Information and Communications Technologies

OECD Communications Outlook 2009

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OECD Communications Outlook

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Foreword

This report, the tenth 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 Dimitri Ypsilanti, Sam Paltridge, Taylor Reynolds, Karine Perset, Claudia Sarrocco and Frédéric Bourassa. They are grateful for the contribution of information by telecommunication carriers and to national delegations which responded in 2008 to an OECD questionnaire relating to industry regulation and data.*

The assistance of Netcraft and the International Telecommunication Union 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 2009, *covering the period 1980-2008.*

The draft of this report was presented to the OECD Working Party on Telecommunication and Information Services Policy at its meeting on 8-9 December 2008. The Committee for Information, Computer and Communications Policy subsequently recommended that the report be made available to the general public.

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ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Executive Summary

This tenth edition of the biennial *OECD Communications Outlook* highlights transformations in the sector and investment in next-generation communication networks. It details the strong, steady growth of subscriptions and revenues in the telecommunication sector despite declining prices facing end users. This edition also looks at issues surrounding the expansion of the Internet as well as how broadcasting markets are evolving with respect to high-speed data networks. This edition of the *Communications Outlook* also looks at key regulatory trends designed to encourage competition and growth.

The upgrade to next-generation networks (fixed and wireless)

Telecommunication companies which survived the bursting of the "dot-com bubble" in 2000 generally emerged stronger and more agile than before. This agility has served them well when facing dramatic changes in telecommunication markets. Communication operators continue upgrading their networks in order to stay competitive and increase revenues. Fixed line and cable providers are investing in fibre-optic infrastructure and wireless carriers are paying for new radio-interface upgrades in order to offer higher-speed data services.

This transformation has been fueled by investment. Telecommunications investment reached USD 185 billion in 2007, an increase of 9% each year from 2005. Investment grew over the past four years, in sharp contrast to the strong investment declines observed between 2000 and 2003.

Communication infrastructure investment plays an increasingly important role in total investment within a country. In 2007, telecommunication investment grew to 2.2% of the gross fixed capital formation within the OECD and telecommunication operators are commonly among the largest private investors in their respective economies.

Despite strong growth through 2007, the global financial crisis evolving in 2008-2009 is likely to dampen investment plans of many operators and may slow investment plans in core networks. The crisis may also negatively impact on a number of new entrants who depend on access to capital in order to expand and compete with better-funded incumbents. Some governments, recognising the economic importance of broadband networks within the economy, are investing in extending and upgrading high-speed access as part of fiscal stimulus packages.

Steady revenue growth

People increasingly rely on telecommunication services for social and economic interactions. The percentage of household budget assigned to communication services has increased relative to other budgetary areas over the last two decades. Households devote an average of 2.2% of their budgets to communication services, underscoring demand for services even during times of economic downturn.

Telecommunications is a USD 1.2 trillion market in the OECD. Telecommunication markets have expanded at a fairly constant annual growth rate of 6% since 1990, even during economic downturns. The fact that operators have been able to maintain historical growth levels in the face of declining per-minute calling prices shows an ability to adapt to quickly changing market conditions and to develop new income streams.

Voice remains the largest revenue source for operators despite declines in calling prices for both fixed and mobile. Mobile revenues accounted for 41% of all telecommunication revenues in the OECD in 2007, up from 22% just a decade earlier. Ten countries now have mobile sectors which are larger than the fixed sector in revenue terms.

Subscriptions growing

There have been two major growth areas in telecommunication services in the previous two years — mobile and broadband. Mobile and broadband subscriptions together accounted for 74% of all communication subscriptions in 2007. Mobile alone accounts for 61% of all subscriptions while standard phone lines have dropped to 26%. This is a dramatic turnaround from the year 2000 when there were more fixed line subscribers than mobile.

The total number of fixed, mobile and broadband subscriptions in the OECD grew to 1.6 billion in 2007 for just over 1 billion inhabitants. To emphasise how our ability to communicate has changed, there are seven access paths in 2007 for every access path in 1980. The sheer increase highlights the growth of the telecommunications industry over this time.

Mobile subscriptions grew at a compound annual growth rate of 10% over the previous two years to push the number of OECD mobile subscriptions to 1.14 billion by 2007. This is an effective penetration rate of 96.1 mobile subscribers per 100 inhabitants. Italy had the highest penetration rate with 151 subscribers per 100 inhabitants and only nine countries had less than one subscription per person.

Mobile growth has been strong but transitioning subscribers to third-generation mobile networks has taken longer than originally planned. As of 2007, only 18.2% of reported OECD mobile subscribers were on third-generation networks.

The other prominent growth area has been broadband. Broadband is now the dominant fixed access method in all OECD countries. In 2005, dial-up connections still accounted for 40% of fixed Internet connections but just two years later that percentage had fallen to 10%. Dial-up has practically disappeared in Korea where it now only accounts for fewer than two out of every 1 000 Internet connections.

The growth of broadband subscriptions has also helped protect fixed line operators from much more dramatic line losses and has increased the value of cable networks around the world. The number of broadband access paths has grown 31% per year over the previous

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four years. DSL remains the leading broadband technology, accounting for 60% of all broadband subscriptions in June 2008. Cable represents 29% while fibre-based connections are 9%. The remaining 2% of connections are over fixed-wireless, satellite and broadband-over-power lines.

The year 2008 also marked a significant shift in fixed broadband technologies. In June 2008, Japan and Korea became the first two countries to have more fibre-based subscriptions than either DSL or cable.

Prices falling

The impressive subscription growth between 2005 and 2007 in part reflects more attractively priced offers from operators. Prices have tended to fall for communication services over time on all platforms.

Over the previous 18 years, residential users saw the real price of residential fixed-line phone service fall roughly 1% per year while business prices fell 2.5% per year. The widespread availability of voice-over-broadband services continues to push down fixed-line calling prices. Many voice-over-broadband plans now offer flat-rate calling plans nationally or internationally.

Mobile subscribers also benefitted from declining prices between 2006 and 2008. The average prices of the OECD mobile baskets (a set number of calls and messages per year) fell by 21% for low usage, 28% for medium usage and 32% for the highest consumption level over the two year period.

Prices may be falling but the composition of voice calls is also shifting. The number of minutes of communication per mobile phone is increasing while the minutes on fixed networks are decreasing. Data between 2005 and 2007 suggest people are making fewer domestic calls on the fixed network in most countries. When people do use fixed networks they are increasingly making calls to users of mobile phones.

Broadband prices have fallen as well over the same time. OECD broadband prices declined significantly over the previous three years. Prices declined an average of 14% per year for DSL and 15% for cable between 2005 and 2008. Operators have been able to increase broadband revenues through attracting new customers and bundling broadband with other services, particularly voice.

The average price of a low-speed connection (advertising downloads at 2 megabits per second or less) was USD 32 per month in September 2008. At the other end of the scale, broadband connections with download speeds advertised as faster than 30 megabits per second averaged USD 45 per month.

The Internet is expanding but current IPv4 addresses are running short

The growth in broadband subscriptions has helped fuel the expansion of the Internet and also been one source of its growing pains. The number of Internet hosts worldwide grew at 33% compounded annually between 1998 and 2008 to reach 540 million hosts in January 2008. Over half of all hosts (287 million) had a generic, top-level domain rather than one tied to a country code.

Networks in OECD countries comprise the majority of networks attached to the Internet. As a network of networks, OECD countries accounted for 74% of the 26 600 networks present in the global routing tables in 2007. The United States has the largest share of networks with an autonomous system assignment – comprising 43% of the world total at the end of 2007.

This growth in the number of networks, and devices attached to those networks has led to a shortage of unique Internet addresses used to identify individual devices connected to the Internet. As a result, there is a need for all network operators to upgrade to a new Internet addressing scheme, Internet protocol version 6 (IPv6). Based on allocation trends, experts estimate that the addresses in the current scheme (IPv4) will run out in 2011 or early 2012 (January 2009 projections).

Television broadcasting evolving

Operators are investing heavily in new, high-speed broadband networks and this allows a much richer audio-visual experience than early broadband connections were capable of transmitting. As a result, the audio visual landscape is rapidly changing with audio and video now delivered over a range of different networks and devices. Television is no longer the sole conduit for diffusion of video data as consumers now watch video content on an array of devices.

Broadcasters, telecommunication operators (fixed and mobile), Internet service providers, content aggregators, advertisers and users are all active parts of a new, converged market. Content is repackaged to ensure that it is accessible over all available networks and devices. Many electronic equipment providers, from mobile phones to handheld audio/video devices are also trying to ensure that their users can access content directly and away from home.

Traditional linear diffusion of content maintains an advantage over other media because of the near ubiquity of televisions in households. On average, 95% of all households in the OECD have at least one television. Only six countries have television penetration of less than 90% of households. This provides a strong base for terrestrial, cable and satellite broadcasters. At the same time, it represents a challenge to new media operators who try to attract viewers to other devices.

Television has become a lucrative potential market for DSL providers and a historical revenue stream to protect for cable operators. A number of DSL providers have been successful at using television over DSL as a way to boost their revenues.

Regulatory changes to support growth

Broadband, and with it the Internet, is often viewed as a general purpose technology having a wide impact on a large number of industries, on social interaction and resulting in a range of new innovative services which have diffused rapidly across economies. Broadband is viewed as an enabler of productivity and economic growth, but its impact on economies will depend on broadband being used by business and consumers, which requires access to broadband at low prices and good quality. In turn, these factors are closely linked with competition in the market.

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Investments in new fibre networks will allow for much higher speeds for end users but consumer benefits may depend on the competitiveness of markets. The high fixed investment costs for new fibre networks to users means a limit to the number of competing fibre networks a specific geographic area may be able to support. Facilities-based competition may be difficult to develop in some markets. Investment in new technology such as next generation access networks, is taking place mainly in urban areas. There are concerns about the implications this may have in creating new digital geographic divides and whether alternative technologies, such as high-speed wireless, are sufficiently adequate to provide rural and remote areas with sufficient capacity for emerging services.

With these concerns in mind, regulatory frameworks, which had reached a certain stability and maturity during the last decade, are in many cases being reviewed in order to ensure that competition prevails.

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OECD Communications Outlook 2009
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Chapter 1

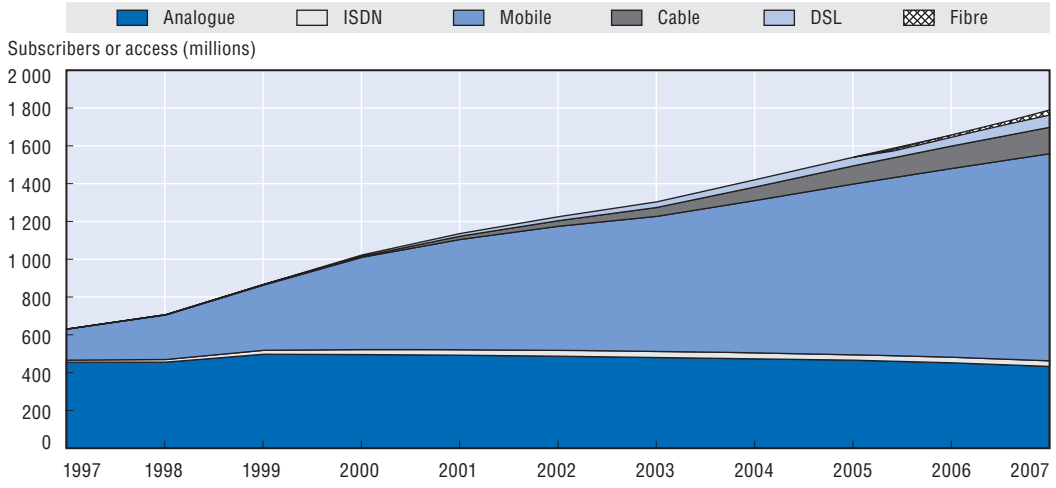
Main Trends

Telecommunication companies which survived the burst of the "dot-com bubble" in 2000 generally emerged stronger and more agile than before and are well poised to face the unfolding economic downturn and dramatic changes in telecommunication markets. Communication operators continue upgrading their networks in order to stay competitive and increase revenues. Fixed line and cable providers are investing in fibre-optic infrastructure, and wireless carriers are paying for new radio-interface upgrades in order to offer higher-speed data services.

The unfolding of the financial crisis in late 2008 highlights the relative strengths of the telecommunication sector as well as potential challenges for continued growth.

Telecommunication markets are relatively resilient to economic shocks. The largest economic downturn in the previous 15 years was between 2001 and 2003, when OECD GDP growth fell below 2% per year. The bursting of the dot-com bubble and subsequent bankruptcies created problems in the telecommunication sector but the number of subscribers continued increasing at a steady pace (Figure 1.1).

Figure 1.1. **Access growth in the OECD, 1997-2007**



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The economic downturn had only a slight impact on telecommunication revenues between 2001 and 2003. Revenues continued growing during the recessionary period in most countries, including the United States (see Chapter 3).

Several characteristics of the telecommunication sector such as the increasing view that communication services are increasingly non-discretionary spending items, long contract durations and bundled services help explain why operators are relatively well insulated from economic downturns. Consumer and business users increasingly include telecommunication spending in the "non-discretionary" category of their budgets. For example, job seekers may view Internet access at home as a key tool for finding new employment. Telecommunication providers also tend to set contract durations at periods of 12 months or longer as a way to recover the costs of the equipment they provide for use when a contract is signed. Mobile phone operators subsidise consumer handsets and recover the costs over the period of the contract, typically 12-24 months. Broadband providers often have a similar contract structure due to the cost of user premises equipment and installation. Consumers typically face steep penalties if they choose to cancel a subscription before the end of a telecommunication contract.

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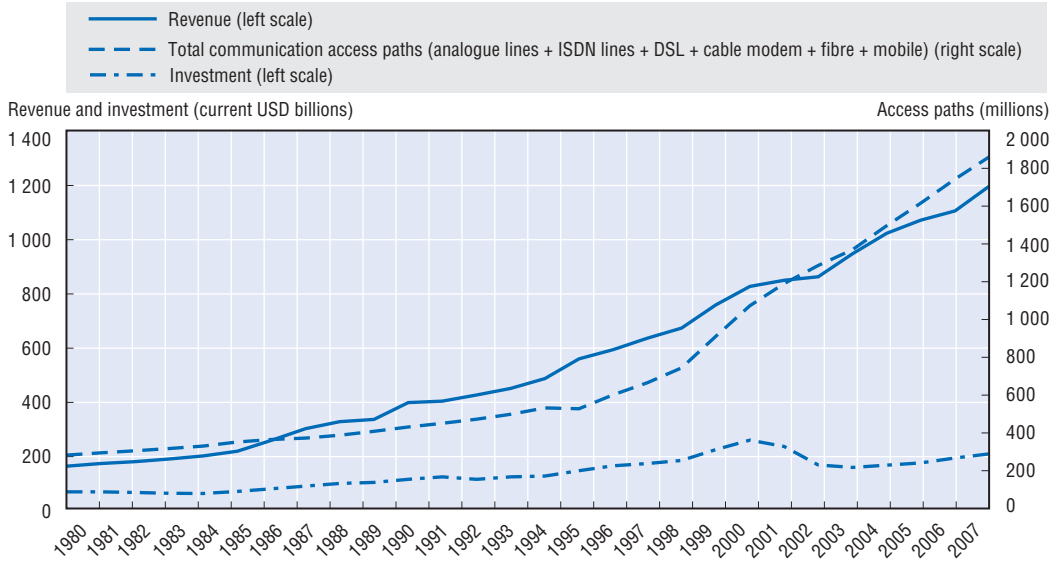
The result of these longer-term contracts is more consumer "stickiness", which is helpful for operators when households start looking for discretionary items to cut from their budgets. This provides more incentive to look for budget cuts in other areas of household consumption first.

Another characteristic of telecommunication markets which may explain their resiliency is the growth of bundled services. One of the key trends discussed in this edition of the *OECD Communications Outlook* is the shift toward 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.

One area of telecommunication markets which is susceptible to economic downturns is investment. Telecommunication investment reached its peak in 2000 at USD 243 billion during the height of the Internet bubble. The next year investment fell by 10%. The decline steepened in 2002, falling 31%, the largest decline observed in the past 15 years. Investment only began to grow again in 2004, but at relatively slower rates than before. In 2007, the level of investment was only beginning to recover to levels close to those in 1999 (Figure 1.2).

Figure 1.2. **Subscriber, revenue and investment growth, 1980-2007**



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In some ways, a decline in investment in one year poses less of a problem in telecommunications since infrastructure investment tends to occur in phases. Rolling out new wired networks or upgrading wireless technologies requires a large up-front capital investment which can then be depreciated over a long time frame. As an example, telecommunication investments leading up to the last economic downturn continue to benefit the industry as a whole. Fibre backhaul networks installed in 1999 and 2000 are still supporting the tremendous growth in consumer broadband and represent the first wave of fibre deployment. The same can be said for 3G mobile networks, which required large investments early in the decade and are only now beginning to bring in substantial

revenues. A decline in investment looks inevitable for 2008 and 2009 but the effects on telecommunication markets may be less severe than elsewhere given strong investment over the previous three years.

Innovation through convergence

The theme of the previous edition of the *Communications Outlook* (2007) was "sustained growth through transformation". This transformation has continued to evolve with many operators moving towards a converged model for delivering a wide range of services. These converged services require more bandwidth per user and this has led operators to upgrade networks to support new services and revenue streams. As a result, the theme of this *Communications Outlook* could be summarised by the phrase "network upgrades to support convergence".

The wired upgrade

Copper-based networks have formed the foundation of wired communication for over 100 years but now the telecommunications industry is moving away from copper to optical fibre-based local loop networks as a way to support high-bandwidth converged services. Fibre networks offer higher capacities than other telecommunications transport technologies and capacity is easy to expand once the fibre is in place simply by changing electronic components at both ends. The optical fibre networks currently being installed will form the foundation of wired data communication for at least the next 25 years and will support high-speed data, high-definition television and voice services.

The first wave of fibre investment was in high-capacity network backbones feeding traditional cable and copper networks. Much of this investment took place between 1995 and 2005. Operators were able to bring high-speed connectivity to neighbourhoods via fibre but then were constrained by copper-based connections to individual homes. Often the backhaul networks had the capacity to support high-speed services but attenuation over long copper loops meant services still were not available to consumers.

Operators are addressing this issue through new investment. This edition of the *Communications Outlook* highlights this second wave of fibre investment, which extends access to individual homes and businesses with next-generation networks as a way to overcome the current bottlenecks of copper networks. Japan and Korea are leading the OECD in this transition. The number of DSL subscribers fell by more than 10% in both countries between June 2007 and 2008 as subscribers switched to higher-capacity fibre network connections. Cable and VDSL operators are also making significant investments by pulling fibre connections deeper into neighbourhoods and then distributing the connectivity to individual residences using existing infrastructure. This allows them to reduce the length of the historical copper connections in order to increase speeds.

One of the key benefits of this upgrade is that fibre allows for much higher capacity downloads and uploads than DSL or cable networks. The increase in upload speeds represents a shift away from asymmetric broadband connections with faster downloads to symmetric connections capable of high-speed communication in both directions. Rather than simply downloading content from the Internet, consumers are increasingly producing content which requires faster uploads.

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Investment in next-generation networks was strong across the OECD throughout 2007, the last year for which investment data were available. The continuation of this trend could be postponed if access to capital is constrained over the next two years and the economic climate remains difficult in OECD countries. The network rollout will eventually continue but the countries with substantial network upgrades already completed, such as Korea, Japan and Sweden, will retain their leadership status for longer.

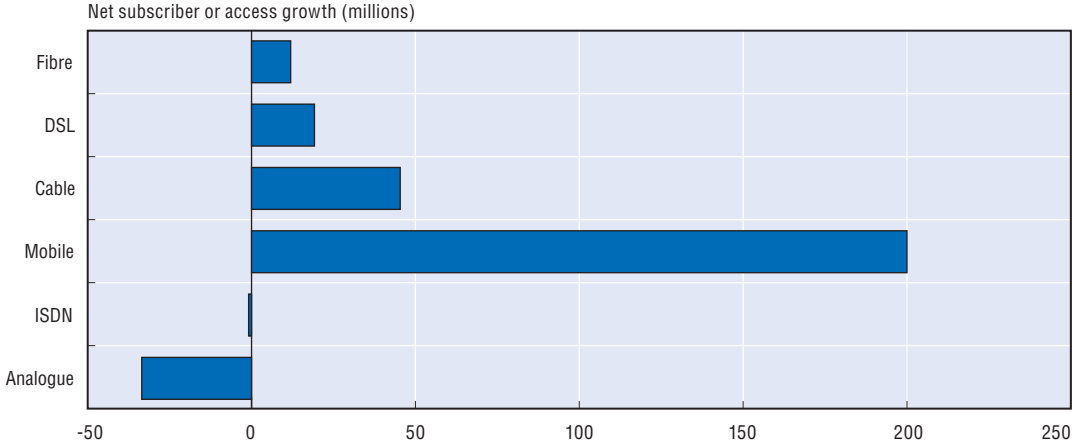
Mobile/wireless growth

Mobile operators were among the first to upgrade their networks to support higher-speed data services. 3G technologies promised to bring more data use to mobile networks and allow for truly mobile Internet access. The rollout of 3G networks has been slower than expected and operators have found it difficult to convince subscribers to upgrade. When subscribers do upgrade to 3G, many only use voice services due to high prices for data access.

There was a significant shift, however, in the way operators price Internet data over mobile networks. The introduction of flat-rate data tariffs on mobile networks struck a chord with consumers and packages offering mobile voice and unlimited data were successful in markets where they were introduced. Operators also lowered their prices for 3G data services to the point that consumers now purchase 3G modems alongside business users who have been the main subscribers for several years. The percentage of 3G subscribers increased steadily, reaching 18.2% of all mobile subscriptions in 2007.

