	20 161	21 694	22 114	19 872	20 450	23 128	29 202	33 841	35 938	38 813	47 353	54 860	49 144
Spain	607 940	513 105	512 030	596 273	623 493	572 638	599 437	616 960	578 223	607 748	687 930	879 696	1 038 323	1 135 990	1 230 355	1 443 201	1 600 182	1 463 769
Sweden	267 320	202 126	217 434	253 797	276 291	253 340	254 720	258 889	247 320	227 340	250 886	314 569	362 035	370 733	398 981	462 429	487 657	406 275
Switzerland	250 306	243 694	269 767	316 609	303 769	264 821	272 595	268 605	249 741	254 628	278 371	324 245	364 015	371 039	392 435	434 251	503 885	491 084
Turkey	146 976	266 412	173 337	208 693	248 217	258 417	270 012	249 038	264 537	195 304	232 103	303 187	390 932	484 277	530 343	648 599	731 180	615 467
United Kingdom	1 091 368	976 412	1 066 134	1 163 914	1 221 447	1 360 810	1 465 170	1 497 952	1 479 595	1 480 910	1 605 319	1 868 436	2 187 193	2 280 105	2 455 176	2 797 764	2 682 207	2 181 050
United States	6 291 500	6 614 300	7 030 500	7 359 300	7 783 900	8 278 900	8 741 000	9 301 000	9 898 800	10 233 900	10 590 200	11 089 200	11 812 300	12 579 700	13 336 200	13 995 000	14 296 900	14 043 900
OECD	20 443 067	20 777 829	22 173 593	24 487 461	24 674 191	24 286 352	24 432 339	25 730 324	26 195 631	25 986 541	27 197 376	30 493 341	33 875 911	35 886 247	37 800 525	41 469 418	43 949 896	41 197 820

Source: OECD Main Economic Indicators.