Mobile subscriptions account for 62% of total access paths in the OECD. The number of net additions on mobile networks between 2005 and 2007 was over 200 million, much greater than any other access path technology (Figure 1.3).

Figure 1.3. **Net access path growth, 2005-07**



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The number of mobile subscriptions in the OECD topped 1.14 billion in 2007, equivalent to 96.1 subscribers per 100 inhabitants. As Chapter 3 will show, mobile revenues now account for nearly half of all telecommunication revenues (41% in 2007), up from 22% ten years earlier. This transformation is evident in data from the largest operators in the OECD shown in Table 1.1. Most of this revenue growth is from new subscriptions as revenues per mobile subscriber have remained relatively stable since 2000.

Transformation of voice

Despite significant price changes, voice remains the largest revenue source for operators although its importance is declining as margins fall in response to competitive pressures. Data comprises a larger percentage of revenues than before and this trend is likely to continue.

There has been a notable shift in telecommunication markets away from fixed to mobile and VoIP voice services. Internet telephony began as a computer-to-computer application but is now available on a wide range of devices and platforms. For example, instant messaging clients were among the first applications to integrate voice services into their platforms and allow users to make free voice calls to other clients. Internet telephony functionality is increasingly available within social networking sites as well, allowing people to make voice calls to other members. While voice services are commonly tied to a computer, they have also moved into the realm of gaming. Gaming consoles such as Microsoft's Xbox and Sony's Playstation 3 already support voice communication over the Internet among gamers.

Some of the most rapid subscriber growth in VoIP has come directly from Internet service providers that now offer voice as part of triple or quadruple-play packages. Cable companies, in particular, were among the first to offer cable telephone services as a way to compete with incumbent providers. In addition to cable operators, competitive DSL providers now offer VoIP as a way to attract customers and provide fully unbundled services.

Telecommunication markets in the OECD continue to grow and transform. 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 develop and grow their various business models.

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Table 1.1. Major public telecommunication operators and Internet service providers in the OECD area (fiscal year 2007 unless noted)

			USD millions							Units		
Name of PTO	Country		Revenue	Net income	Debt		Capital expenditures	Mobile revenue	R&D spending	Fixed access lines	DSL/cable/ FTTH lines	Mobile subscribers
AT&T	United States		118 928	11 951	57 255	(3)	17 717	38 568		61 582 000	14 156 000	70 052 000
Verizon	United States		93 469	5 521	31 157	(7)	17 538	43 882				65 700 000
NTT	Japan	(1)	90 708	532	3 637	(8)	18 079	23 268	2 619			53 390 000
Deutsche Telekom	Germany		85 638	7 241	50 959	(5)	10 979	47 534	274	50 500 000		119 600 000
Telefonica	Spain		77 316	12 200	62 033	(5)	10 996	30 322	814	41 974 200	10 277 800	169 219 700
France Telecom	France		72 548	8 630	52 847	(4)	9 589	10 342	1 233			109 700 000
Vodafone (Group)	United Kingdom	(1)	70 000	20 200	50 294	(5)	10 150	70 000	468			260 500 000
Telecom Italia	Italy		42 863	7 896	48 905	(5)	7 562	20 427	167	22 124 000	11 060 000	67 611 000
BT	United Kingdom	(1)	41 408	5 790	18 920	(5)	6 600	696	2 504	27 209 000	12 700 000	360 000
Sprint	United States		40 146	- 28 910	22 130		6 322	34 698				45 329 000
Comcast	United States		30 895	2 587	31 323	(7)	6 158				15 200 000	
KDDI	Japan	(1)	30 542	1 850	4 857	(8)	4 391	24 311	166	3 080 000	2 220 000	30 339 000
America Movil	Mexico		28 507	5 046	12 520	(9)	3 168			3 866 000	130 000	153 422 000
Telstra	Australia	(2)	20 690	5 188	12 702	(5)	4 502	5 313	8	10 668 000	4 977 000	9 335 000
Korea Telecom	Korea		20 080	1 260	9 905	(e)	3 913	6 322	313	11 200 000	11 200 000	13 721 000
KPN Telecom	Netherlands		17 070	3 425	16 133	(10)	1 879	9 110	22	5 400 000	2 400 000	27 000 000
BCE Inc.	Canada		16 697	4 650	8 112	(5)	2 945	3 861		8 176 000	2 004 000	6 216 000
Time Warner Cable	United States		15 955	1 123	13 577	(3)	3 433				7 900 000	
Telenor	Norway		15 780	3 277	7 769	(4)	3 328	9 945	100	2 058 000	1 074 000	143 000 000
TeliaSonera	Sweden		14 252	3 003	5 533	(5)	51	6 586	256	6 218 000	2 326 000	14 501 000
Qwest	United States		13 778	2 917	14 251	(7)	1 669	560		12 789 000	2 600 000	
SK Telecom	Korea		12 066	2 220	4 675	(3)	1 954	12 066	235			21 968 169
Telmex	Mexico		11 964	4 011	8 368	(11)	1 267			17 800 000	2 925 000	69 500 000
Rogers	Canada		9 461	595	10 001	(7)	1 679	5 143		990 000	1 465 000	7 300 000
AllTEL	United States		8 803	183	23 374	(3)	1 059					
OTE	Greece		8 657	908	10 493	(7)	1 509	3 082		8 889 000	825 000	15 546 000
Telus Corp.	Canada		8 481	1 176	5 740	(5)	1 654	4 010		4 404 000	1 020 000	5 568 000
Portugal Telecom	Portugal		8 422	1 143	15 124	(7)	1 232	5 488	7	2 312 000	714 000	39 745 000
Belgacom	Belgium		8 308	1 312	2 112	(3)	856	2 814		3 899 000	1 237 000	4 620 000
Virgin	United Kingdom		8 147	33	11 917	(3)	1 053	1 195		103 900	287 300	4 429 200
Swisscom	Switzerland		9 241	1 726	8 614		1 688	3 346		3 686 000	1 602 000	5 007 000
TDC	Denmark		7 228	1 485	7 610	(8)	956	2 134	5	3 670 000	1 290 000	4 475 000
Wind	Italy		7 221	1 000	9 382	(7)	878	4 985		2 380 000	1 022 000	15 600 000
Türk Telekom	Turkey		7 102	1 925	3 062	(3)				18 200 000	4 500 000	9 900 000
Telekom Austria	Austria		6 738	675	6 037	(6)	1 166	4 158	65	1 683 700	750 700	15 449 000
Bouygues Telecom	France		6 570	1 022	2 786	(7)	822	6 570				6 800 000
Tele2 AB	Sweden		6 423	- 45	1 102	(7)	632	3 361		5 990 000	1 304 000	17 427 000
Cable & Wireless	United Kingdom	(1)	6 304	616	4 560	(7)	822	1 766		1 900 000	466 000	6 400 000
Telephone and Data Systems (TDS)	United States		4 829	528	5	(7)	566	3 946		1 010 900	186 800	6 122 000
Neuf Cegetel	France		4 586	186	1 284	(6)	567				2 172 000	
Level3	United States		4 199	- 1 113	7 790	(7)	633					
Telecom NZ	New Zealand	(2)	4 166	524	3 433	(7)	726	613	7	1 434 000	543 000	2 200 000
ONO	Spain		2 214	378	5 001	(7)	733				1 203 000	

(1) Fiscal year ending March 2008. (2) Fiscal year ending June 2008. (3) Long-term liabilities. (4) Current liabilities. (5) Total liabilities. (6) Net debt. (7) Interest-bearing liabilities. (8) Total contractual obligations. (9) Debt obligations excluding lease obligations. (10) Debt from continuing operations. (11) Total debt and capital lease obligations.

StatLink http://dx.doi.org/10.1787/623854164615

ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Chapter 2

Recent Communication Policy Developments

Broadband is often viewed as a general purpose technology having a wide impact on a large number of industries and on social interaction, resulting in a range of new innovative services which have diffused rapidly across economies. The impact of broadband in the economy is strongly linked to the level of competition in the market because lower prices and better quality increase broadband adoption. Policy makers are therefore reviewing regulatory frameworks – which had reached a certain stability and maturity over the last decade – to ensure that competition prevails.

Introduction

Broadband issues have become increasingly dominant in the telecommunication policy arena for OECD countries and are expected to continue to be an area of primary importance in the future. Broadband, and with it the Internet, is often viewed as a general purpose technology having a wide impact on a large number of industries, on social interaction and resulting in a range of new innovative services which have diffused rapidly across economies. Broadband is viewed as an enabler of productivity and economic growth, but its impact on economies will depend on broadband being used by business and consumers, which requires access to broadband at low prices and good quality. In turn, these factors are closely linked with competition in the market.

The continued rapid technological changes in the communications sector are expected to have important consequences for the development of new innovative services, but may also impact on the development of competition in the sector. The most important changes will be those resulting from changing technology in fixed telecommunication networks with the replacement of digital switches by IP-based network technology and the eventual replacement of the copper local loop by fibre. The development of these next generation networks (NGN) – core and access networks – is expected to result in the future in the diffusion of a significant range of new applications, accelerate the process of convergence of different communication platforms and markets, and enhance the ability of different devices to communicate with each other. Nevertheless, the financial crisis which affected OECD economies in 2008 is very likely to dampen many operators' fibre investment plans and may slow down investment plans in core networks. The crisis may also negatively impact on a number of new entrants who have depended on debt to expand services and need access to capital in order to expand and compete with incumbents who generally have better revenue streams and better access to capital markets.

The replacement of copper local loop networks with fibre to the home networks (next generation access networks) will significantly increase the potential capacity of networks. Different topologies are being used by operators for fibre loops across countries. Some operators prefer VDSL2, essentially bringing fibre up to street cabinets, whereas other operators prefer a passive optical network (PON) topology whereby a single fibre is split to provide service to multiple premises (point-to-multipoint). Few operators are using point-to-point topologies even though some analysts view this is as the most promising of the different network topologies.

Although the higher speed offered by networks with fibre in the local loop should bring important benefits to consumers, the realisation of these benefits may depend on the extent to which access markets are competitive and provide prices which stimulate access and use. Given that the high investment costs for fibre local loops may act to limit the number of competing fibre networks a specific geographic area may be able to support, facilities-based competition may be difficult to develop in some markets. Investment in new technology, such as next generation access networks, is taking place mainly in urban areas. Concerns are being raised as to the implications this may have in creating new digital geographic divides

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and whether alternative technologies, such as high-speed wireless, are adequate to provide rural and remote areas with sufficient capacity to deliver new emerging services.

In those countries with extensive cable television networks, the potential to upgrade these networks to DOCSIS 3.0 standards may provide a competitive alternative to fibre. However, in a number of countries where local loop unbundling has been implemented, concerns have been expressed that the topology of certain fibre networks may not allow for access by new entrants. In turn, this may mean that competition which has developed through local loop unbundling would be harder to sustain and may impact on the level of competition in the market. Some regulators, as well as the European Commission, are meeting this potential new challenge by proposing that functional separation of integrated incumbent operators should be part of the policy toolkit available to regulators to use, as a last resort measure, if other possibilities to create competitive markets have not been successful.

Thus regulatory frameworks, which had reached a certain stability and maturity during the last decade, are in many cases being reviewed in order to ensure that competition prevails. Renewed regulatory emphasis is being placed on certain issues such as access to rights of way, access to ducts and poles, and how to ensure that multi-dwelling units share access to inside wiring.

Trends in competition

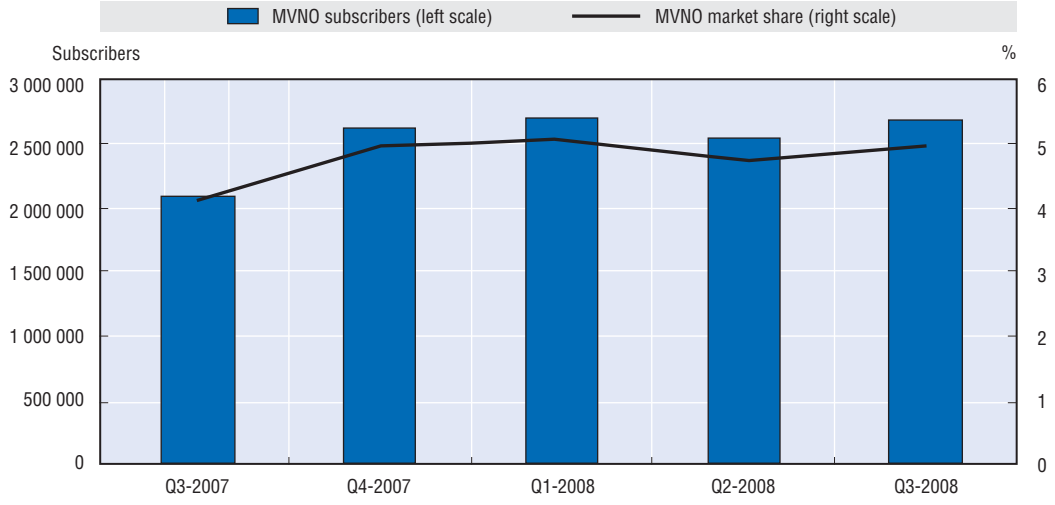
It has become increasingly difficult to map the development of competition in the communications sector because of the range of different options available to customers to access networks and make voice calls. Many of these options are not, as yet, part of the official statistical collection process, and because of the number of options available, it is difficult to obtain data through company annual reports. In itself, this range of options is indicative of choice in the market. In previous versions of the *Communications Outlook* this chapter indicated cross-country data on a number of PSTN suppliers. Such data (shown in Table 2.1) have become increasingly less valid (especially in the fixed line market) as an indicator of market activity and are in many cases not available as many countries have shifted away from a licensing regime for market entry by fixed telecommunication operators to an authorisation process. In addition, an increasing number of cable television operators and Internet service providers (ISPs) offer voice services using voice-over-Internet protocol (VoIP) and these service providers have not traditionally been classified as fixed telecommunication operators. Irrespective of how voice services are offered in the fixed market, they require access to a fixed line or cable access. The mapping of the development of fixed lines would provide data on how competition is developing among operators that rely on fixed facilities. Unfortunately, although all OECD countries have a commitment to develop facility-based competition, many do not collect data indicating how such competition is emerging in this area. A number of incumbent telecommunication operators that traditionally published data in annual reports on their number of fixed analogue subscriber lines now only note that the number of subscribers is declining, or publish data on the number of broadband customers. Table 2.2 provides available data on the PSTN subscriber line market share of new entrants for a number of OECD countries. Table 2.3 shows the development of preselection for OECD countries. In most OECD countries, preselection started to decline as VoIP and broadband emerged on the market. In some cases, however, preselection remains important, in particular for long-distance voice services.

Although mobile voice prices are seldom competitive with the price of telephony using the fixed network, the convenience of mobility has led to a significant substitution from fixed-

line to wireless networks, resulting in a decline in the number of fixed-line subscribers over the last several years. As indicated in Chapter 3, mobile revenues have in many OECD countries overtaken revenues from fixed networks. This downward trend in fixed lines seems to have flattened out as an increasing number of relatively cheap voice-over-IP offers has emerged on the market, many offered by the incumbent operators, and also due to the demand for xDSL broadband lines. Chapter 4 examines developments in the fixed-line market.

The distribution of market share in the mobile sector is shown in Table 2.4. In some countries there has been some reduction in the relative market share of the leading mobile operator but overall, market shares have tended to remain fairly static. Table 2.4 only shows market shares for network operators. Competition has emerged in some countries from mobile virtual network operators (MVNOs). As an example, in France MVNOs have taken 5% of the mobile market; however, due to financial difficulties, some MVNOs in France have been taken over by the network operators who have often maintained the existing MVNO brand name (Figure 2.1). In the United Kingdom, MVNOs have a market share in the region of 4%.

Figure 2.1. **Market share of mobile virtual network operators in France**



Source: ARCEP (French Telecommunications and Posts Regulator).

StatLink http://dx.doi.org/10.1787/618822361634

Number portability has played an important role in the development of competition. Table 2.5 provides data for the number of lines (fixed and mobile) ported in 2007. Relative to the number of fixed lines, the number of subscribers who ported their numbers has been relatively small. Porting mobile numbers has been utilised more by subscribers in that market.

In tandem with developments in high-speed broadband and next generation networks, important changes are taking place in wireless services and technologies. There is increasing growth in 3G mobile services with emphasis in particular on data (broadband Internet) access and upgrading of technologies to handle higher speeds. Mobile technology is still evolving with the development of WiMAX and long-term evolution (LTE) technology, which is in the process of standardisation and expected to support high speeds. Some view that these technologies may become competitive with fixed broadband networks. The mobile sector has also seen significant innovation over the last several years in terminal equipment, with manufacturers rapidly introducing models with new features emphasising mobile broadband access applications. New terminals which emphasise broadband access and new mobile broadband applications are also putting pressure on

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mobile operators to lower prices for high-speed mobile data access and to eliminate – or at least provide more liberal – download caps to users. In the longer term, mobile operators may need to lower their prices, eliminate restrictive download caps, and support open platforms if they wish to compete with fixed broadband service providers.

A major area of policy concern for many countries in the mobile sector has been the high international roaming charges. The European Commission has taken concrete steps by implementing a *roaming regulation* in order to reduce these charges within the European Union. Implemented in 2007, the regulation has required that European mobile operators provide a "Eurotariff" for receiving calls when abroad and making calls from abroad – the tariffs set originally in July 2007, which are considered as maximum tariffs, were subject to further reductions in July 2008 and will be reduced again in July 2009. Emphasis has also been placed on increasing transparency by informing consumers of roaming prices. The EC initiative has been important in focusing attention on this issue. Some countries believe that international roaming needs to be examined on a wider, global basis.

In the past, the emphasis in creating competition in telecommunication markets was mainly through supply-side measures. There has been growing attempts by regulators to empower consumers in order to strengthen competition. Demand-side policies, such as facilitating consumer choice through reducing constraints on contracts which make it expensive for consumers to change providers, can be effective in ensuring competition where sufficient choice has developed in communication markets. More effective number portability measures which simplify and speed up the porting process have also been emphasised by some regulators. In several countries, as an example, porting a mobile number can be implemented within a day from the moment a customer makes a request. There is no reason why other countries cannot follow this best practice. As Chapter 4 notes, some regulators are also taking initiatives to ensure that broadband subscribers are aware of the actual, rather than the advertised, speeds they will obtain when entering into contracts for the provision of broadband. This is an important initiative in protecting consumers given that they pay different monthly subscriber rates for different levels of speed.

Competition is not only about choice and the prices of network providers. It also encompasses access to content on the different networks. For this reason, there is increasing emphasis in some countries on ensuring that network operators do not have traffic prioritisation policies on broadband networks that unreasonably restrict access to lawful and non-harmful content of third parties. Such policies for network neutrality may increase in importance as broadband becomes the major means of accessing content. Although concerns on network neutrality and problems encountered have mainly been on the North American market, some other OECD regulators have begun to examine the issue.

Platform competition versus local loop unbundling

Platform competition is the ultimate goal of regulators, but different views have been expressed on how to develop such competition. In particular, there has been much debate on whether local loop unbundling as a policy creates longer-term disincentives to invest in infrastructure for both incumbent operators and new entrants. It has been argued that incumbents will not invest in upgrading networks if they have to make these available to new entrants, while new entrants will not invest in their own facilities if they have access to the facilities of incumbents. The other side of the argument has been that incumbents, as a monopoly carrier in most markets, obtained monopoly rents over a long period allowing

them to construct their facilities, obtain rights of way and build up a brand name; and in addition, that without wholesale access to incumbent facilities, new entrants would not be in a position to build-up their networks. This argument builds on a ladder of investment concept whereby new entrants need to obtain a customer base through service competition providing them with revenues so that they can invest in facilities. Constructing a network, in particular a local loop, before having a customer revenue base would be prohibitive.

As incumbents move to develop fibre local loop networks, the argument with respect to investment disincentives is again being raised. A number of incumbents, particularly in those countries with local loop unbundling policies, have stated that they would not invest in fibre loops if they are required to make them available to new entrants. On the other side, new entrants have noted that the network topology chosen by incumbents in many cases would only allow wholesale bitstream access and could in the longer term reduce the level of competition in markets.

With the development of fibre local loops, a new concern has been expressed by new entrants. Incumbents have indicated that they would no longer require their main distribution frame facilities (MDF) where new entrants who access unbundled local loops have their equipment. A number of regulators have required that incumbents maintain these MDF sites to avoid stranding the investment of new entrants and have stipulated that incumbents should provide information on the scheduling of closures of MDF sites.

The issues regarding how to move forward to create competition in a market where fibre replaces the copper local loop need to be resolved rapidly in the near future to ensure that countries can build on the competition that has been created to date in the fixed line telecommunication market. In addition, investment in new technology such as next generation access and core networks is taking place mainly in urban areas. This has raised concerns as to the implications this may have in creating new digital geographic divides and whether alternative technologies, such as high-speed wireless, are sufficiently adequate to provide rural and remote areas with sufficient capacity to deliver new emerging services. In this context, Switzerland adopted legislation in 2007 that has designated broadband access as part of universal service in that country beginning in 2008 and setting a minimum transmission rate of 600 kbit/s downstream and an upper price limit.

Regulatory issues

Past editions of the *Communications Outlook* have tracked progress in reducing government ownership of public telecommunication operators. Since the last *Communications Outlook* (2007), some progress has been made in reducing government ownership of public telecommunication operators, particularly in Australia and Turkey (Table 2.6). In Australia, after a progressive divestiture of government ownership of the incumbent, the government transferred the remaining 17% shareholding into an independent *Future Fund*. In Turkey, state ownership of the incumbent was reduced from 45% in May 2008 to 30%. Greece also reduced its ownership in the incumbent, OTE, from 33% to 28%. A number of countries that had made commitments in the past to completely privatise their incumbent operators have still not done so, although in many cases the share of government ownership has declined somewhat. In the present financial situation it is likely that any major reductions in state ownership will be deferred.

Many municipalities have taken initiatives to invest in broadband networks. In many cases this has been undertaken because these municipalities have felt that the

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telecommunication operators have not provided adequate service at affordable prices. While such initiatives can be useful in expanding access, it is important that the networks are open to third parties and do not impinge on private investment. The municipality also should ensure that other potential broadband investors have access to rights of way. However, while many initiatives began with the idea that the municipality would only offer dark fibre, in many cases a service provider could not be found, so municipalities also set up Internet service providers.

National restrictions on foreign-owned enterprises

The OECD Declaration on International Investment and Multinational Enterprises, adopted in 1976 by the governments of the OECD member countries, includes a commitment by countries to treat enterprises operating on their territory but controlled by the nationals of another country no less favourably than domestic enterprises in like situations.[1] National restrictions on foreign-owned enterprises in the telecommunications sector are only applicable to a few OECD countries (Table 2.7), and these countries have to a large extent maintained these restrictions for a significant period of time with only some improvement. The experience of those countries without restrictions has shown that there is little to be concerned about in having an open telecommunications market for foreign investment. The only countries that have foreign investment restrictions in the telecommunication sector which apply to all players in the market are Canada, Korea and Mexico.[2] A Canadian Parliamentary committee and two expert review panels have recommended easing foreign investment restrictions, but to date this has not occurred. Mexico, which lacks effective competition in the fixed line market, could benefit significantly from more foreign investment in the telecommunications sector.

In several OECD countries restrictions only apply to the incumbent operator where legal requirements require majority ownership, or a significant ownership share, by the government in the incumbent (Japan, Norway and Switzerland). Several countries also maintain a golden share in the incumbent (Hungary, Portugal, and Turkey).

Governments have sufficient powers in an emergency or other crisis to ensure that telecommunication operators act in the public interest. As such, arguments that restrictions, whatever the form, are necessary on incumbents for national security purposes are not valid. There is even less justification in maintaining blanket restrictions on all operators which prevent market players, usually new entrants, from having access to foreign capital.

Local loop unbundling

In some countries local loop unbundling has played a major role in the development of broadband markets. Since the last *Communications Outlook,* New Zealand and Switzerland have both put in place policies for unbundling (Table 2.8). In the United States, regulators to date have relied on competition among cable companies, traditional telephone companies, and other emerging providers, rather than on local loop unbundling, to increase the deployment of broadband services. Of the OECD countries, only Mexico has no policy for LLU. In that country the cable network as well as fixed network is not well developed.

As Table 2.8 indicates, there are a number of countries where not all exchanges are able to offer fully unbundled lines. For example, in Australia only 10% of local exchanges are enabled to support fully unbundled lines and in France about 70% of lines are available for unbundling, whereas in Switzerland (where unbundling is only recent) 8% of local

switches support unbundling. Nevertheless, in all cases switches supporting LLU are in the larger urban areas so that a relatively high proportion of the population is covered.

Available data on the number of unbundled lines show quite significant growth in many countries (Table 2.9), particularly in a number of EU countries. In the United States the number of unbundled lines peaked in 2004 and has since declined following the elimination of unbundling for fibre loops in 2003.

Table 2.10 provides some country data on local loop unbundling pricing. There are some important differences in prices among countries. The monthly charge in France for an unbundled loop from the incumbent is EUR 9.29 per month compared to EUR 16.43 in Ireland, EUR 7.81 in Italy and EUR 10.44 in Austria.

Fixed-to-mobile interconnection (or termination charges)

The issue of fixed-to-mobile termination charges remains contentious with many users arguing that these high charges result in the high retail charges they face in the market. Table 2.11 provides an overview of the role of regulators in that market, and in particular whether they regulate or determine fixed-to-mobile termination rates. In a number of countries mobile termination charges are regulated and in a few European countries all the mobile operators in the market are designated as having market power and thus subject to regulation.

Household expenditures on communications

Information and communication technologies (ICTs) have become an important part of consumer expenditures and play a large part in the everyday life of many OECD consumers. Although ICT-related expenditures represent a small percentage of the household budget (2.2% in 2007), this part of the household budget has grown steadily over the last two decades.

Table 2.12 shows the percentage of household spending in different categories over the last 12 years. Expenditures on communications reached a peak in 2004 and then lowered slightly. Data from the National Accounts database can be used to evaluate overall trends in expenditure on communication in the OECD countries. The category 'communication' includes communications equipment and services as well as postal services. These three items cannot be disaggregated.

Figure 2.2 provides an index using data from Table 2.12 in order to compare the evolution of spending by category. For the last 12 years, communications has been the fastest growing part of the household budget (with the exception of one year, when health expenditure took the lead). In contrast to expenditure on communications, a number of categories of household expenditure, such as clothing and footwear, food, furniture and alcoholic beverages have been taking a smaller share of household spending.

Using national surveys, Figure 2.3 compares in USD PPP the monthly spending by a household in communication services with a breakdown (for some countries) by type of access. The data show that there is a very wide range of spending patterns across the OECD countries. Unfortunately, these surveys are not always easy to compare since they are undertaken using different questionnaires, definitions and methodologies. Some countries, such as Ireland, Poland and United States, do not include Internet services in their data. Excluding China and Hungary, the broad average of expenditure per month on ICT in those countries where the data are available is USD PPP 95 per month. For Canada, France, Japan and Switzerland, detailed data on expenditure are shown in Figure 2.4. For all four countries

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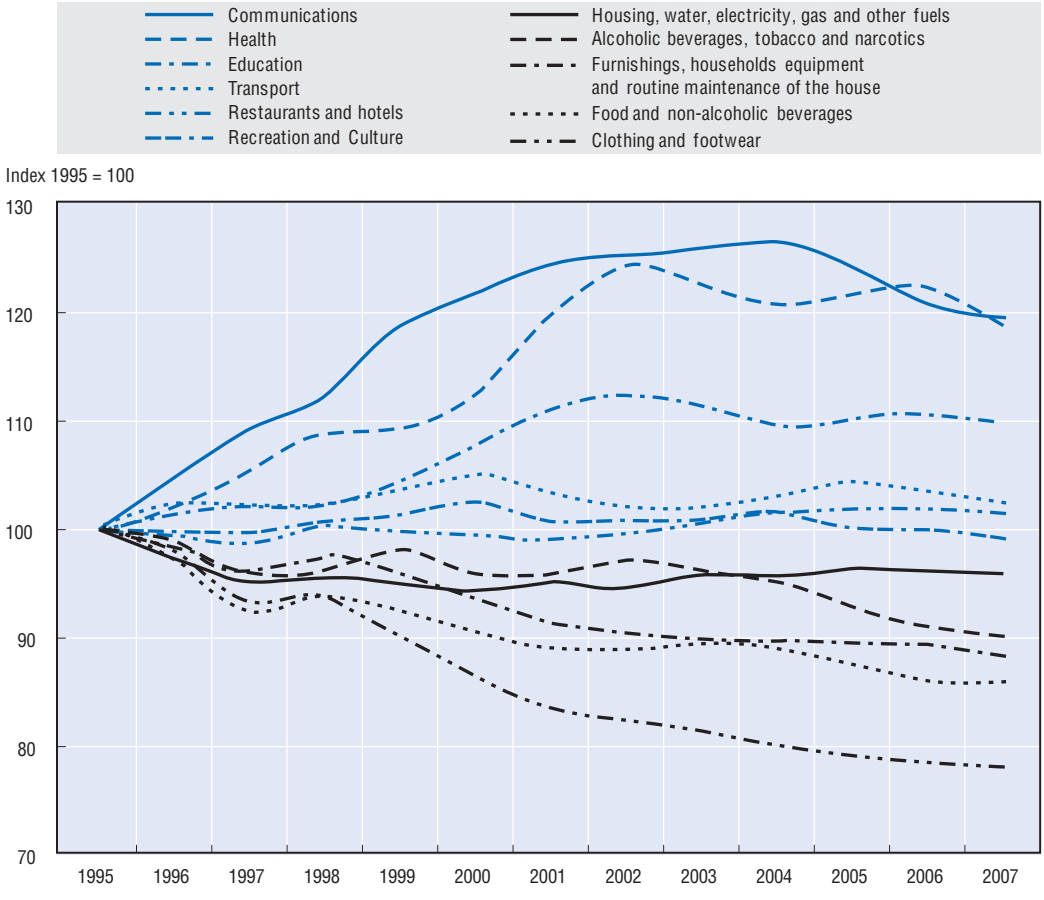
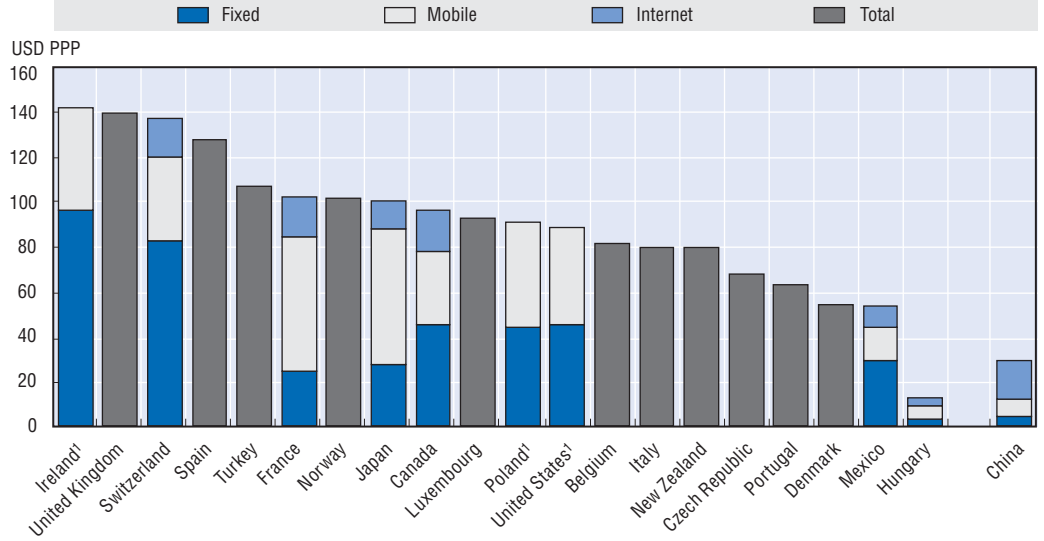
Figure 2.2. **Changes in the proportion of households' expenditure by category in the OECD, 1995-2007**



StatLink http://dx.doi.org/10.1787/618825201661

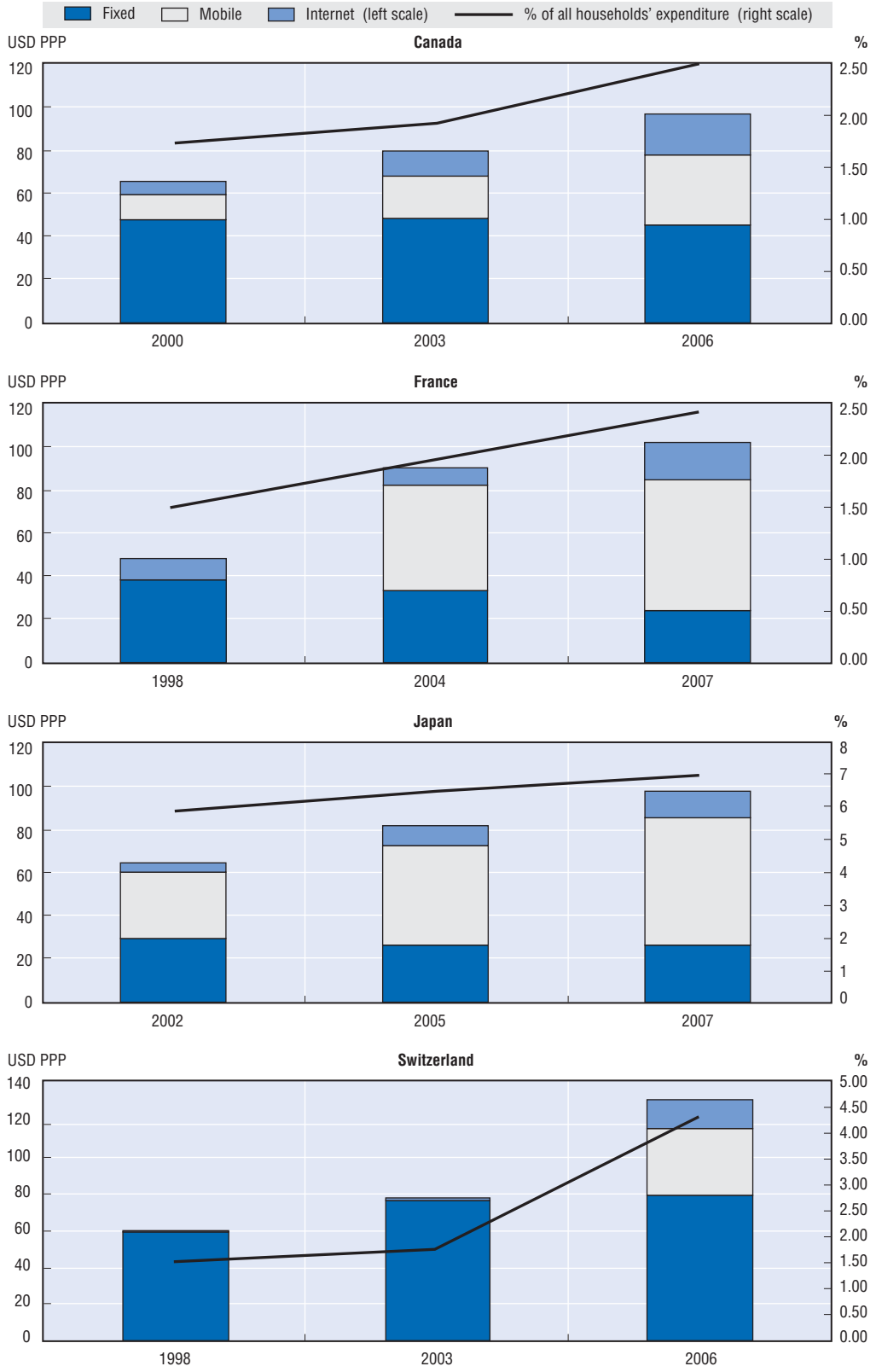
Figure 2.3. **Monthly household expenditures on ICT**



1. Internet expenditure not included.

StatLink http://dx.doi.org/10.1787/618836018205

Figure 2.4. **Monthly household expenditures on communications**



StatLink http://dx.doi.org/10.1787/618880204077

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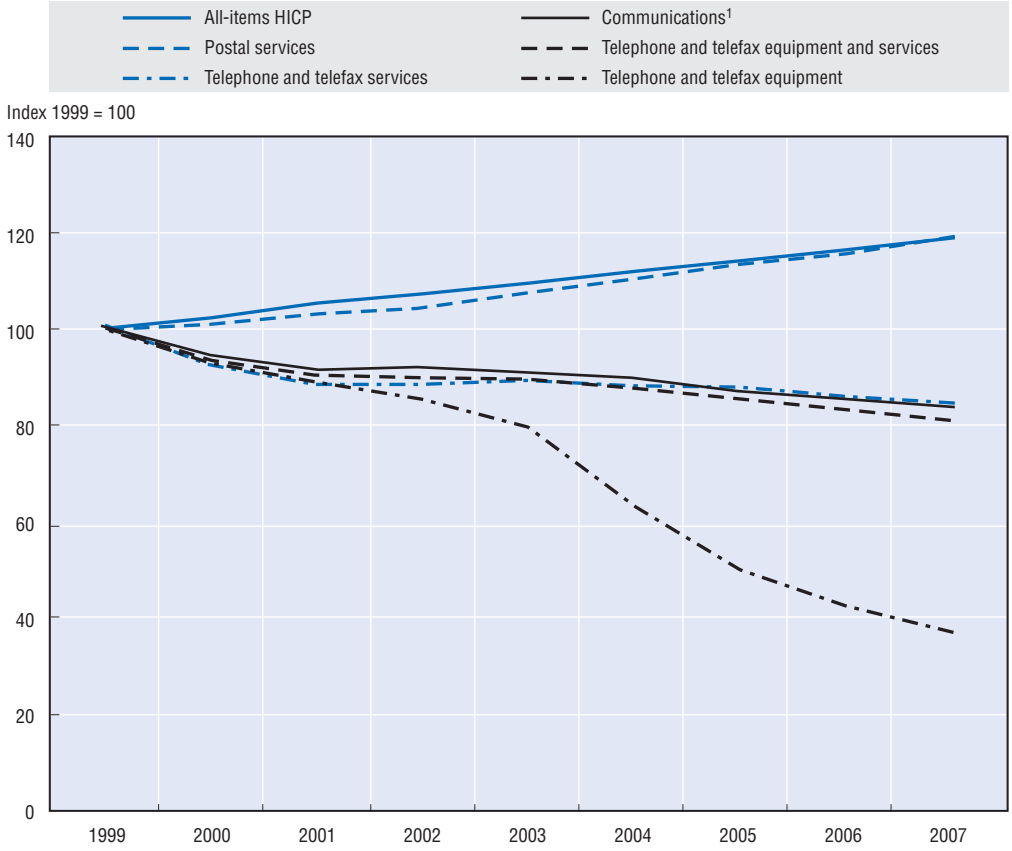
the percentage of the ICT spending in total household spending is growing with Canada and France at a similar level (2.5%), while for Japan the level is three times higher and almost two times for Switzerland. In absolute terms, the monthly spending for Canada, France and Japan is around USD PPP 100 and a little higher in Switzerland. The spending on mobile services and equipment is growing steadily in the four countries and spending on fixed is decreasing slightly. Spending on the Internet is stable or increasing slightly.

Figure 2.5 shows the harmonised indices of consumer prices for the EU25. While the general indices for all items have increased by 19% in the last eight years, the indices for communication have declined by 16.4%. There is a large difference between the indices of services (telephone and telefax services) and equipment (telephone and telefax equipment), with the equipment indices declining significantly more rapidly (–63%) than for services (–15%).

Figure 2.5. **Trends in harmonised indices of consumer prices (HICP) for communication, EU25**



1. Communications includes: Telephone and telefax equipment and services, Telephone and telefax equipment and Postal services.

Source: Eurostat.

StatLink http://dx.doi.org/10.1787/620030013020

Notes

1. For the full list of exceptions to National Treatment (not based on security considerations) by country as accepted by the OECD in July 2008, see *www.oecd.org/dataoecd/32/21/1954854.pdf*.
2. See "National Treatment for Foreign-controlled Enterprises", OECD, July 2008, *www.oecd.org/dataoecd/32/21/1954854.pdf*.

Table 2.1. Number of operators in service[1], 2007

	Fixed PSTN (local, national and international)	Cellular mobile	IMT-2000 operators (*i.e.* UMTS / 3rd generation)	MVNOs	Number of licensed cable TV operators
Australia	3	4	4	1	4
Austria	145	4	4	0	130
Belgium	63	3	3	27	24
Canada	92	18	5	5	52
Czech Republic	62	4	4	0	58
Denmark	27	35	5	1	28
Finland	45	4	4	2	26
France[2]	3	3	3	14	257
Germany	128	11	4	1	37
Greece				No	0
Hungary	38	3	3	0	526
Iceland	2	5	3	1	0
Ireland	113	6	4	1	18
Italy	35	4	4	9	2
Japan	22	14	12	Permitted	518
Korea	13	3	2	18	103
Luxembourg	10	3	3	Permitted	71
Mexico	8	10 (regional operators)	--	No	1165
Netherlands				1	+/- 60
New Zealand	2	2	2	1	1
Norway	10	5	4	4	No licences required (large number providing cable TV in small local networks
Poland	36	8	4	4	254
Portugal	25 licensed (17 active)	3	3	4 (1 active)	11
Slovak Republic				0	193
Spain	91	4	4	17	1 (national level) 4 (regional level)
Sweden	55	4	4	1	
Switzerland		5	3	6	504
Turkey	1 (+ 32 long distance carriers)	3		No	5
United Kingdom	118	5	5	20+	1
United States[3]	1248	177	7	Permitted	33 736

1. Licensing authorisation and registration practices differ across OECD countries such that it is difficult to compare the number of operators. For a number of countries licences do not differentiate between local, national and international PSTN or the provision of infrastructure. Some licences may be regional. Some countries licence services rather than networks so that an individual firm offering a range of services has multiple licences. Some countries have included companies providing PSTN via carrier selection in data on fixed PSTN. Resellers are not included where they can be identified. In a number of countries there are small community cable TV companies.

2. Only Metropolitan France included.

3. US mobile operators have the flexibility to upgrade their networks to 3G technologies on their existing 2G (PCS/cellular/SMR) spectrum.