StatLink http://dx.doi.org/10.1787/888932402280

Annex Table A.4. **Total population**

Thousands

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	17 581	17 757	17 949	18 193	18 417	18 606	18 812	19 036	19 270	19 531	19 768	20 009	20 250	20 542	20 871	21 236	21 642	22 101
Austria	7 841	7 906	7 936	7 948	7 959	7 968	7 977	7 992	8 012	8 042	8 082	8 118	8 169	8 225	8 268	8 301	8 337	8 363
Belgium	10 047	10 086	10 116	10 137	10 156	10 180	10 203	10 223	10 246	10 281	10 330	10 373	10 417	10 474	10 543	10 622	10 708	10 790
Canada	28 371	28 685	29 001	29 302	29 610	29 906	30 155	30 401	30 686	31 019	31 354	31 640	31 941	32 245	32 576	32 932	33 327	33 740
Chile	13 665	13 909	14 152	14 395	14 596	14 796	14 997	15 197	15 398	15 572	15 746	15 920	16 093	16 267	16 433	16 598	16 764	16 929
Czech Republic	10 318	10 331	10 336	10 331	10 315	10 304	10 295	10 283	10 273	10 224	10 201	10 202	10 207	10 234	10 267	10 323	10 430	10 507
Denmark	5 171	5 189	5 206	5 230	5 262	5 285	5 303	5 321	5 338	5 357	5 376	5 390	5 403	5 419	5 437	5 460	5 492	5 522
Estonia	..	1 511	1 477	1 448	1 425	1 406	1 393	1 379	1 372	1 367	1 361	1 356	1 351	1 348	1 345	1 342	1 341	1 340
Finland	5 042	5 066	5 089	5 108	5 125	5 140	5 153	5 165	5 176	5 188	5 201	5 213	5 227	5 245	5 266	5 289	5 313	5 339
France	58 745	58 995	59 210	59 419	59 624	59 831	60 047	60 333	60 725	61 163	61 605	62 038	62 491	62 959	63 394	63 781	64 141	64 494
Germany	80 594	81 179	81 422	81 661	81 896	82 052	82 029	82 087	82 188	82 340	82 482	82 520	82 501	82 464	82 366	82 263	82 120	81 875
Greece	10 500	10 558	10 606	10 634	10 709	10 777	10 835	10 883	10 918	10 950	10 988	11 024	11 062	11 104	11 149	11 193	11 237	11 260
Hungary	10 324	10 294	10 261	10 329	10 311	10 291	10 267	10 238	10 211	10 188	10 159	10 130	10 107	10 087	10 071	10 056	10 038	10 023
Iceland	261	264	266	267	269	271	274	277	281	285	288	289	293	296	304	311	319	319
Ireland	3 555	3 574	3 586	3 601	3 626	3 661	3 714	3 755	3 804	3 864	3 932	3 997	4 067	4 160	4 261	4 365	4 443	4 468
Israel	..	..	..	5 545	5 685	5 829	5 971	6 125	6 289	6 439	6 570	6 690	6 809	6 930	7 054	7 180	7 309	7 440
Italy	56 797	56 832	56 843	56 844	56 860	56 890	56 907	56 916	56 942	56 977	57 157	57 605	58 175	58 607	58 942	59 375	59 832	60 263
Japan	124 567	124 938	125 265	125 570	125 859	126 157	126 472	126 667	126 926	127 316	127 486	127 694	127 787	127 768	127 770	127 771	127 510	127 328
Korea	43 748	44 195	44 642	45 093	45 525	45 954	46 287	46 617	47 008	47 357	47 622	47 859	48 039	48 138	48 297	48 456	48 607	48 747
Luxembourg	392	398	404	410	416	421	426	432	439	442	446	452	458	465	473	480	489	498
Mexico	86 238	87 797	89 352	91 120	92 544	93 908	95 233	96 550	98 258	99 564	100 762	101 870	102 866	103 831	104 748	105 677	106 573	107 440
Netherlands	15 182	15 290	15 381	15 460	15 526	15 607	15 703	15 809	15 922	16 043	16 147	16 223	16 276	16 317	16 341	16 378	16 440	16 527
New Zealand	3 506	3 542	3 585	3 634	3 691	3 747	3 792	3 822	3 843	3 868	3 900	3 970	4 045	4 101	4 148	4 198	4 241	4 281
Norway	4 286	4 312	4 337	4 358	4 381	4 405	4 432	4 462	4 491	4 513	4 539	4 565	4 591	4 622	4 661	4 706	4 768	4 829
Poland	38 173	38 221	38 252	38 275	38 289	38 292	38 283	38 270	38 256	38 251	38 232	38 195	38 180	38 161	38 132	38 116	38 116	38 153
Portugal	9 963	9 974	9 998	10 030	10 058	10 091	10 129	10 172	10 226	10 293	10 368	10 441	10 502	10 549	10 584	10 608	10 622	10 632
Slovak Republic	5 307	5 325	5 347	5 363	5 374	5 384	5 391	5 396	5 401	5 380	5 379	5 379	5 382	5 387	5 391	5 397	5 406	5 418
Slovenia	..	..	..	1 989	1 990	1 986	1 982	1 984	1 989	1 992	1 995	1 996	1 997	2 001	2 008	2 019	2 022	2 042
Spain	39 175	39 261	39 331	39 388	39 479	39 583	39 722	39 927	40 264	40 721	41 314	42 005	42 692	43 398	44 068	44 874	45 593	45 930
Sweden	8 668	8 719	8 781	8 827	8 841	8 846	8 851	8 858	8 872	8 896	8 925	8 958	8 994	9 030	9 081	9 148	9 256	9 341
Switzerland	6 943	6 989	7 037	7 081	7 105	7 113	7 132	7 167	7 209	7 285	7 343	7 405	7 454	7 501	7 558	7 619	7 711	7 799
Turkey	56 986	57 913	58 837	59 756	60 671	61 582	62 464	63 366	64 259	65 135	66 009	66 873	67 734	68 582	69 421	70 256	71 079	71 897
United Kingdom	57 585	57 714	57 862	58 025	58 164	58 314	58 475	58 684	58 886	59 113	59 323	59 557	59 846	60 238	60 587	60 975	61 383	61 767
United States	256 922	260 282	263 455	266 588	269 714	272 958	276 154	279 328	282 418	285 335	288 133	290 845	293 502	296 229	299 052	302 025	304 831	307 483
OECD	1 076 454	1 087 005	1 095 321	1 111 361	1 119 472	1 127 541	1 135 259	1 143 122	1 151 794	1 160 291	1 168 521	1 176 798	1 184 910	1 192 924	1 200 866	1 209 330	1 217 440	1 224 884

Source: OECD Annual Labour Force Statistics.

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