StatLink http://dx.doi.org/10.1787/623888075755

Table 2.2. Fixed subscriber line market share of new entrants
% of total fixed analogue subscriber lines[1]

	2002	2003	2004	2005	2006	2007
Australia	0.9	1.8	2.5	1.8	1.9	2.2
Austria	5	6	7	10	10	14
Belgium	..	..	7.7	11.3	13.9	18
Canada	..	1	2	4	9	12
Czech Republic	..	..	..	0.3	0.3	0.3
Denmark	..	4.7	5.1	7.1	7.4	4.9
Finland	..	..	..	66	68	67
France	..	..	2.3	1.3	..	..
Germany	1	3	5	8	12	17
Greece	0	0	1	1	1	1
Hungary	21	21	21	22	24	25
Iceland	..	8	13	15	16	18
Ireland	..			0	..	..
Italy	0	1	3.8	5.8	8.6	14.3
Japan[2]	..	..	5.3	6.2	7.5	9
Korea	13	14	..	..	8	9
Luxembourg	..	1	..	1.2	3	4
Mexico	..	..	..	..	..	..
Netherlands	..	..	..	0	..	..
New Zealand	..	..	..	..	9	11.5
Norway	1	10	19	22	..	..
Poland	9	9		10	..	..
Portugal	5	6	7	11	21	26
Slovak Republic	0	0	..	0.05	0.08	5.6
Spain	..	..	..	14.3	17.2	18.2
Sweden	..	..	..	..	..	..
Switzerland[3]	0	0.1	0.1	0.1	0.2	0.3
Turkey	0	0	0	0	0	0
United Kingdom	17	18	20	24	30	32
United States	13	16	18	18	17	18

1. This table indicates self-owned new entrant subscriber lines as a percentage of total subscriber lines in a country. As such it does not count unbundled, wholesale or resale of lines. Countries which in the past had regional operators (Canada, Finland, Hungary and the United States) are not directly comparable with countries that had a single national monopoly provider.

2. All data are for end of fiscal year, *e.g.* data for 2007 are as of 31 March 2008.

3. Indicates estimates by the Secretariat.

StatLink http://dx.doi.org/10.1787/624032116188

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

	2002	2003	2004	2005	2006	2007	As % of main lines
Australia	..	..	..	..	..	..	..
Austria	870 000	976 041	961 037	935 200	851 000	720 000	30.6
Belgium	595 627	850 384	1 115 761	1 048 672	908 751	837 849	23.1
Canada	..	..	..	..	..	..	..
Czech Republic	..	..	..	..	545 575	..	..
Denmark	905 161	918 018	564 009	398 903	339 868	293 230	13.9
Finland	..	..	..	..	..	..	..
France	6 420 482	7 514 000	7 676 000	8 820 000	6 893 000	4 891 000	..
Germany	4 141 000	4 900 000	6 000 000	6 300 000	5 900 000	4 700 000	20.4
Greece	..	274 021	635 867	906 119	955 538	788 729	16.5
Hungary	..	..	..	778 890	655 096	619 755	20.6
Iceland	..	27 061	18 805	16 371	16 255	15 592	11.6
Ireland	176 472	225 170	252 495	207 017	122 703	88 302	5.1
Italy	3 370 000	3 600 000	4 017 000	4 085 000	3 829 000	2 780 000	14.5
Japan	16 348 000	16 826 000	16 997 000	16 232 000	16 971 000	16 592 000	37.1
Korea	21 674 000	22 085 000	21 792 000	21 774 000	21 831 413	21 776 590	99.5
Luxembourg	..	43 900		57 800	56 700	50 750	29.7
Mexico	..	..	..	..	..	..	..
Netherlands	..	..	..	..	..	..	..
New Zealand	..	..	..	..	365 000	438 000	23.8
Norway	395 168	321 719	164 618	101 324	..	..	..
Poland	1 825 068	2 193 000	1 340 375	1 344 449	..	..	..
Portugal	374 268	355 517	394 894	470 107	429 935	294 741	10.1
Slovak Republic					19 777	9 701	0.9
Spain	1 806 999	2 311 009	2 385 890	2 295 128	1 934 027	1 822 476	9
Sweden	256 532	273 803	44 269	44 488	44 819	31 067	0.7
Switzerland	1 369 252	1 247 631	1 196 146	1 131 565	1 025 124	825 679	28.7
Turkey	..	..	..	..	..	..	..
United Kingdom	638 138	2 597 664	4 571 131	5 781 273	6 314 843	5 893 113	20.5
United States	..	..	..	94 814 000	102 000 000	99 103 000	66

StatLink http://dx.doi.org/10.1787/624037546110

Table 2.4. Market share of mobile network operators in the OECD, 2007

Percentage market share based on number of subscribers

Number of operators:	1	2	3	4	5
Australia	43.3	32.6	16.7	7.4	
Austria	40.4	33.4	20.9	5.3	
Belgium	45.6	31.4	23		
Canada	37.8	29.2	28.7	2.3	2
Czech Republic	40.4	39.3	20.3		
Denmark*	34.3	21	20.3	10.6	5.3
Finland	39.2	38.4	20.3	2.1 [1]	
France*	43.8	33.9	17	6.3	
Germany	36.8	34.7	15.2	13.3	
Greece	38.6	33.5	27.9		
Hungary	44	35.1	20.9		
Iceland	60.1	38.2	1.3	0.4 [2]	
Ireland	44.5	32.3	18.9	4.3	
Italy	40.5	33	17.4	9.1	
Japan	49.7	28.1	17.4	4.3	0.5
Korea	50.5	31.5	18		
Luxembourg	52.6	36.6	10.8		
Mexico	73.3	18.3	5.9		
Netherlands					
New Zealand	52.2	47.8			
Norway	57.1	23.4	9.2	7.6	2.7
Poland	34.2	32.5	31.1	2.1	0.1
Portugal*	46.7	38.7	14.6		
Slovakia					
Spain	45.3	30.7	22.6	0.9	0.5
Sweden					
Switzerland	61.8	18.7	18.7	0.8	
Turkey	57.1	26.9	16		
United Kingdom[3]	27.2	23.6	22.4	21.4	5.4
United States	31.4	29.4	20.3	12.9	6

*Secretariat estimates.

1. Includes subscribers for a small network based mobile operator and two MNVOs.

2. Includes two small operators.

3. Includes MVNO subscribers.

StatLink http://dx.doi.org/10.1787/624046770184

Table 2.5. Number portability: number of fixed lines and mobile numbers ported

	Fixed subscriber lines ported	As % subscriber lines	Mobile numbers ported	As % of mobile subscribers
Australia	713 966	7.3	1 313 241	6.2
Austria	63 000	2.7	105 000	1.1
Belgium	174 265	4.8	250 280	2.4
Canada				0.0
Czech Republic	568 857	23.8	170 357	1.3
Denmark		0.0		0.0
Finland	39 207	2.3	455 483	7.5
France	2 600 000	9.8	870 900	1.6
Germany	n/a		1 573 348	1.6
Greece				0.0
Hungary	180 913	6.0	147 317	1.3
Iceland	n/a		n/a	
Ireland	10 810	0.7	359 200	7.2
Italy	1 119 965	5.8	4 200 000	4.7
Japan	n/a		2 960 000	2.8
Korea	153 610	0.7	1 486 321	3.4
Luxembourg				0.0
Mexico	Implemented in July 2008		Implemented in July 2008	
Netherlands				0.0
New Zealand	32 000	1.7	31 000	0.7
Norway	n/a		688 000	13.3
Poland	n/a		109 618	0.3
Portugal	213 917	7.4	76 453	0.6
Slovak Republic				0.0
Spain	694 888	3.6	4 210 048	8.7
Sweden				0.0
Switzerland	79 588	2.8	119 520	1.5
Turkey	To be implemented in May 2009		Implemented as of November 2008	
United Kingdom				
United States				

StatLink http://dx.doi.org/10.1787/624048545161

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Table 2.6. Government ownership of public telecommunication network operators

	Operator	Status	Control of PSTN
Australia	Telstra	The government divested ownership progressively between 1997 to 2006.	A shareholding accounting to just under 17% has been transferred to a government-created independent investment entity called the Future Fund. Under current legislation Telstra shares held by the Future Fund are deemed to be held by a person other than the Commonwealth.
Austria	Telekom Austria AG	28.68%	
Belgium	Belgacom Group	53.5% (Belgian state)	
	NMBS – Holding NV	99.9% (Belgian state)	
	Infrabel	7.34% (Belgian state) + 99.9% in NMBS Holding that owns 96.66% of Infrabel	
	Sofico	99.9% (Walloon region)	
	Syntigo	100% (Belgian state)	
Canada	Saskatchewan Telecommunications	Province of Saskatchewan: 100% owned	
Czech Republic	O2 (Cesky Telecom)	Private ownership: 100%	
Denmark	Dong Energy	Government owns 72.98% of shares	
Finland	TeliaSonera Ltd.	State ownership: 13.7% by Finnish government and 45.3% by Swedish government	
	Elisa Ltd.	0.65%	
France	Orange/France Télécom	State ownership: 27.3% of capital	
Germany	Deutsche Telekom AG	14.8% directly by federal government, 16.9% via the KfW Bankengruppe (Kreditanstalt für Wiederaufbau, 80% owned by the federal government, 20% by Länder)	

Table 2.6. Government ownership of public telecommunication network operators *(continued)*

	Operator	Status	Control of PSTN
Greece	OTE (Cosmote is a wholly owned subsidiary of OTE)	State ownership: 28.033%	
	Forthnet	The state owns 4.2% through the Public Foundation of Technological Research.	
	Voicenet	Voicenet is a subsidiary of OTENET (84%) and ia now fully absorbed by OTE.	
Hungary	Magyar Telekom	One golden share	
Iceland	Siminn	Private ownership: 100%	
Ireland	Eircom	Private ownership: 100%	
Italy	Agestel S.r.L.	100% 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 Corp.	The government holds 33.7% of the issued shares of NTT Corp. as of March 2008.	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).
	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's ownership in NTT East Corp. and NTT West Corp. is indirect.	
Korea	KT	Private ownership: 100%	
Luxembourg	P&T Luxembourg	State ownership: 100%	
Mexico	Telefonos de Mexico	Private ownership	
	Satélites Mexicanos, S.A. de C.V.	State ownership: 25%	
	Telecomunicaciones de México (Telecomm-Telegrafos)	100%	

Table 2.6. Government ownership of public telecommunication network operators *(continued)*

	Operator	Status	Control of PSTN
New Zealand	Telecom New Zealand	Private ownership. A convertible preference share in Telecom ("the Kiwi Share") is held by the Kiwi Shareholder (the Minister of Finance). The New Zealand government purchased the Kiwi Share for NZD 1 when Telecom was privatised in 1990.	The "Kiwi Share" obligation imposes universal service obligations on the incumbent
	Kordia	Kordia owns Orcon, 100% independent state-owned enterprise.	
Norway	Telenor	State ownership: 54% (December 2007)	
	Bane Tele AS	State ownership: 50%	
Poland	Telekomunikacja Polska S.A.	3.87% (July 2008)	Orlen owns 19.6% of Polkomtel's shares and 10.2% of Orlen's shares are owned by the Treasury; Weglokoks owns 4% of Polkomtel's shares and is in turn owned 100% by the Treasury; PGE owns 17.59% of Polkomtel's shares and is in turn owned 100% by the Treasury; KGHM owns 19.61% of Polkomtel's shares and is in turn owned 41.79% by the Treasury.
	Polkomtel	Polkomtel's shareholders are partially or entirely owned by the state	
Portugal	PT Comunicações, S.A.	8.44% (December 2007)	The government has a golden share in Portugal Telecom Group.
	PT PRIME - Soluções Empresariais de Telecomunicações e Sistemas, S.A.	8.44% (December 2007)	
	TMN - Telecomunicações Móveis Nacionais, S.A.	8.44% (December 2007)	
	Refer Telecom – Serviços de Telecomunicações S.A.	100% (December 2007)	
	RENTELCOM-Comunicações, S.A.	51% (December 2007)	
	EMACOM - Telecomunicações da Madeira, Unipessoal, Lda.	100% (December 2007)	
		(Portugal continues on next page)	

Table 2.6. Government ownership of public telecommunication network operators *(continued)*

	Operator	Status	Control of PSTN
Portugal *(continued)*	NETCALL – Telecomunicações e Tecnologias de Informação, S.A.	40% (December 2007)	
	CTT – Correios de Portugal, S.A.	100% (December 2007)	
	Rádio e Televisão de Portugal, S.A	100% (December 2007)	
	CATVP – TV Cabo Portugal, S.A.	13.93% (December 2007)	
	INFONET PORTUGAL – Serviços de Valor Acrescentado, Lda.	7.6% (December 2007)	
	TELE LARM Portugal - Transmissão de Sinais, Lda.	The government has ownership shares in this company but ANACOM does not have information on its percentage value.	
Slovak Republic	Slovak Telekom, a.s.	49% controlled by state	15% owned by the National Property Fund; 34% state holding
Spain		Private ownership	
Sweden	TeliaSonera	State ownership: 45.3% by Swedish government and 13.7% by Finnish government	
Switzerland	Swisscom	State ownership: 55.2% (April 2008)	The Swiss Confederation is required by law to retain its majority shareholding in Swisscom.
Turkey	Türk Telekomünikasyon A.Ş.	State ownership: 30%	
	TÜRKSAT Uydu Haberleşme Kablo TV ve İşletme A.Ş.	State ownership: 100%	
	Avea İletişim Hizmetleri A.S.	Indirect ownership: Türk Telekomünikasyon A.Ş., in which the government has a 30% share, owns 81% of Avea.	
United Kingdom	BT	Private ownership: 100%	
United States	All major carriers	Private ownership: 100%	

StatLink http://dx.doi.org/10.1787/624083127305

Table 2.7. National treatment for foreign-controlled enterprises: restrictions in telecommunications

Australia	Foreign ownership of Australian real estate and business enterprises (including the incumbent, Telstra) is subject to restrictions set out in the *Foreign Acquisitions and Takeovers Act 1975*. These require the approval of the Australian government for the acquisition of Australian real estate, for the acquisition of shares or assets of existing Australian businesses, and for investments in new businesses in Australia, that exceed certain value thresholds (currently ranging from AUD 10 million to AUD 913 million). As at 1 January 2008, relevant value thresholds are: For non-US investors: • Investment in a new business: AUD 10 million. • Acquisition of shares or assets of an existing business: AUD 100 million. For US investors: • Investment in a new business or acquisition of shares or assets of an existing business, where the business relates to telecommunications: AUD105 million. Section 65 of the *Telecommunications Act 1997* allows for conditions to be placed on a carrier licence that relate to the extent of foreign ownership or control (whether direct or indirect) of the holder. In addition, the *Telstra Corporation Act 1991* (Part 2A, Division 4) places the following specific limits on foreign ownership of Telstra: • A particular foreign person and their associates must not, in aggregate, hold or control more than 5% of the shares of Telstra; and • Foreign persons and their associates must not, in aggregate, hold or control more than 35% of the shares of Telstra. The Act also contains provisions that require Telstra's head office, its base of operations and place of incorporation to remain in Australia, and the Chairperson and the majority of directors to be Australian citizens.
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, in the *Telecommunications Act*. Pursuant to section 16 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.
Czech Rep.	No foreign ownership restrictions except as regards land ownership.
Denmark	No foreign ownership restrictions.
Finland	No foreign ownership restrictions.
France	No foreign ownership restrictions.
Germany	No foreign ownership restrictions.

Table 2.7. National treatment for foreign-controlled enterprises: restrictions in telecommunications *(continued)*

Greece	No foreign ownership restrictions.
Hungary	No foreign ownership restrictions.
Iceland	No foreign ownership restrictions.
Ireland	No foreign ownership restrictions.
Italy	No restrictions. WTO rules apply with respect to reciprocity.
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. Board members in NTT and the regional companies are required to have Japanese nationality.
Korea	A foreign government or foreign person may not in the aggregate hold more than 49% of the total issued shares of a facilities-based supplier of public telecommunications services. A juridical person in which a foreign government or a foreign person is the largest shareholder and holds 15% or more of that juridical person's issued shares is deemed a foreign person. Any person who intends to provide facilities-based telecommunications services from abroad into the territory of Korea without any business place in Korea shall conclude a contract on the cross-border provision of facilities-based telecommunications services with a domestic facilities-based telecommunications operator or special telecommunications operator who provide the same facilities-based telecommunications services.
Luxembourg	No foreign ownership restrictions.
Mexico	According to article 12 of the Telecommunications Federal Law, and pursuant to article 7 of the Foreign Investment Law, public telecommunication concessions may only be granted to Mexican citizens or enterprises. Foreign investors or their investments may only own up to 49% of the ownership interest in an enterprise, established or to be established in the territory of Mexico, to own or operate a public telecommunications network. Foreign investment may participate in excess of 49% in concessionaire enterprises authorised to provide cellular telephony services, in which case the enterprises will require the favourable ruling of the National Foreign Investment Commission. The Foreign Investment Law and Regulations and the Concession require that Mexican shareholders retain the power to determine the administrative control and the management of Telmex. Non-Mexican investors are not permitted to own more than 49% of the capital stock of a public telecommunication operator. Foreign investment in cellular telephony may be authorised up to 100%.
Netherlands	No foreign ownership restrictions.
New Zealand	Crown approval is required for ownership shareholding of 10% and greater in Telecom NZ.
Norway	The Norwegian government is required to maintain a minimum of 34% of the shares in the incumbent telecommunication operator (Telenor ASA). As of December 2007 the government held 53.97% of the shares in Telenor ASA.
Poland	No foreign ownership restrictions. The majority of the members of the supervisory board of a telecommunications company must be resident Polish citizens.
Portugal	No foreign ownership restrictions.

Table 2.7. National treatment for foreign-controlled enterprises: restrictions in telecommunications *(continued)*

Slovak Republic	No foreign ownership restrictions.
Spain	Section 34 of the Spanish Royal Decree-Act 6/2000 of 23 June, on urgent measures to intensify competition in goods and services markets, provides that natural or legal persons, who, directly or indirectly, have a capital share or voting rights equal to or above 3% of the total amount in two or more corporations with the condition of incumbent operator(s) in the provision of mobile telephone services or telephone at fixed locations services, cannot exercise the voting rights corresponding with the excess of the aforesaid percentage in more than one corporation. For the purposes of this Section, incumbent operator(s) is understood as any undertaking which, having the condition of operator in the above-mentioned markets, possesses one of the five highest market shares. Nevertheless, in accordance with the Spanish Royal Decree 1232/2001 of 12 November, the Telecommunications Market Commission may authorise the exercise of the voting rights corresponding with the aforesaid excess in matters regarding the participation or the designation of members in the management board, provided that it does not mean the exchange of strategic information between operators nor implies risk of co-ordination of strategic behaviours.
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 6.1 of the LET, *Loi sur l'entreprise des télécommunications*). In November 2005, the Federal Council had indicated a wish to allow for the total privatisation of Swisscom and had requested a plan to revise the law. In the Spring of 2006 the Swiss Parliament refused to discuss the issue of privatisation.
Turkey	No foreign ownership restrictions. However, according to the 17th Supplementary Article of Telegram and Telephone Law No. 406; "All the shares of Türk Telekom can be sold except for a preference (golden) share providing voice and approval rights to the state during the decision-making process in authorised boards of the company in order to protect national interests concerning the economy and security(…)". Currently, 55% of Türk Telekom shares belong to Oger Telecoms.
United Kingdom	No foreign ownership restrictions.
United States	The Communications Act allows the FCC to deny certain radio licenses to parent corporations with greater than 25% foreign investment only if the public interest is served by this refusal. When a foreign-organised company files an application with the FCC to provide US international telecommunications services, or to acquire control of an existing provider of US domestic or international telecommunications services, the FCC seeks the advice of US Executive Branch agencies with respect to national security, law enforcement, and foreign policy and trade policy concerns. In addition, the US Communications Act does not allow the FCC to grant a radio license to a foreign government. It also does not allow the FCC to grant a common carrier (or broadcast, aeronautical fixed, or aeronautical en route) radio license to a foreign individual or corporation, or to a US corporation of which more than 20% of the stock is owned or voted by foreign individuals, corporations or governments. However, where an applicant for a common carrier radio license has a controlling US parent with greater than 25% foreign investment, our Communications Act allows the FCC to deny the license only if the public interest is served by this refusal.

StatLink http://dx.doi.org/10.1787/624101467572

Table 2.8. Local loop unbundling

Country	Local loop unbundling policy since 2006	Number of local exchanges (MDF) and proportion of these exchanges that are unbundled (number and percentage)
Australia	There have been no significant changes to the policy governing the provision of unconditioned local loop service (ULLS) in Australia since 2006. The ULLS was redeclared in July 2006 following a declaration inquiry pursuant to section 152AL of the *Trade Practices Act 1974* (TPA). The ACCC's final decision on declaration of the ULLS can be found at *www.accc.gov.au.* Local loop pricing principles were updated in November 2007 and indicative prices were set in June 2008. See *www.accc.gov.au.*	Those exchanges that are able to offer fully unbundled lines are called Telstra Equipment Building Access (TEBA)-enabled exchanges. These exchanges have specified areas allocated for housing access seekers' equipment. There are currently 506 local exchanges across Australia which are TEBA-enabled. This represents approximately 10% of all local exchanges in Australia.
Austria	Several dispute settlement proceedings have been ongoing since late 2007. Alternative operators mainly criticise charges as being too high and processes (regarding fault repair and introduction of new transmission technologies) as not being efficient. NRA decisions are expected during the summer of 2008. Following a combined voice/broadband retail product offered by the incumbent at a special rate in winter 2007 and subsequent action by the NRA, the monthly LLU charge was lowered from EUR 10.70 to EUR 10.44 on 21 November 2007 and again to EUR 9.33 (from 1 January 2008) on 7 May 2008 to avoid a margin squeeze between retail and wholesale price. Sub-loop and shared line prices decreased accordingly. In addition, the NRA took regulatory action on 28 January 2008 against harmful interference for alternative network operators' DSL services caused by DSLAMs which had been placed by the incumbent at several greenfield distribution frames.	About 1 400 MDFs; all of them are able to offer unbundled lines.
Belgium	New tariffs for unbundling were implemented (rental fee, one-off charges) and operations made more efficient (new SLA, eliminating unnecessary customer visits).	595 local exchanges and 512 local distribution centres (or 1 107 MDFs) 100% ("able" is defined as "incumbent can provide at that location")

Table 2.8. Local loop unbundling *(continued)*

Country	Local loop unbundling policy since 2006	Number of local exchanges (MDF) and proportion of these exchanges that are unbundled (number and percentage)
Canada	The requirement to unbundle local loops was initially mandated by the CRTC in 1998. Following a comprehensive review of the regulatory requirements for the provision and pricing of wholesale services, in 2008 the CRTC reaffirmed the requirements to unbundle copper loops at cost-based prices.	The requirement to unbundle local loops at regulated cost-based rates exists for over 95% of local lines. There are a limited number of exchanges where unbundled local loops are not available due to cost considerations.
Czech Republic	Ceiling prices valid since 2 May 2006 were changed by a new price decision (no. CEN/11/06.2008-2, issued 3 June 2008). These prices have been in effect since 1 July 2008.	Local exchanges which are able to offer fully unbundled lines = 95%. The proportion of LLU coverage corresponding to colocation rooms constructed by OLOs is 40%.
Denmark	Since the "Market 11" decision in January 2006 some changes have been made in relation to local loop unbundling. The main change has been the implementation of sub-loop regulation that obliges the SMP operator to lease out sub-loops to alternate operators. The obligation also carries a price control.	100%
Finland	No significant changes.	All incumbents' local exchanges.
France	Unbundling policy was extended to include networks put in place by local governments and wholesale "fibre liaison" offers which link geographically distant switches. By March 2008 nearly 3 200 such switches were unbundled by new entrants, covering 70% of the population. In one year new entrants connected 1 200 new switches serving 2.8 million customers. The French regulator has also emphasised quality of service including access to lines as well as to reactive lines with technical problems. Diagnostic tools to test for synchronisation are being put in place and should be available nationally by the end of 2008.	69.7% of lines available for unbundling (3 190 of 13 000 exchanges).
Germany	By a decision taken in mid-2007, the Federal Network Agency also obliged Deutsche Telekom AG to open up its cable conduits to competitors and – if there is no vacant duct capacity – to grant access to dark fibre to ensure access to the local loop. With this requirement it was intended to give competitors easier access to the unbundled local loop at a point closer to the end customer than the main distribution frame, *i.e.* notably at the cable distributor.	In Germany 100% of MDF are able to support full unbundling. To date competitors of Deutsche Telekom AG are colocated at about 45% of all MDFs and are able to reach 75% of all access lines.

Table 2.8. Local loop unbundling *(continued)*

Country	Local loop unbundling policy since 2006	Number of local exchanges (MDF) and proportion of these exchanges that are unbundled (number and percentage)
Greece	EETT reviewed OTE's proposal for the Reference Unbundling Offer (RUO) and finally approved it with significant modifications in April 2007. The RUO focuses on procedural issues (provision of local loops, colocation, migration between services, etc.), fault reporting and management, and SLA terms and conditions including penalties. The RUO has been updated twice (July 2007, April 2008) in order to clarify some issues or introduce new items according to the market needs (*e.g.* fine tuning of the fault repairing procedure, clarifications regarding colocation and backhauling, etc.).	Potentially 2 103. Offered at 152 (7.22%).
Hungary	New market decision on LLU in December 2007.	N/A
Iceland	No changes.	Local exchanges (MDF) = 223 Local exchanges able to offer fully unbundled lines = 118 or 53%
Ireland	Since 2006, there have been a number of changes relating to local loop unbundling. 2006: A synchronised LLU and GNP product was deployed, which streamlined and integrated geographic number porting with local loop unbundling, making it into a single process. 2007: Significant product improvements, including: the ability to migrate seamlessly from service-based wholesale product combinations, *e.g.* deployment of wholesale line rental and wholesale DSL to the LLU product set. 2008: Publication of a market analysis consultation (doc. 08/41) and a response with a draft decision (doc. 08/104).	100% of the SMP operator's access paths are eligible for unbundling.
Italy	No changes since 2006, but currently the subject of a new market analysis.	According to AGCOM regulation, all Telecom Italia LECs could offer full ULL upon request by alternative operators. So far, ANO's requests were concentrated on a reduced number of LEC (mainly in large cities or more economically developed areas), covering more than 50% of customers.
Japan	No significant changes.	There is an obligation to offer unbundled lines for all local exchanges, 100% of PSTN local exchanges.

Table 2.8. Local loop unbundling *(continued)*

Country	Local loop unbundling policy since 2006	Number of local exchanges (MDF) and proportion of these exchanges that are unbundled (number and percentage)
Korea	Revised LLU criteria in December 2007. Usage fee reduced from KRW 9 070 to KRW 6 570.	Local exchange : KT = 312 (2008). All KT local exchanges offer unbundled lines.
Luxembourg	No change.	Two companies are present in 19 of 50 MDFs of the incumbent.
Mexico	Local loop unbundling is unavailable.	Unavailable.
New Zealand	In November 2007, the Commerce Commission (New Zealand's independent regulator) issued its final determinations on the price and non-price terms on which Telecom NZ must make unbundled copper local loop and co-location regulated services available to other telecommunications providers. The Commission's determinations are complete commercial arrangements which will allow competitors to take the services from Telecom without the need for any separate agreements. In December 2007, the Commerce Commission issued its final determination on the price and non-price terms on which Telecom must make the unbundled bitstream access (UBA) service available to other telecommunications providers. The UBA service is a wholesale service that allows telecommunications companies to supply a range of broadband services to retail customers. The Commerce Commission also launched standard terms determination processes for mobile co-location and sub-loop related services. These processes are expected to be finalised by the end of 2008. In June 2008, the Commerce Commission issued its final determinations on the price and non-price terms for the backhaul services that support the unbundled copper local loop (UCLL) and unbundled bitstream (UBA) broadband services. These services will allow Telecom's competitors to get access to transmission capacity between Telecom's local exchanges or data switches, and their networks.	The number of colocations halls available equals 2.5%, but with no distinction on shared or full access.
Norway	No changes since 2006. NPT are in the process of reviewing our market analysis, but there will be no changes until 2009, at the earliest.	No such data available, but we assume the percentage is high, considering the relatively high share of unbundled lines in Norway (compared to other countries).

Table 2.8. Local loop unbundling *(continued)*

Country	Local loop unbundling policy since 2006	Number of local exchanges (MDF) and proportion of these exchanges that are unbundled (number and percentage)
Poland	No policy changes. Provisions of the April 2006 reference offer still apply. Decisions made to resolve LLU-related disputes were based on these provisions. After issuing the decision including the unbundling reference offer, the regulator observed how the market was influenced. Some agreements were signed only after the intervention of the regulator. The development of unbundling was not considered satisfactory. After a market analysis and a decision on SMP, the regulator is currently in the process of issuing another unbundling reference offer. The main changes will include: • reduction of access prices to local loop (active and non-active loops); • colocation process/sharing of collocation rooms; • migration process between WLR, BSA and LLU.	The number of colocation rooms available equals 2.5%, but with no distinction between shared or full access.
Portugal	April 2006: ANACOM set maximum charges for LLU offer. June 2007: ANACOM approved a decision regarding co-location procedures. January 2008: ANACOM started the review of the market 4 of EC Recommendation on relevant markets (wholesale [physical] network infrastructure access [including shared or fully unbundled access] at a fixed location).	All local exchanges are able to offer fully unbundled lines (subject to availability of colocation space and technical conditions). Notwithstanding, alternative operators are not colocated in all MDF as, for example, they make their LLU investment decisions taking into account, namely, the MDF dimension (i.e. number of lines connected to that MDF).
Spain	Telefónica is obliged to publish monthly key performance indicators. Bitstream access previously priced as retail-minus and now under cost orientation.	All MDFs are open to unbundling. In practice, as of December 2007 operators are present in 674 MDFs, which represents coverage of 61.2% of subscriber lines.

Table 2.8. Local loop unbundling *(continued)*

Country	Local loop unbundling policy since 2006	Number of local exchanges (MDF) and proportion of these exchanges that are unbundled (number and percentage)
Switzerland	On 1 April 2007 changes in the Telecommunication Law entered into force, obliging service providers with a dominant market position to offer cost-based prices for new forms of access to resources and the following services: • fully unbundled access to the local loop; • access to broadband (bitstream) for a period of four years; • billing of connections to the fixed network; • leased lines; • access to cable ducts. Unbundling and bitstream access only have to be provided for twisted metallic pairs.	According to Swisscom, 8% of local switches were equipped to support unbundling at the end of 2007.
Turkey	There has been no change in LLU policy since 2006, when the first reference unbundling offer was approved. The first LLU agreements were signed in May 2007.	Approximately 8% of total PSTN subscribers are able to reach the services provided by LLU. The percentage is increasing exponentially.
United Kingdom	None.	100%
United States	None.	As of December 2007, incumbent local exchange carriers reported 11 119 000 unbundled network element lines and resold lines out of 140 839 000 total lines.

StatLink http://dx.doi.org/10.1787/624103187250

Table 2.9. Number of unbundled local loops and as a percentage of analogue subscriber lines

	2002	2003	2004	2005	2006	2007	As % of main lines
Australia						391 000	4
Austria	9 075	26 437	71 595	127 851	198 000	288 000	12.3
Belgium	3 637	6 597	7 844	9 230	53 720	80 818	2.2
Canada	380 806	439 725	568 080	710 080	721 700	859 149	
Czech Republic					23 195		
Denmark	54 834	63 236	92 030	139 538	189 048	268 366	12.7
Finland				258 229	399 000	420 000	24.1
France		273 255	1 536 000	2 840 000	3 986 000	5 156 000	
Germany	944 941	1 349 848	2 000 000	3 300 000	4 700 000	6 400 000	26.6
Greece	93	655	2 715	6 884	19 504	274 091	5.7
Hungary				40	4 424	13 182	0.4
Iceland		12 074	19 216	24 357	31 371	35 812	26.6
Ireland		1 366	1 668	4 978	19 528	17 918	1.1
Italy	124 400	538 800	732 909	1 085 837	1 710 906	2 929 841	15.2
Japan							
Korea	0	672	0	0			
Luxembourg		1 579		3 651	7 025	10 224	6
Mexico							
Netherlands	29 107	93 490	462 214	657 127	796 560	573 500	17
New Zealand					0	0	0
Norway							
Poland						129	0
Portugal	54	1 867	8 780	72 019	195 754	291 175	10
Slovak Republic					0	0	0
Spain		16 016	113 954	434 760	939 009	1 353 948	6.7
Sweden	7 671	51 902	209 944	373 504	517 781	609 164	12.8
Switzerland						700	0
Turkey							0
United Kingdom	2 250	8 229	27 801	192 000	1 295 082	3 728 810	13
United States	17 229 000	21 296 000	22 253 000	17 108 000	13 124 000	11 119 000	7.4

StatLink http://dx.doi.org/10.1787/624132780443

Table 2.10. **Local loop unbundling pricing**

End of 2007

Country	One-off connection charge and charge per month for an unbundled local loop	One-off connection charge and charge per month for a shared line	One-off connection charge and charge per month for a wholesale line
Australia	Connection charges are determined by direct negotiation between the parties, or via access disputes arbitrated by the regulator. In 2007 the charges derived from such disputes relating to Band 2 (the most popular band, including metro/suburban areas) were: One-off: AUD 52.80 Monthly: AUD 14.30	As with unbundled loops, shared line charges are directly negotiated or set via access disputes arbitrated by the regulator. In 2007, the charges determined by the regulator in such disputes were: One-off: AUD 40.90 Monthly: AUD 2.50	The same principles apply to wholesale services, although these are declared under the *Trade Practices Act 1974*. The regulator has published a number of non-binding pricing principles for wholesale line rental, and at the end of 2007 they were: AUD 23.12 for residential; and AUD 25.84 for business No one-off connection charge was specified.
Austria	One-off connection charge for new line with work on subscriber premises: EUR 109 One-off connection charge for new line without work on subscriber premises: EUR 31.50 Monthly rental for fully unbundled loop: EUR 10.44 Monthly rental for sub-loop between Greenfield distribution frame and network termination point on user´s premises: EUR 8.09 Monthly rental for sub-loop between inhouse distribution point and network termination point on user´s premises: EUR 0	One-off for new line: EUR 31.50 Monthly: EUR 5.22	(Voice line resale) One-off for system implementation: EUR 750 One-off for new line: EUR 109 Monthly: EUR 12.70
Belgium	One-off without customer visit: EUR 25.44 One-off with customer visit: EUR 86.95 Monthly: EUR 9.29	One-off without customer visit: EUR 25.44 One-off with customer visit: EUR 86.95 Monthly: EUR 9.29	One-off without customer visit: EUR 46.09 One-off with customer visit: EUR 94.65 Monthly rental fee, naked bitstream: EUR 14.24 Monthly rental fee, bitstream with voice: EUR 5.47

Table 2.10. **Local loop unbundling pricing *(continued)***

End of 2007

Country	One-off connection charge and charge per month for an unbundled local loop	One-off connection charge and charge per month for a shared line	One-off connection charge and charge per month for a wholesale line
Canada	Canada has a one-off service charge which includes an order charge and a per loop charge. For businesses the per order charge is CAD 40.09 and per loop charge CAD 22.44. For residences the per order charge is CAD 21.77 and per loop charge CAD 14.90. The monthly rate for an analogue loop ranges from CAD 8.50 in downtown core major cities to CAD 15.96 in towns and villages to CAD 44.20 in remote areas.		
Czech Republic	One-off: CZK 2 323 Monthly: CZK 360 New prices (from 1 July 2008): One-off: CZK 2 068 Monthly: CZK 262	One-off: CZK 2 437 Monthly: CZK 92 New prices (from 1 July 2008): One-off: CZK 2 272 Monthly: CZK 53	One-off: CZK 80 (simple) / 165 (complex) Monthly: CZK 178 (mini) / CZK 318 (standard price plan)
Denmark	One-off connection: DKK 340 Monthly: DKK 68.20	One-off: DKK 291 Monthly: DKK 34.10	One-off: DKK 731.20 Monthly: DKK 107.10
Finland	One-off: EUR 123.65 (weighted average of 32 SMP-operators providing ULL). Prices vary between EUR 80 and EUR 175 Monthly: EUR 11.21 (weighted average of 32 SMP operators providing ULL). Prices vary between EUR 7.11 and EUR 21.02	One-off: EUR 96.46 (weighted average of 32 SMP-operators providing ULL). Prices vary between EUR 60 and EUR 151.50 Monthly: EUR 5.59 (weighted average of 32 SMP operators providing ULL). Prices vary between EUR 3.55 and EUR 10.51	There are no provisions for operators to publish these prices.
France	One-off: EUR 50 (provisional; agreement pending) Cancellation fee: EUR 15 (from 1 July 2006) Monthly: EUR 9.29	One-off: EUR 60 Cancellation fee: EUR 35 Monthly: EUR 1.80 (+EUR 1.10 for filters)	One-off: EUR 49 for traditional subscription (PSTN) and EUR 54 for naked ADSL (without PSTN). Monthly: EUR 12.90 (standard subscription) EUR 20 (naked ADSL + EUR 0.10 for “bi-VC” bitstream access)

Table 2.10. **Local loop unbundling pricing *(continued)***

End of 2007

Country	One-off connection charge and charge per month for an unbundled local loop	One-off connection charge and charge per month for a shared line	One-off connection charge and charge per month for a wholesale line
Germany	Line transfer without work at end-customer premises: EUR 36.19 Line transfer with work at end-customer premises: EUR 58.20 New line with work at primary connection point (PCP) and without work at end-customer premises: EUR 39.57 New line with work at PCP and with work at end-customer premises: EUR 63.10 New line without work at PCP and without work at end-customer premises: EUR 32.22 New line without work at PCP and with work at end-customer premises: EUR 55.76 Disconnection charge without simultaneous switchover at end customer premises: EUR 20.93 Disconnection charge with simultaneous switchover at end customer premises: EUR 5.21 Monthly: EUR 10.50	One-off: EUR 60.82 Cancellation: EUR 48.65 Monthly: EUR 1.91	Not available in Germany.
Greece	One-off: EUR 41.57 Monthly: EUR 8.48	One-off: EUR 45.73 Monthly: EUR 1.86	One-off: EUR 34.25 (full LLU)/EUR48.46 (shared) Monthly: EUR 8.7 (full LLU)/EUR 2.04 (shared)
Hungary	HUF 9.364	HUF 9.364	Not available in Hungary.
Iceland	One-off: ISK 2 950 Monthly: If only PSTN (lower frequency): ISK 862 Both PSTN and shared access per month: ISK 1 147	One-off: ISK 2 950 Monthly: ISK 285	N/A
Ireland	One-off: EUR 55 Monthly: EUR 16.43	One-off: EUR 55 Monthly: EUR 8.41	One-off: EUR 92.39 Monthly: EUR 18.02

Table 2.10. **Local loop unbundling pricing *(continued)***

End of 2007

Country	One-off connection charge and charge per month for an unbundled local loop	One-off connection charge and charge per month for a shared line	One-off connection charge and charge per month for a wholesale line
Italy	One-off: EUR 36.15 Monthly: EUR 7.81	One-off: EUR 36.15 Monthly: EUR 2.63	One-off: EUR 5.98 Monthly: EUR 10.68
Japan	One-off: connection fees vary Monthly (full unbundling): JPY 1 285 (NTT East) / JPY 1 383 (NTT West)	Monthly: JPY 79 (NTT East) / JPY 89 (NTT West)	There no provisions for operators to publish these prices.
Korea	Monthly (full unbundling): KRW 6 570 (as of 2007)	Monthly: KRW 3 285 (as of 2007)	Monthly: KRW 6 570 (as of 2007)
Luxembourg	One-off: EUR 58.79 Monthly: EUR 10.75	Connection: EUR 81.16 Monthly rental charge: EUR 3.20	Monthly (analogue subscriber): EUR 13.97
Mexico	N/A	N/A	N/A
New Zealand	Unbundling only commenced in NZ in March 2008.	Unbundling only commenced in NZ in March 2008.	Unbundling only commenced in NZ in March 2008.
Norway	One-off: NOK 1 056 Monthly: NOK 95	One-off: NOK 556 Monthly: NOK 54	There are several types of wholesale lines (both unbundled and bitstream).
Poland	One-off: PLN182 Monthly: PLN 36 (local loop) PLN 22 (sub-local loop)	One-off: PLN 204 Monthly: 13 PLN (local loop) PLN 8 (sub-local loop)	One-off (RIO 8 April 2008): PLN 152.31 Monthly (RIO 8 April 2008): WLR POTS: PLN 20.05 WLR ISDN-BRA: PLN 29.16
Portugal	One-off: EUR 38.00 Monthly: EUR 8.99	One-off: EUR 38.00 Monthly: EUR 2.51	
Spain	One-off: EUR 24.00 Monthly: EUR 9.72	One-off: EUR 32.41 Monthly: EUR 3.00	
Switzerland	Unbundled line prices (net of VAT): One-off (to take over an active line): CHF 95.90 One-off (to take over inactive line): CHF 74.30 Monthly: CHF 31.00 In the autumn of 2007, in response to the demand of a number of operators, prices were reviewed by ComCom. Swisscom reduced the price for an unbundled line effective 1 January 2008 from CHF 31.00 to CHF 23.50 (net of VAT).	Swiss law does not require the provision of a shared access line.	Following a review by the Competition Commission, ComCom obliged Swisscom, in November 2007, to offer bitstream access at cost-oriented prices to alternative providers that request such access.

Table 2.10. **Local loop unbundling pricing *(continued)***

End of 2007

Country	One-off connection charge and charge per month for an unbundled local loop	One-off connection charge and charge per month for a shared line	One-off connection charge and charge per month for a wholesale line
Turkey	One-off: TRY 100 Monthly: TRY 17	One-off: TRY 100 Monthly: TRY 5.75	WLR is not implemented in Turkey.
United Kingdom	One-off: GBP 34.86 Monthly: GBP 6.67	One-off: GBP 34.86 Monthly: GBP 1.30	One-off: GBP 2.00 (transfer), GBP 88.00 (new supply) Monthly: GBP 8.39
United States	National average unbundled local loop price as of March 2006 is USD 13.70. See "A Survey of Unbundled Network Element Prices in the United States," by Billy Jack Gregg, Public Service Commission of West Virginia. No current data available on one-off connection charge.	Pursuant to the terms of the Triennial Review Order, line sharing has been completely phased out in the US as of September 2006.	

StatLink http://dx.doi.org/10.1787/624135723141

Table 2.11. Fixed-to-mobile interconnection

Australia	Publication of termination rates Mobile termination rates are not published. However, as mobile termination is a declared service, the regulator periodically releases 'pricing principles'. These pricing principles are intended to improve the information available to the market and indicate the pricing methodology the regulator would be likely to adopt if notified of a dispute in the supply of that particular declared service. Determination of fixed-to-mobile termination rates Fixed-to-mobile termination rates are not treated any differently than mobile-to-mobile termination rates. Mobile termination rates are determined by direct negotiation between the parties, or via access disputes arbitrated by the regulator. Regulation of termination rates The regulator has no general power to set or enforce termination rates, only to arbitrate on specific disputes between carriers. When this involves determining rates, the regulator favours a cost-oriented approach to price-setting.
Austria	Publication of termination rates Yes, (mobile) termination rates are available on RTR's website: *www.rtr.at.* Determination of fixed-to-mobile termination rates According to the outcome of the last mobile termination market analysis (decisions dated 15 October 2007), all MNOs were designated as having significant market power (SMP) on their respective markets. Consequently, the NRA imposed the specific obligation (amongst others) to charge cost-orientated mobile termination rates according to long-run average incremental cost (LRAIC). This obligation was implemented by mandating a "glide path" for mobile termination rates. All MNOs were obliged to terminate calls for (a maximum of) EUR 0.572 by 1 January 2009 at the latest. There is no legal obligation regarding the amount of the interconnection charge for non-SMP operators. The NRA therefore rules that non-SMP operator interconnection fees must be reasonable. In Austria there is no differentiation for termination rates according to whether the call originates from a mobile or a fixed network.
Belgium	Publication of termination rates Following the BIPT Council decision of 11 August 2006 on market definition, competition analysis, identification of operators with a significant market position, and the determination of appropriate remedies on Market 16, the BIPT has obliged Belgacom Mobile, Mobistar and Base to publish the access and interconnection tariffs for termination on a mobile network. Determination of fixed-to-mobile termination rates At the end of April 2008 the BIPT published the MTR charges for 2008. As from 1 May 2008, MTR charges are the following: Belgacom Mobile: EUR 0.793/minute (VAT excluded) Mobistar: EUR 0.994/minute Base: EUR 0.125/minute A further decrease was scheduled for 1 July 2008: Belgacom Mobile : EUR 0.72/minute (VAT excluded) Mobistar : EUR 0.902/minute Base : EUR 0.114/minute Regulation of termination rates Mobile termination rates of Belgacom Mobile, Base and Mobistar are regulated by price ceilings and subject to cost orientation.

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Table 2.11. Fixed-to-mobile interconnection *(continued)*

Canada	Publication of termination rates Generally, fixed-to-mobile termination rates are not published (see "regulation of termination rates" below). 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 Under the regulatory framework established by the CRTC, a mobile operator can choose to interconnect as a wireless service provider (WSP) or as a competitive local exchange provider (CLEC). As a WSP the mobile operator is treated as a large customer, receiving no compensation for calls it terminates and paying for termination on the fixed network. If the mobile operator interconnects as a CLEC, the relationship is between peers. (However, additional regulatory obligations apply to CLECs that are not imposed on WSPs.) A mobile operator that is a CLEC interconnects with a fixed operator for local traffic on a sender-keeps-all basis. Thus, no payment is made by either party to the other for traffic termination within the same exchange. If there is a significant traffic imbalance, sender-keeps-all will not apply, and specific regulated per-trunk rates apply.
Czech Republic	Publication of termination rates Yes, the ceiling price has been CZK 2.99 per minute since 2 May 2006 and applies to all three mobile operators determined to have SMP in the relevant market (no. 16). Determination of fixed-to-mobile termination rates The ceiling price of CZK 2.99 per minute was determined by the CTO on the basis of results of an analysis of the relevant market (no. 16). This ceiling price for termination to mobile networks does not differentiate between origins of the call, whether fixed or mobile. Prices have been determined on the basis of full allocated historical cost (FAHC). Regulation of termination rates Yes, the mobile network termination rates are valid for all SMP operators in the relevant market (no. 16). The prices are cost-oriented and have been determined on the basis of FAHC.
Denmark	Publication of termination rates Yes Determination of fixed-to-mobile termination rates Termination rates are regulated by NITA in accordance with principles in the European Regulatory Framework for Electronic Communications. Termination rates in mobile networks do not differentiate between origins of the call, whether fixed or mobile. The rates for termination are determined by a LRAIC-based regulation regime. Three MNOs are regulated with similar prices. The last, and smallest, MNO is regulated a bit differently, but will converge with the LRAIC price within the next few years. Regulation of termination rates Mobile termination rates are regulated for all MNOs and MVNOs with their own MSC. All MNOs and MVNOs with their own MSC are found to have SMP and are thus subject to regulation. The regulation is cost-oriented.

Table 2.11. Fixed-to-mobile interconnection *(continued)*

Finland	Publication of termination rates Yes, SMP operators have the obligation to publish tariff information on their website. Mobile termination rates can also be found on FICORA's website: *www.ficora.fi* Determination of fixed-to-mobile termination rates Termination rates are commercially negotiated between operators and rates must be cost-oriented. However, only calls from fixed networks dialled using an identifier or pre-selection must be cost-oriented. FICORA evaluates the cost orientation of rates using a top-down FAC method. Regulation of termination rates FICORA has found that all mobile operators have SMP in the mobile termination market. FICORA has imposed a cost orientation obligation on nationwide operators (DNA, Elisa and TeliaSonera).
France	Publication of termination rates Yes, operators publish reference offers. This obligation is imposed by ARCEP in the context of its market analysis for mobile call termination. Determination of fixed-to-mobile termination rates Call termination tariffs are regulated by ARCEP, who imposes tariff ceilings which are cost-oriented. In practice the operators apply these ceilings. Operators are also subject to non-discrimination requirements (different buyers of call termination need to face the same conditions). The tariff ceilings have been fixed until June 2009 at EUR 0.65 per minute for Orange and SFR, and EUR 0.85 per minute for Bouygues Telecom Regulation of termination rates The three operators (in metropolitan France) have been declared as having SMP and are subject to cost orientation requirements.
Germany	Publication of termination rates Yes, published in the Official Gazette of the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railways. Determination of fixed-to-mobile termination rates *Ex ante*-regulated according to the costs of efficient service provision.
Greece	Publication of termination rates Yes. From July 2006, termination rates on mobile networks are determined by EETT, using a LRAIC bottom-up model. Regulation of termination rates All mobile operators have been designated as having SMP in the respective mobile termination market. The regulatory obligation among others is the provision of cost-oriented termination rates for each mobile operator.
Hungary	Publication of termination rates Yes. Determination of fixed-to-mobile termination rates NRA approval on the basis of LRIC cost model made by the fixed SMP operator. NRA approval of the SMP operators' cost model based on LRIC.

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Table 2.11. Fixed-to-mobile interconnection *(continued)*

Iceland	Publication of termination rates Yes. Determination of fixed-to-mobile termination rates By benchmarking. Regulation of termination rates If operators have significant market power and both Siminn and Vodafone have been declared SMP on the mobile network interconnection market then prices are cost-oriented. Currently, mobile termination prices are determined by benchmarking and change according to cost orientation.
Ireland	Publication of termination rates Eircom publishes and regularly updates a Switched Transit Routing and Pricing List (STRPL) which contains mobile termination rates (Table 101) and fixed termination rates (Table 103). The most recent STRPL is effective from 1 January 2009 and available at *www.eircomwholesale.ie*. Determination of fixed-to-mobile termination rates The termination rates of mobile operators which have been designated with SMP are subject to price control regulation by ComReg. There is no differentiation between termination rates for F2M and M2M. Regulation of termination rates In the case of mobile termination rates, the three mobile operators which have been designated with SMP in the market for wholesale call termination on their individual networks have undertaken to voluntarily reduce their mobile termination rates. These current voluntary reductions are available at *www.comreg.ie.* In the case of fixed termination rates, Eircom is currently the only fixed operator whose termination rates are subject to price control. Other fixed operators designated with SMP in the market for wholesale call termination on their individual networks will also be subject to price control when they reach 5% of the market for total access paths or five years from the date of the decision, whichever occurs soonest. See *www.comreg.ie.*
Italy	Publication of termination rates Yes, mobile operators must publish a reference interconnection offer with the cost and technical conditions for termination of calls from other networks (either fixed or mobile). Price control imposed by AGCOM is applied through a network cap mechanism (glide path) and maximum rates are defined in advance for any year of application of the network cap. Determination of fixed-to-mobile termination rates Termination rates do not differentiate between origins of the call, whether fixed or mobile. Regulation of termination rates All MO are designated as SMP in the market and are subject to price control on cost-oriented basis.
Japan	Publication of termination rates Telecommunications carriers with Category II-designated telecommunications facilities are obliged to publicise their interconnection tariffs including termination rates. Determination of fixed-to-mobile termination rates 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 cost-efficient.

Table 2.11. Fixed-to-mobile interconnection *(continued)*

Korea	Publication of termination rates Yes. Determination of fixed-to-mobile termination rates The government sets the conditions for rate determination and makes them public. The termination rates for fixed network (KT) and mobile network (SKT, KTF, LGT) are determined according to the criteria for interconnection. Mobile termination rates in 2007 (KRW per minute): SKT: 32.78, KTF: 39.60, LGT: 45.10 Regulation of termination rates The government makes public the criteria for calculating interconnection fee and calculates the mobile termination rate accordingly (except 3G).
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.
Mexico	Publication of termination rates Rates are public. Determination of fixed-to-mobile termination rates Article 42 of the Federal Law on Telecommunications allows operators to negotiate the interconnection rate. It stipulates that public telecommunications network licensees must interconnect their networks and, to this end, conclude any agreement within a period of 60 calendar days following a request to do so. After that time, if the parties have not concluded the agreement (or even before, upon mutual request), the Ministry, within the following 60 calendar days, will decide on the conditions of the agreement. Regulation of termination rates Mobile termination rates are not subject to any specific regulation. Nevertheless, the Federal Law on Telecommunications states that in the event that licensees of public telecommunications networks do not reach an agreement within a period of 60 calendar days, the Ministry will decide on the conditions of the agreement.
New Zealand	Publication of termination rates Termination rates for the period 2007-2012 for fixed-to-mobile voice calls are published in Deeds Poll (voluntary undertakings) issued by the 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 (voice) termination rates were set by the two incumbent mobile operators as voluntary undertakings in April 2007. These (voice) termination rates are currently unregulated and are negotiated commercially by the operators concerned. Regulation of termination rates Fixed-to-mobile voice termination rates are subject to self-regulation of the Deeds Poll of April 2007. Other mobile termination rates are currently unregulated.

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Table 2.11. Fixed-to-mobile interconnection *(continued)*

Norway	Publication of termination rates Yes, they are published in NPT's decisions in Market 16. Determination of fixed-to-mobile termination rates Termination rates for NetCom and Telenor are regulated. Other MNOs and MVNOs have commercially negotiated rates. The prices for Telenor and NetCom are based on a LRIC model. Regulation of termination rates Termination rates for NetCom and Telenor are regulated with a price cap (a glide path towards LRIC in 2010). NPT has proposed fair and reasonable prices (specified with a price cap) for other MNOs and MVNOs. There is a national consultation on this draft decision until 10 June 2009.
Poland	Publication of termination rates Yes, by decision of the President of OEC dated 26 April 2007. Determination of fixed-to-mobile termination rates Set by NRA. The July 2007 decision of the President of OEC regulated the maximum per minute rates for F2M connection for the incumbent. M2M termination rates are determined on the basis of international benchmarks. Regulation of termination rates Yes.
Portugal	Publication of termination rates Yes. On 25 February 2005, ANACOM published the market analysis for voice call termination (available at *www.anacom.pt*) in which mobile termination rates were included. Determination of fixed-to-mobile termination rates The termination rates were determined through regulation. Regulation of termination rates The termination rates imposed by ANACOM were a result of market analysis, according to the EC regulatory framework. The concrete figures on the decision of 25 February 2005 were determined by international benchmarking for the period between March 2005 and October 2006 (the latest value of the glide path is still applicable). A new glide path is in preparation to set new prices in the near future.
Spain	Publication of termination rates Yes. Determination of fixed-to-mobile termination rates The termination rates are regulated by the NRA in case of operators with significant market power. New mobile virtual operators (MVO) are to be regulated as well in their termination rate (in the coming months), although for the time being these new MVO are free to set their termination charge given that their prices are "reasonable". The termination rate is regulated by a glide path, *i.e.* a price cap that covers a period of three years (until Spring 2009). The price level is set based on the costs declared by the operators. Regulation of termination rates Yes, operators with significant market power are regulated. Their termination rates must be cost-oriented.

Table 2.11. Fixed-to-mobile interconnection *(continued)*

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 National Regulatory Authority (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.
Turkey	Publication of termination rates The Standard Interconnection Reference Tariffs (SIRT) for GSM operators having significant market power (SMP) were published on 31 March 2008. Determination of fixed-to-mobile termination rates The SIRT does not bind operators, who may set their charges freely in bilateral agreements. However, if operators fail to conclude interconnection agreements and apply to the TA for dispute resolution, then the TA will likely impose the charges determined in the SIRT. Standard interconnection reference tariffs in force as of 1 April 2008 for GSM set by the Telecommunications Authority of Turkey (TA): • Turkcell Communication Services Inc.: TRY 9.10 per minute • Vodafone Telecommunication Inc.: TRY 9.50 per minute • Avea Communication Services Inc.: TRY 11.20 per minute Regulation of termination rates TA may request operators with significant market power to set their access and interconnection tariffs on cost-oriented bases.
United Kingdom	Publication of termination rates Not published as such. They must be notified to interconnected operators and to Ofcom. Determination of fixed-to-mobile termination rates Following a public consultation, the UK regulator (Ofcom) sets the maximum levels on the termination rate charges that operators can impose for fixed-to-mobile calls. In 2007, Ofcom set a glide path of maximum mobile termination rates for the period 2007-2011. Termination rates to mobile networks are determined by the same charge controls, whether the call originates from a fixed or mobile network. Regulation of termination rates Yes, maximum levels are set. The reason for setting charge controls is because Ofcom has determined that there are separate markets for the provision of wholesale mobile voice call termination in the UK to other Communications Providers by each of the five mobile operators in the UK market (Vodafone, O2, Orange, T-Mobile and H3G). Each of the five mobile operators has significant market power in the market for termination of voice calls on its network(s).

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Table 2.11. Fixed-to-mobile interconnection *(continued)*

United States	Publication of termination rates No. In the United States, most mobile networks operate under a mobile-party-pays regime, although other settlement arrangements are permitted. In the US, termination payments are intercarrier payments, not payments users must make. In many cases, intercarrier rates for mobile networks are commercially negotiated. However, intercarrier rates between dominant carriers, the incumbent local exchange carriers (ILECs), and other carriers – including mobile operators – are regulated. LECs' and mobile operators' intercarrier rates applying to calls within an FCC-defined "local" area fall under the FCC's "reciprocal compensation" rules. For calls exchanged with an ILEC, the rules require that the rate the ILEC charges the mobile operator for termination be based on its long-run average incremental costs. The rules further presume that the rate that the mobile operator charges the ILEC for termination will be the same as that charged by the ILEC, unless the mobile operator can prove that its costs are higher than the costs of the ILEC. Generally, termination rates for calls that are not "local" under the FCC rules fall under the interstate and intrastate access charge regimes. For fixed-to-mobile toll calls, mobile operators generally are not able to charge for termination because they are detariffed. Determination of fixed-to-mobile termination rates Termination rates for local fixed-to-mobile calls are initially commercially negotiated. If operators cannot reach agreement, in some cases, they may be arbitrated by local public utilities commissions. Termination rates paid to fixed operators for non-local calls are determined by filed interstate and intrastate access tariffs. Regulation of termination rates Termination rates for local fixed-to-mobile calls are initially commercially negotiated. If operators cannot reach agreement, in some cases, they may be arbitrated by local public utilities commissions. Termination rates paid to fixed operators for non-local calls are determined by filed interstate and intrastate access tariffs.

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Table 2.12. Percentage of final consumption expenditure of households per category in the OECD area

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Communications	1.83	1.91	1.99	2.05	2.17	2.22	2.27	2.29	2.30	2.31	2.26	2.21	2.18
Health	8.23	8.39	8.67	8.96	8.99	9.26	9.87	10.24	10.11	9.95	10.02	10.06	9.78
Education	1.81	1.82	1.85	1.84	1.89	1.95	2.00	2.03	2.01	1.98	1.99	2.00	1.98
Housing, water, electricity, gas and other fuels	20.73	20.13	19.74	19.76	19.69	19.52	19.68	19.63	19.82	19.79	19.95	19.95	19.85
Recreation and culture	9.35	9.32	9.31	9.41	9.47	9.57	9.43	9.43	9.42	9.48	9.36	9.33	9.26
Transport	12.07	12.33	12.31	12.37	12.55	12.67	12.48	12.30	12.31	12.41	12.59	12.49	12.35
Restaurants and hotels	7.31	7.27	7.19	7.33	7.29	7.28	7.24	7.27	7.33	7.40	7.43	7.45	7.42
Alcoholic beverages, tobacco and narcotics	3.05	3.01	2.92	2.93	2.99	2.93	2.92	2.95	2.93	2.89	2.83	2.77	2.74
Furnishings, household equipment and routine house maintenance	6.04	5.93	5.80	5.89	5.80	5.65	5.52	5.45	5.42	5.42	5.40	5.38	5.32
Food and non-alcoholic beverages	12.43	12.08	11.49	11.64	11.48	11.22	11.09	11.04	11.10	11.07	10.90	10.70	10.68
Clothing and footwear	6.17	6.04	5.75	5.79	5.55	5.33	5.17	5.07	5.01	4.93	4.87	4.84	4.80

StatLink http://dx.doi.org/10.1787/624187233040

ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Chapter 3

Telecommunication Market Size

Telecommunications is a USD 1.2 trillion market in the OECD. Telecommunication markets have expanded at a fairly constant annual growth rate of 6% since 1990, even during economic downturns.

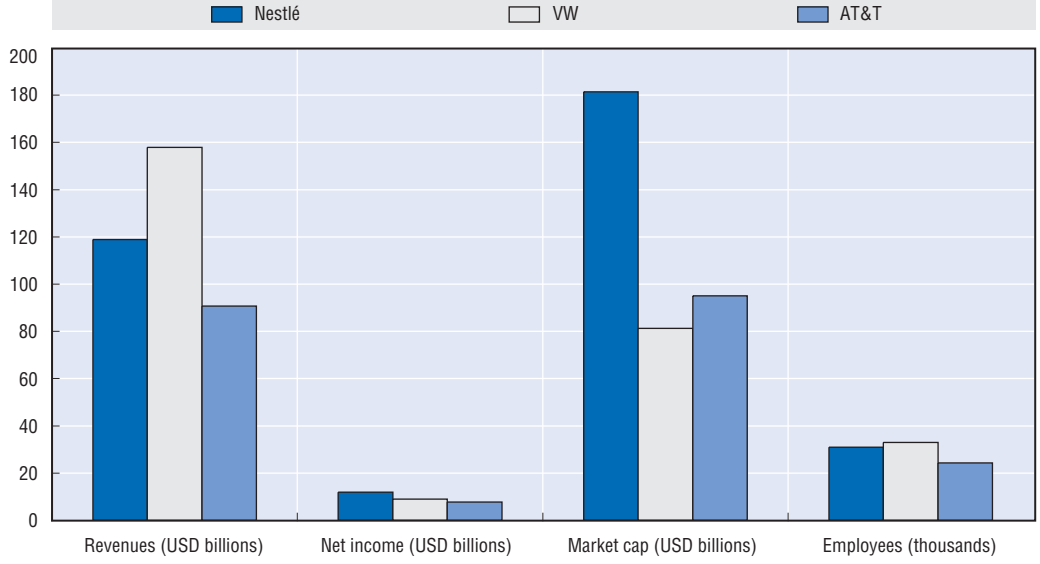
Voice remains the largest revenue source for operators despite declines in calling prices for both fixed and mobile. Mobile revenues accounted for 41% of all telecommunication revenues in the OECD in 2007, up from 22% just a decade earlier. Ten countries now have mobile sectors which are larger than the fixed sector in revenue terms.

Introduction

Telecommunication firms are as large as leading firms in other key markets such as food and automobiles (Figure 3.1). A comparison of Nestlé (the Swiss food manufacturer), VW (the German auto group) and AT&T (the American telecommunication firm) highlights their similarities in size. VW (the parent company of VW, Audi, Seat, Škoda, Lamborghini, Bugatti and Bentley) had the largest operating revenues of the three with nearly USD 160 billion in 2007. AT&T had revenues of USD 119 billion and Nestlé of USD 97 billion. While revenues were lower than VW, AT&T had the highest market capitalisation of the three in 2007 at nearly USD 180 billion. Each of the firms employs between 276 000 and 329 000 people.

Figure 3.1. **Comparing giants: food, telecom and cars**

December 2007 results from Nestlé (Switzerland), VW (Germany) and AT&T (United States)



Source: Nestlé, Volkswagen and AT&T 2007 annual reports.

StatLink http://dx.doi.org/10.1787/620035476632

Telecommunications is a trillion dollar market in the OECD and it continues to grow. Total OECD telecommunication revenue reached nearly USD 1.2 trillion in 2007 (Table 3.1). The compound annual growth rate in revenue between 2005 and 2007 held fairly constant at 6%, in line with historical growth averages since the early 1990s. The fact that operators have been able to maintain historical growth levels in the face of declining per-minute calling prices shows an ability to adapt to quickly changing market conditions.

Historically, telecommunication revenues flowed from subscription and per-minute call changes. Revenues from standard voice communication continue falling as voice becomes more of a commodity than a "pay-per-call" service. Liberalisation of

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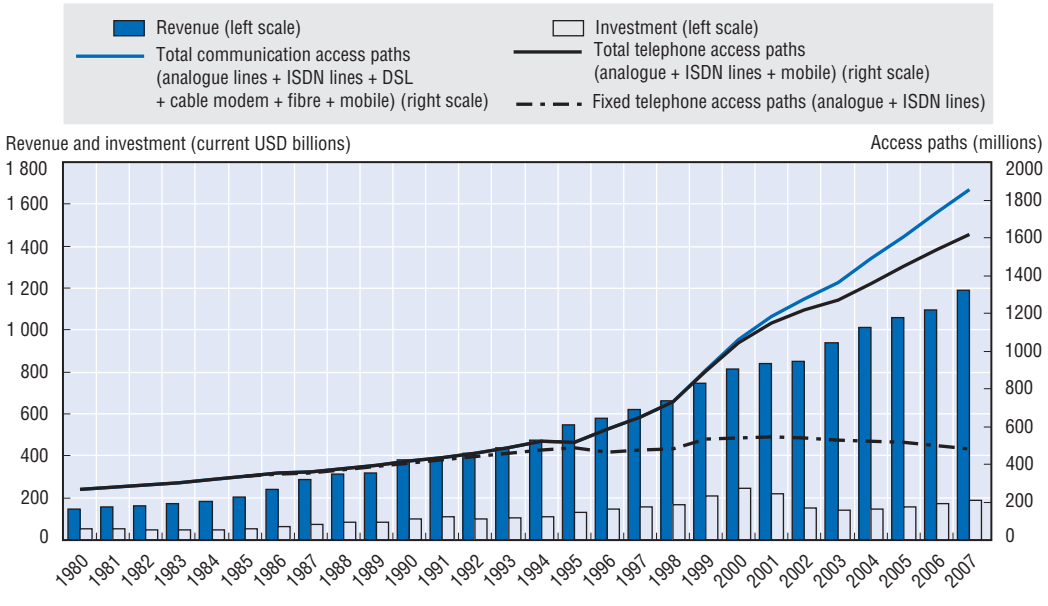
telecommunication markets introduced needed competition and led to much lower prices for consumers and businesses, but this also left operators searching for new revenue streams to make up for shortfalls in the voice segment. Much of the transformation in the sector as a result of these shifts has been from two major market developments in the past 20 years which have helped transform the revenue model for telecommunication operators.

The first major market development was the widespread adoption of mobile voice communication in the 1990s. As Chapter 4 shows, mobile is now the dominant telecommunication access path in the OECD and throughout most of the world. Mobile revenues now make up 41% of all telecommunications revenue. Rapid mobile adoption improved the revenue situation of telecommunication operators and mobile is arguably the most important driver for the industry. Mobile revenues have been under pressure though as competition pushes down per-minute charges, following a similar trend which appeared ten years earlier with the PSTN.

The second industry shift was away from dial-up Internet connections to high-speed, always-on broadband connections. The introduction of broadband helped operators in two key ways. Firstly, it introduced a new revenue stream to help compensate for falling per-minute revenues on both the PSTN and mobile networks. Secondly, broadband adoption has slowed the decline of fixed-line telephone subscriptions since subscribers typically keep a fixed line subscription to receive DSL service.

These two recent shifts allowed operators to maintain revenue growth even in the face of declining voice revenues. The introduction of these new telecommunication paths has been a key factor in maintaining revenue growth (Figure 3.2).

Figure 3.2. **Trends in public telecommunication revenue, investment and access paths, 1980-2007**



StatLink http://dx.doi.org/10.1787/620061308543

These two industry shifts can be seen well in time-series data of total number of access paths. In 1980 there were 268 million (Figure 3.2) access paths, which have since

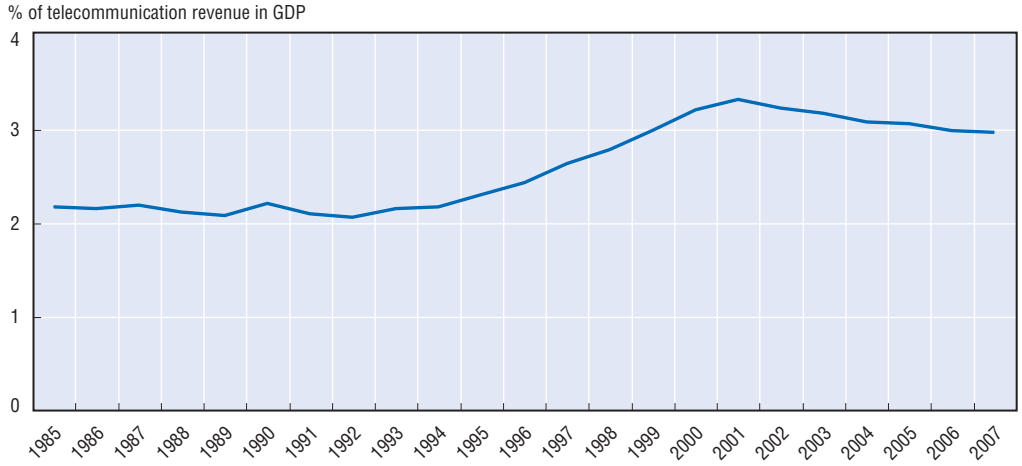
grown to 1.6 billion in 2007. Looking at it another way, there were seven access paths in 2007 for every access path in 1980. The sheer increase in the number of access paths highlights the growth of the telecommunications industry over this time.

The number of access paths increased six times over the previous 25 years and this can help explain why telecommunication revenues are growing as a percentage of GDP. Prices for an individual telecommunication path may have fallen but households now subscribe to multiple access paths.

One way telecommunication operators have managed to increase the number of lines/paths in service is by selling service bundles rather than stand-alone items. This helps operators keep revenues high and allows them to continue monetising increasingly commoditised services such as fixed-line voice.

Revenues can provide valuable insight into consumer spending trends in the telecommunications industry. Telecommunication expenditures, proxied by reported revenues, are equivalent in size to roughly 3% of GDP (Table 3.2). The 3% figure needs to be interpreted carefully because telecommunications services are purchased both as intermediate inputs and final goods. The best way to interpret the figure is by examining changes in the ratio over time (Figure 3.3).

Figure 3.3. **Telecommunication revenue as a percentage of GDP for total OECD, 1985-2007**



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Telecommunication revenues were comparable to 2% of GDP up until the early 1990s when mobile adoption accelerated. From 1992 onwards, revenues as a percentage of GDP grew from 2% to 3% until 2000. The ratio has fluctuated slightly around the 3% level since then even as prices for telecommunication services continue to fall (Chapter 7).

Figure 3.3 provides historical background on the ratio between GDP and telecommunications revenues but these ratios can vary significantly between countries. The Korean and Portuguese telecommunication sectors are the largest relative to GDP in the OECD at nearly 5%; Luxembourg and Norway's telecommunication sectors were the smallest relative to GDP at just under 1.4%.

Revenues are often used as a proxy for expenditures and can provide insights about households and individuals when reported on a per-capita basis. Using the data this way

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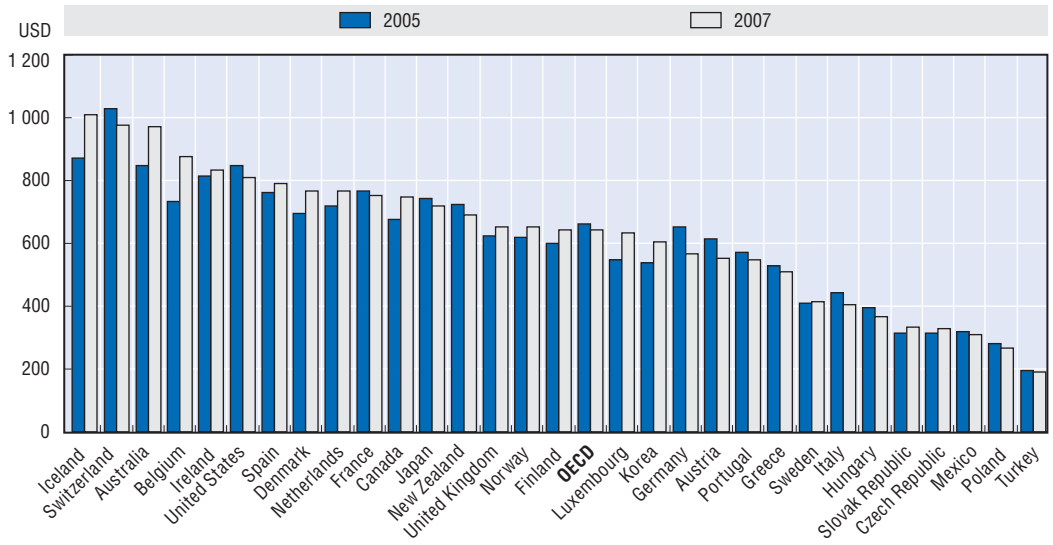
provides a rough estimate of the percentage of income spent on telecommunication services.

Korean and Portuguese revenue per capita is roughly 4.5% to 5% of GDP per capita and the two countries lead the OECD in this ratio. Luxembourg and Norway have the highest GDP per capita in the OECD in 2007 and correspondingly have the lowest ratio of per-capita revenues to per-capita GDP at 1.4%. This would imply that consumers in Korea and Portugal spend a much larger percentage of their income on telecommunication services than consumers in Luxembourg or Norway. Telecommunications revenues in Switzerland, Iceland and Australia were over USD 1 600 per inhabitant in 2007. By contrast, Mexico and Turkey had the lowest annual revenue per capita at under USD 300.

Revenue data is also helpful in gauging the "productivity" of an access path. With revenue data it is possible to find the average revenue attributed to each access subscription, or path. A communication access path is calculated as: analogue telephone lines + ISDN lines + mobile subscribers + DSL + cable broadband + fibre + other broadband.

The results vary considerably across countries (Figure 3.4). The average revenue per access path in the OECD was USD 641, down slightly from USD 661 two years earlier (Table 3.3). Revenues may be down slightly for each line but the number of lines is still increasing. Iceland, Switzerland and Australia have the highest levels of revenue both in terms of access paths and population (Figures 3.4 and 3.5). Revenues per access path in Iceland are more than five times larger than in Turkey.

Figure 3.4. **Public telecommunication revenue per communication access path, 2005 and 2007**

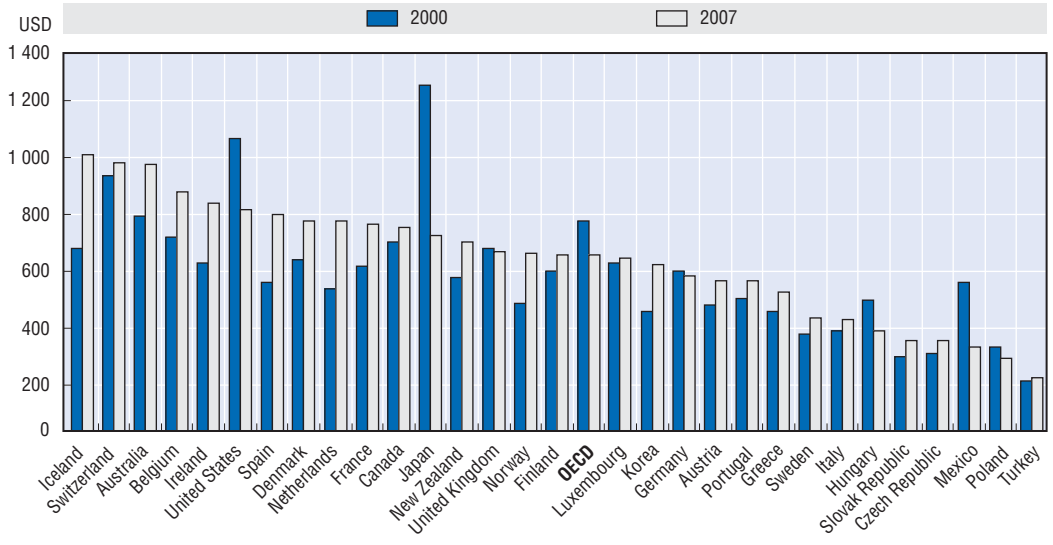


StatLink http://dx.doi.org/10.1787/620133843438

Fixed access lines

Revenue from access lines is falling in most OECD countries. In the United Kingdom, for example, BT Retail's revenue from traditional services fell 3% in the year ending March 2008. However, BT's "new wave revenue", which they describe as mainly broadband, grew 20% over the year.[1]

Figure 3.5. **Public telecommunication revenue per capita, 2000 and 2007**



StatLink http://dx.doi.org/10.1787/620134214307

The Belgian incumbent Belgacom reported that revenues from voice subscriptions were down nearly 2% in 2007. The largest decline though was in revenues from voice traffic on the fixed network, which fell over 11%.[2] While the per-minute revenues fell, Belgacom's voice subscription revenue did not decline as much as voice traffic. This scenario is relatively common in OECD countries. Subscribers hold onto their fixed lines, often simply to subscribe to DSL services. This helps maintain subscription revenue. Voice revenues fall as calling prices decline and users shift calls from the PSTN to mobile and VoIP services. Belgacom's Internet revenues increased 12% over the same period.

Many operators no longer separate out fixed line telephony from broadband service revenues in their reporting. This convergence of the PSTN and broadband networks highlights the commoditisation of voice over fixed-line networks as well as operators' new reliance on broadband networks for revenues.

Mobile revenues

Mobile revenues have largely replaced the declining revenues from the PSTN side of operator's businesses. Mobile revenues overall have grown 10% each year since 2005, reaching USD 492 billion in 2007 (Table 3.5).

Mobile revenues accounted for 41% of all telecommunication revenues in the OECD in 2007, up from 22% just ten years earlier (Figure 3.6). Mobile is the dominant revenue source in a number of countries. In Japan, for example, mobile accounts for 71% of Japanese telecommunication revenues, accentuating the high level of mobile development there. Ten countries now have mobile sectors which are larger than the fixed sector in terms of revenue.

Many operators reported falling revenues on the fixed side but growing revenues on the mobile side to make up the difference. Bell Canada reported a 1.4% increase in revenues in 2007 due to a 7.9% growth at Bell Wireless and a 1.0% decline at Bell Wireline.[3]

AT&T is one of the largest operators in the OECD and both data and wireless revenues grew while fixed voice revenues fell. Between 2006 and 2007, AT&T was able to slow the decline of fixed line revenues while significantly boosting wireless revenues (Figure 3.7).

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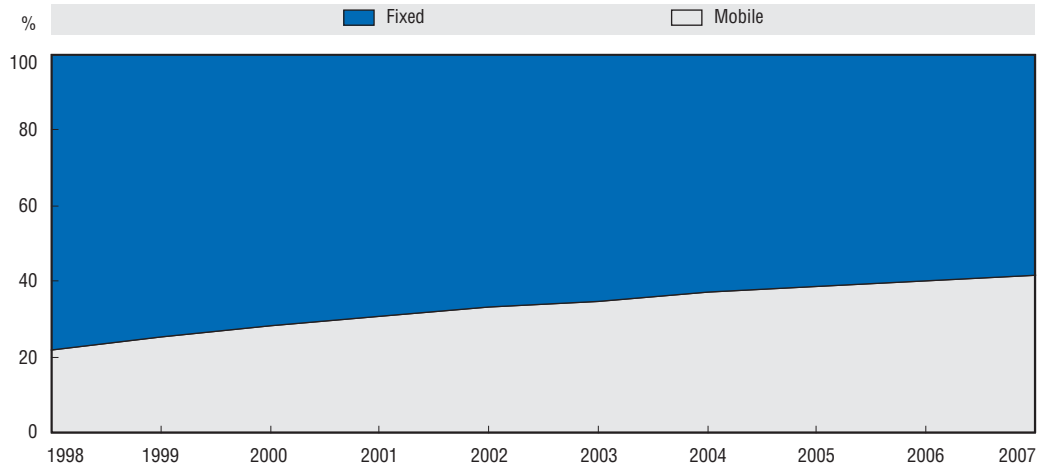
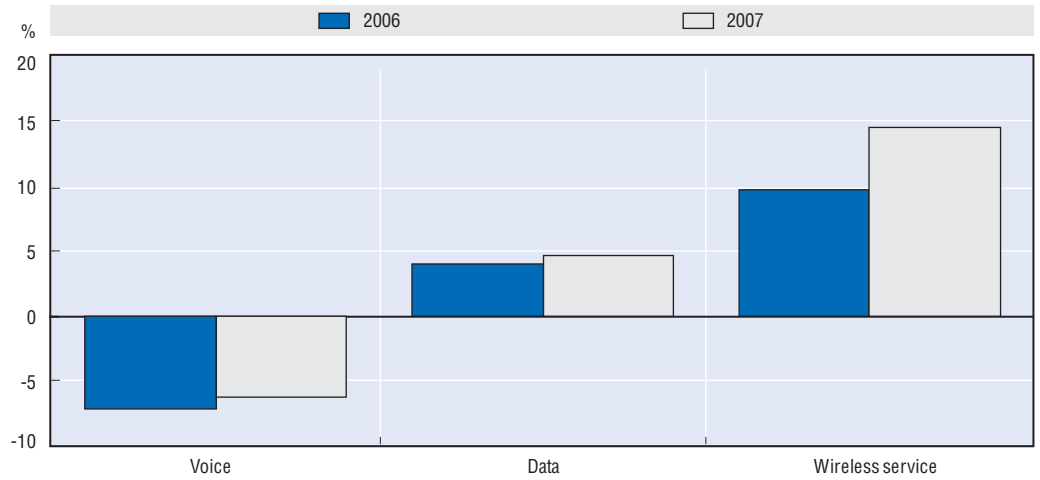
Figure 3.6. **OECD share of mobile and fixed telecommunication revenues, 1998-2007**



StatLink http://dx.doi.org/10.1787/620135233816

Figure 3.7. **United States: AT&T's revenue trends, 2006 and 2007**

Revenue growth/losses



Source: AT&T Annual Report 2007.

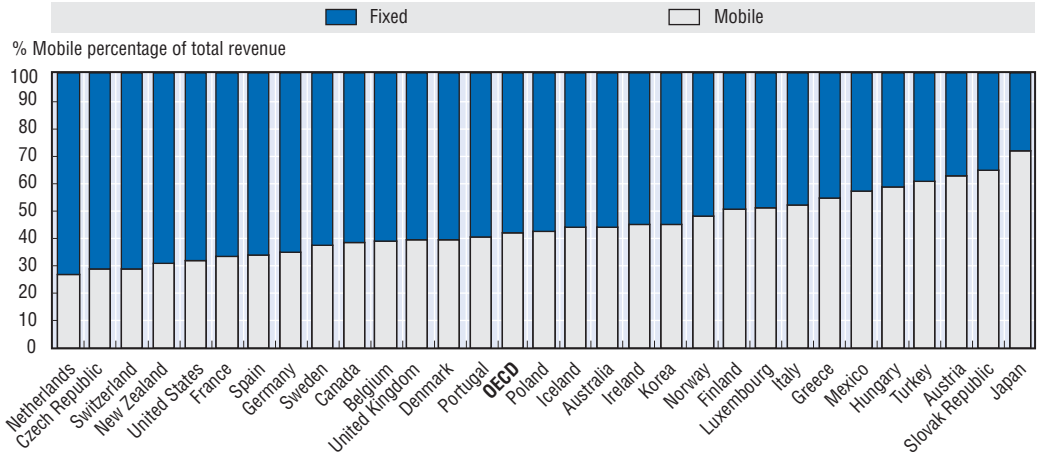
StatLink http://dx.doi.org/10.1787/620168868481

The relative importance of mobile revenues in the telecommunication sector differs across countries (Figure 3.8). Mobile revenues only accounted for 26% of total revenues in 2007 in the Netherlands but 65% in the Slovak Republic.

In some cases mobile markets are beginning to show signs of maturity seen a decade ago in the fixed-line market. The price per minute of communication continues to fall in many markets due to increased competition, leaving mobile operators looking for new revenue sources.

Revenues per mobile subscriber fell between 1997 and 2002, only to start slightly increasing again over the next five years. In 2007, mobile revenues per subscriber averaged USD 36 per month in the OECD (Table 3.8). These rebounding revenues are the result of changing market conditions and new data services. Prices for mobile service

Figure 3.8. **Share of mobile revenue in total telecommunication revenue**

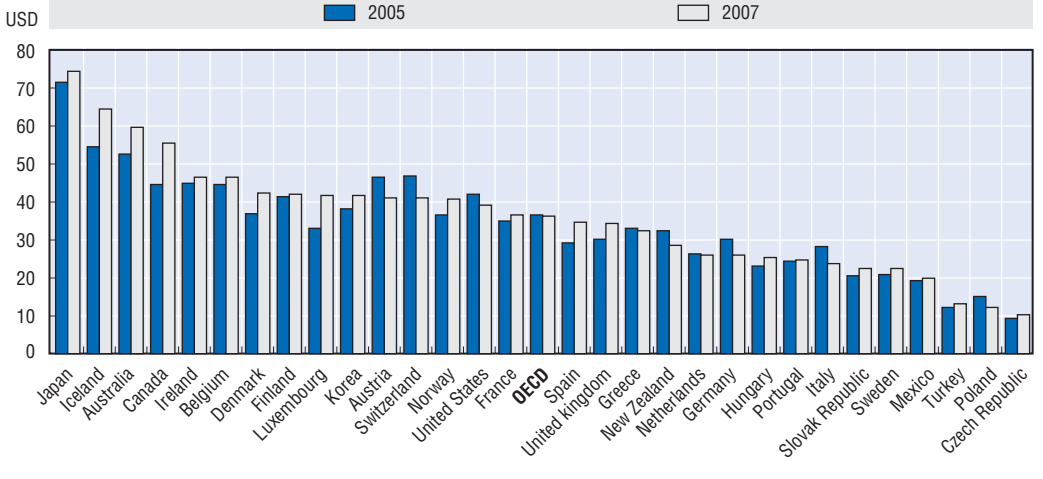


StatLink http://dx.doi.org/10.1787/620172280712

started to fall from high levels in the 1990s with the introduction of competition in the sector. This pushed prices down more than 50% from 1996 to 2002. Operators countered the fall in voice revenues by emphasising new and existing data services such as WAP, GPRS, 3G and SMS. The effort was successful and mobile revenues per subscriber have been slowly increasing since. Operators are looking to data on 3G networks as a new revenue source, but these investments are only now beginning to draw in a substantial number of users.

Data services on 3G networks remain a promising source of new revenue. The revenue models for mobile broadband data are still in flux with no dominant business plan emerging yet. Many operators still charge users by the megabyte for data traffic and these prices are often high. In other cases, operators have chosen flat-rate plans for mobile broadband but control excessive usage with low data caps. Operators face a difficult pricing challenge where setting prices too low will reduce network quality for all, and setting prices too high will leave the frequencies under-utilised.

Figure 3.9. **Monthly mobile revenue per subscriber, 2005 and 2007**



StatLink http://dx.doi.org/10.1787/620272228045

Mobile data services are already a significant part of operators' revenues. Belgacom's data revenues were already 31% of voice revenues in 2007. Even more telling is that mobile voice revenues fell by 6% over the period while mobile data revenues jumped 28%.[4]

Verizon Wireless' data revenues of USD 7.3 billion accounted for one-fifth of total wireless revenues at Verizon in 2007.[5] These trends suggest that broadband could potentially become as important a revenue source on mobile networks as it is already on fixed networks.

Even traditional data on mobile networks have been increasing. SMS use increased by 50% in 2007 for Portugal Telecom's mobile operator, working out to an average of 83 SMS messages per user per month.[6] The Portuguese regulator ANACOM reports that SMS in the entire market grew 49% in 2007 to an even higher 116 messages per month.

Broadband

The growth of broadband subscriptions has helped protect PSTN operators from much more dramatic line losses and has increased the value of cable networks around the world. The number of broadband access paths grew 31% per year over the previous four years. Broadband prices have fallen as well, as a stand-alone service, over the same time. Operators have been able to keep broadband revenues high through attracting new customers and bundling broadband with other services, particularly voice. There are some markets, such as France, where there are relatively few stand-alone broadband connections. Most operators sell triple or quadruple play telecommunication packages instead. These packages can be beneficial to subscribers who want all the offered services but they also tend to hide the price of individual services – making comparisons difficult.

A number of operators now break down revenues into voice and data and this helps provide an idea of the size of broadband markets. NTT separates voice revenues from "IP/packet communication services" when reporting revenues. Mobile voice (25.7%), fixed voice (26.5%) and IP/packet communication services (24.0%) contributed roughly equally to overall services revenues. The percentages for mobile and fixed both declined while data increased over the year.

The US operator Qwest's voice revenues (mainly PSTN) amounted to USD 8.5 billion while data revenues were USD 5.1 billion in 2007.[7] Operators without large mobile operations such as Qwest rely heavily on data revenues for their businesses.

In Australia, Telstra's Internet, IP, and data access revenues accounted for 14% of total revenues in the year ending June 2008. Within Telstra's consumer segment, Internet revenues were slightly less than half those of the mobile or PSTN segments.[8]

In Canada, Bell Canada's data revenues of CAD 3.6 billion in 2007 approached the level of both fixed voice (CAD 4.8 billion) and mobile revenues (CAD 4.1 billion).

These examples show how data revenues are approaching the level of fixed and mobile voice in a number of countries. What is more telling is the upward trend in data revenues compared with slower gains in mobile and declines in the fixed segment.

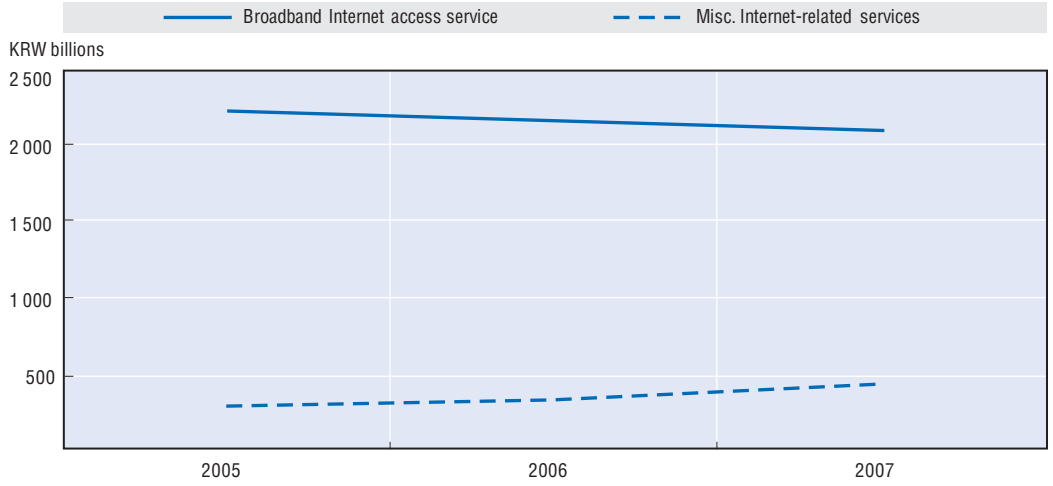
Both fixed and mobile markets have followed a similar revenue trend over time as markets grow, mature and eventually decline. Telecommunication markets often grow quickly after the introduction of a new technology or service. Then, new competitors enter markets and services expand. At some point revenue growth begins to taper off over time

as stronger competition develops. Eventually markets mature and prices fall as a result of strong competition. Operators can offset decreasing prices by adding more subscribers during the earlier stages. At some point though, markets saturate and revenues often decline.

Korea has one of the most developed broadband markets in the world and is beginning to show signs of market maturity. KT's broadband revenues actually declined over the previous two years. This is likely the result of increased competition from other infrastructure-based providers and very high penetration levels. Some of the losses were recuperated through peripheral Internet business services such as data centres (Figure 3.10) but the trend likely reflects market maturity and strong price competition.

Figure 3.10. **Korea: Broadband revenue declines at KT**

Operating revenues by Internet segment, 2005-07



Source: KT Annual Report 2007, Form 20-F.

StatLink http://dx.doi.org/10.1787/620284166387

Television

Operators will continue to look for new revenue streams as the average revenue per connection declines. Television has become a lucrative potential market for DSL providers and a historical revenue stream to protect for cable operators. A number of DSL providers have been successful at using television over DSL as a way to boost revenues.

The French operator Free includes television as a component of all broadband subscriptions. Subscribers living close enough to an exchange can watch TV over DSL on a regular television set. Those without suitable DSL lines can watch via their computer. Operators in many OECD countries now offer television over DSL, but Free has been more successful than others with pay-television services. In December 2007 Free's parent company Iliad announced that over 80% of subscribers were accessing pay-TV services such as video-on-demand or *à la carte* channels. In addition, Free also offers anti-virus protection, PC insurance and premium customer services as a way to boost average revenues per user. These value-added services accounted for 22.4% of their broadband revenues in 2007. [9]

Verizon in the United States is another traditional DSL operator which has been successful in attracting television subscribers. Televison is a key revenue driver on its new

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fibre-optic network. At the end of 2007, Verizon had 1.8 million TV subscribers, of which nearly 1 million were over fibre and the remainder over satellite.[10] The number of subscribers makes Verizon the 10th largest cable operator in the United States – after two years of offering services.

Belgacom's television product accounts for a small percentage of total revenues but was its fastest growing revenue source in 2007. Belgacom TV's revenues accounted for 0.4% of total revenues in 2006 but 1.2% of revenues a year later.[11]

Cable operators, on the other hand, have always had strong television positions and have moved into phone and Internet markets quickly. Time Warner Cable is the second largest cable operator in the United States and still derives 67% of its revenues from video. Data accounts for 25% of revenue and voice 8%. The cable experience is slightly different than DSL because television programming is still a growth market for operators. Time Warner Cable's revenues for television – its incumbent property – grew at 33% in 2007. That is just slightly lower than the increase in data revenues from Internet at 35%.[12]

Voice traffic

There are two pronounced trends in voice traffic which appear in the 2005-2007 data. First, the minutes of domestic voice calls per fixed line are falling in most countries. Second, these calls appear to be shifting to mobile networks as the number of minutes of communication per mobile phone increases (Table 3.7).

This trend is well highlighted by Austria where the introduction of flat-rate voice telephony on mobile networks has shifted calls away from the fixed-line network. Voice traffic on Telekom Austria's fixed network fell 13.3% in 2007 as a result of the shift to mobile communications.[13]

There was an OECD monthly average of 272 minutes of outgoing calls on fixed line telephones in 2007. This is down 32 minutes per month from 2005 (Table 3.8).

Domestic voice traffic over fixed lines has declined in most countries since 2000. This is the result of a number of factors but primarily the shift to using mobile phones for all calls. There is an interesting rebound trend appearing recently in a number of OECD countries. The number of PSTN minutes per line declined until 2005 when the numbers started rising again. For example, French minutes per PSTN line fell until 2004 when they started to increase again (Table 3.6). One explanation is the shift in France to flat-rate national calls offered by a number of carriers.

On the mobile side, the OECD average number of outgoing minutes of completed calls on mobile networks was 220 minutes per month in 2007 (Table 3.8). This is up 56% from two years ago. Subscribers in the United States make far more outgoing calls on mobile phones each month than any other country in the OECD. The average number of minutes per mobile subscription was 443 in 2007, more than double the OECD average. There are a number of countries which had 60 minutes of outgoing calls or less per month attributed to mobiles in 2007: the Slovak Republic, Switzerland and New Zealand. A few countries such as France, Japan, New Zealand, Portugal and the Slovak Republic saw slight declines in the number of minutes attributed to each mobile.

Some of these gains in usage happen slowly over time. Telecom Portugal's mobile operator TMN reported that monthly usage per subscriber increased by only 0.3% in 2007 to 120.6 minutes per month (an increase of about 20 seconds of calls per month).[14]

International telecommunication traffic increased between 2005 and 2007 in two-thirds of OECD countries where data are available. The Slovak Republic and France had increases in outgoing minutes of international telecommunications traffic while traffic out of Denmark declined by nearly 50% (Table 3.9).

Research and development

Research and development in the telecommunications sector is increasingly undertaken by equipment manufacturers in the place of telecommunication providers, allowing for operators to use cash flow elsewhere. For example, Portugal Telecom's investments in research and development fell by 50% between 2005 and 2007. [15]

Some operators still perform significant amounts of research and publish the figures. BT's research and development was equivalent to 6% of revenues in the 2008 fiscal year (Table 3.10). NTT also continued to invest heavily in research expending 2.9% of revenues.

Legislation in some countries still requires operators to undertake research or subsidise it by funding government research centres. In Korea, the Telecommunications Basic Law requires network service providers to contribute 0.75% of their total annual revenues to the Institute of Information Technology Assessment. In 2007 this amounted to USD 313 million (KRW 291 billion) overall.[16] SK Telecom, the largest mobile provider in Korea, invested 2% of revenues in research and development while Korea Telecom invested 1.6%.

Another way to measure the amount of telecommunication research is to look at the number of telecommunication-related patents granted in major markets. Patents are one outcome of research but do not necessarily proxy the level of overall research and development investment well. The United States and the European patent offices publish data on the number of patents awarded to certain companies or in a certain field. Typically patents are filed first in the country of research and then subsequently filed internationally in key markets. This allows researchers to effectively gather global patent information in just one jurisdiction.

The number of telecommunication patents awarded to key electronic manufacturers such as Cisco, Nokia and Samsung fell by 19% between 2005 and 2007 (Table 3.11). Telecommunication operators also had a significant number of patents themselves.

The number of patents awarded to major telecommunication firms increased by 71% between 2005 and 2007 (Table 3.12). Much of the increase in US-filed patents is attributed to two of the world's largest telecommunication firms: AT&T and NTT. Patents which list either NTT or AT&T as the assignee accounted for 71% of patents across all major telecommunication firms.

OECD countries still account for the large majority of all telecommunication patents. Data from the European Patent Office indicates that 81% of all telecommunication patents submitted were from OECD countries (Table 3.13). The United States alone accounted for 32% of submitted telecommunication patents. China was second only to the United States in the number of telecommunication-related patents submitted to the EPO. Chinese submissions accounted for 63% of all non-OECD patent applications.

Employment trends

Telecommunication firms grew between 2005 and 2007 with respect to the number of people they employ. Some of this growth is a result of mergers and acquisitions and may mask actual job reductions. The number of employees at SK Telecom grew 121% in two

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years as a result of its merger with Hanaro Telecom. Employment at AT&T also rose 60% as a result of merger activity. Cable and Wireless, KPN, American Movil and Telenor all increased headcounts by at least 30%.

Other firms reduced their headcounts by a significant proportion. OTE in Greece reduced the number of its employees by 36%. TDC, Portugal Telecom and Bell Canada all reduced numbers by at least 10%. The telecommunication firms with the largest number of employees at the end of 2007 were AT&T (309 050), NTT (258 110), Telefonica (248 487), Deutsche Telekom (243 736) and Verizon (235 000) (Table 1.1).

Notes

1. BT Annual Report & Form 20-F 2008.
2. Belgacom Annual Report 2007, *www.belgacom.com/group/gallery/content/shared/Q4_2007/2007_FY result_en.pdf*.
3. Bell Canada Enterprise Annual Report 2007, *www.bce.ca/data/documents/BCE_annual_2007_ en.pdf*.
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16. KT Annual Report 2007, Form 20-F.

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	CAGR 2005-2007	CAGR 2000-2007	CAGR 1991-2007
Australia	8 730	9 554	8 991	8 458	9 943	11 130	*13 109*	*13 463*	*12 850*	16 385	*14 656*	15 454	*15 301*	19 391	*24 396*	26 614	*28 593*	*34 848*	14.4	13.2	8.4
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	0.6	8.5	6.3
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	12 151	14 863	13.9	10.8	11.0
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	11.6	8.1	6.7
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	*5 669*	7.8	13.6	16.6
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	11.4	10.1	8.0
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	7.4	6.3	6.8
France	18 918	20 522	23 079	22 442	23 190	30 159	30 612	28 630	31 454	35 705	35 893	38 568	42 079	51 673	59 642	65 455	65 414	73 402	5.9	10.8	8.3
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	82 593	84 125	82 875	87 397	1.9	7.8	7.3
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	8 539	9 758	9 636	*10 406*	*11 562*	9.5	12.4	14.3
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	6.5	8.8	17.0
Iceland	85	89	103	103	107	133	156	151	167	191	253	216	228	319	382	464	471	578	11.7	12.5	12.4
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	3 983	5 048	5 094	5 356	6 214	10.5	15.6	10.5
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	4.3	10.4	6.4
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	134 269	0.8	-2.8	6.1
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	13.2	10.8	13.8
Luxembourg	146	153	231	225	269	301	317	305	341	363	340	372	394	473	528	567	612	676	9.2	10.3	9.7
Mexico	4 027	5 390	6 701	7 885	8 643	6 492	6 755	8 770	9 654	11 298	14 371	16 057	16 931	17 075	18 724	21 833	25 734	28 668	14.6	10.4	11.0
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*	*21 960*	7.5	11.7	9.4
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	4 155	4 744	6.6	11.4	7.5
Norway	2 336	2 204	2 442	2 456	2 612	3 132	3 437	3 609	2 466	2 603	2 625	2 814	3 358	3 997	4 466	4 767	4 836	5 324	5.7	10.6	5.7
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	12 851	14 447	12.4	15.0	17.1
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*	3.8	10.2	11.8
Slovak Republic	..	..	180	205	232	316	417	451	480	444	804	942	1 024	1 345	1 623	1 857	1 959	2 533	16.8	17.8	
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	8.9	15.0	11.8
Sweden	5 330	5 717	6 047	4 543	5 036	6 993	7 577	6 910	7 393	4 623	4 416	4 777	5 167	6 240	6 797	6 638	6 619	7 400	5.6	7.7	1.6
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	12 821	13 057	*14 034*	4.6	7.9	6.4
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	14.5	14.8	11.8
United Kingdom	25 796	26 031	26 500	24 083	25 940	28 552	*30 539*	*35 782*	35 785	40 448	45 058	46 616	49 309	56 936	65 665	65 970	69 064	77 629	8.5	8.1	7.1
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	*363 781*	*376 676*	*393 449*	4.0	3.0	6.0
OECD	..	382 457	411 850	436 232	472 490	545 497	580 423	622 791	660 427	746 362	815 188	838 179	851 059	936 794	1 013 049	1 061 560	1 095 842	1 187 477	5.8	5.5	7.3

Note: Values in italics are estimates.

StatLink http://dx.doi.org/10.1787/624216650134

Table 3.2. Telecommunication revenue as a percentage of GDP

	1985	1990	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	GDP per capita 2007 (USD)
Australia	1.92	2.81	2.99	3.15	3.36	3.94	3.66	4.05	3.60	3.55	3.70	3.60	3.64	3.69	45 322
Austria	1.68	1.75	1.82	1.81	1.94	2.37	2.32	2.66	2.57	2.66	2.61	2.53	2.35	2.11	44 617
Belgium	1.27	1.37	1.56	1.70	2.00	2.33	3.15	2.92	2.95	3.06	3.05	3.03	3.05	3.24	43 192
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	2.48	43 957
Czech Republic	..	1.69	1.91	2.54	2.96	3.51	4.08	4.14	4.34	4.38	4.05	3.92	3.79	3.26	16 946
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	2.48	2.63	56 827
Finland	1.50	1.62	1.95	2.49	2.79	3.09	3.30	3.35	3.48	3.16	3.02	2.71	2.70	2.49	46 539
France	1.65	1.55	1.94	2.01	2.14	2.45	2.71	2.89	2.88	2.88	2.91	3.03	2.90	2.83	40 772
Germany	1.60	2.91	1.87	2.02	2.25	2.39	2.72	2.86	2.89	2.95	3.03	3.00	2.86	2.63	40 347
Greece	1.33	1.55	2.38	2.42	3.15	3.03	4.00	4.29	4.48	4.43	4.25	3.90	3.90	3.70	27 979
Hungary	..	..	3.45	4.55	5.20	6.22	6.70	6.45	5.81	5.56	4.71	4.63	4.43	4.17	13 766
Iceland	1.29	1.35	1.92	2.04	2.01	2.18	2.91	2.72	2.56	2.91	2.89	2.85	2.83	2.90	64 106
Ireland	2.31	2.15	2.08	2.62	2.16	2.00	2.34	2.37	2.60	2.54	2.74	2.51	2.42	2.38	61 388
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	35 677
Japan	1.58	1.52	2.14	2.74	2.93	3.28	3.50	3.83	3.30	3.29	2.93	2.90	2.98	3.07	34 288
Korea	2.05	2.05	2.17	1.76	3.70	3.58	4.62	4.27	4.22	4.02	4.90	4.79	5.04	5.00	20 014
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	1.36	103 468
Mexico	0.52	1.53	2.27	2.00	2.09	2.14	2.26	2.35	2.38	2.44	2.47	2.59	2.72	2.81	9 730
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	2.85	2.83	47 433
New Zealand	2.46	3.33	3.44	3.34	3.69	3.75	4.22	4.04	4.06	3.65	3.62	3.78	3.87	3.63	31 519
Norway	1.91	2.02	2.14	2.28	1.63	1.64	1.56	1.65	1.75	1.78	1.73	1.58	1.44	1.37	82 572
Poland	..	0.88	1.69	1.65	2.10	2.74	3.17	3.45	3.48	3.53	3.80	3.77	3.76	3.43	11 061
Portugal	2.66	1.93	2.83	3.52	3.56	3.89	4.50	5.19	5.05	5.04	5.08	4.95	4.75	4.45	21 064
Slovak Republic	..	..	1.72	2.09	2.14	2.16	3.93	4.46	4.17	4.04	3.84	3.88	3.51	3.38	13 920
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	4.21	32 072
Sweden	1.78	2.24	2.91	2.74	2.92	1.80	1.80	2.12	2.08	2.01	1.90	1.81	1.68	1.63	49 545
Switzerland	2.15	2.14	2.62	2.57	2.82	3.25	3.30	3.43	3.42	3.51	3.55	3.46	3.35	3.29	56 836
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	2.47	9 027
United Kingdom	2.36	2.59	2.50	2.68	2.48	2.75	3.10	3.21	3.13	3.05	3.01	2.90	2.82	2.77	46 100
United States	2.67	2.54	2.71	2.98	2.99	3.13	3.28	3.31	3.26	3.12	2.98	2.94	2.87	2.86	45 489
OECD	2.13	2.16	2.28	2.60	2.74	2.94	3.16	3.28	3.18	3.12	3.04	3.01	2.95	2.92	34 380

Note: Calculations make use of estimates in Table 3.1.

StatLink http://dx.doi.org/10.1787/624282213083

Table 3.3. Telecommunication revenue ratios

USD

	2000		2001		2002		2003		2004		2005		2006		2007	
	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	787.9	760.6	709.5	791.4	642.2	774.6	748.4	970.1	857.3	1 205.8	846.4	1 296.6	854.2	1 373.6	971.9	1 650.8
Austria	459.4	552.1	497.3	627.1	511.4	656.4	612.9	820.6	629.1	918.5	615.5	939.0	558.2	912.5	550.9	941.6
Belgium	707.8	709.3	541.4	656.3	561.5	722.0	674.8	911.6	732.9	1 048.3	731.4	1 093.5	754.3	1 152.5	876.3	1 399.3
Canada	692.8	670.5	628.8	673.0	603.3	674.5	615.8	721.5	652.5	804.6	677.9	882.5	707.2	977.6	746.5	1 077.9
Czech Republic	280.6	225.5	240.7	250.2	272.1	320.5	304.8	392.1	312.4	434.9	315.3	477.0	343.4	525.5	330.2	550.6
Denmark	628.4	781.7	575.9	792.6	545.8	815.4	648.0	1 025.3	695.3	1 176.4	693.0	1 213.1	665.6	1 248.2	767.9	1 494.9
Finland	587.5	773.6	571.7	807.4	610.4	909.1	641.6	991.5	686.1	1 084.7	600.8	1 012.8	614.8	1 070.6	644.9	1 159.4
France	603.6	590.8	576.8	630.4	607.5	682.9	698.0	832.9	749.5	955.1	765.3	1 042.0	720.0	1 035.1	753.8	1 154.6
Germany	585.2	627.3	552.7	656.0	573.0	709.1	660.0	870.1	686.5	1 001.1	652.5	1 020.1	596.9	1 006.2	567.7	1 062.4
Greece	435.2	466.1	406.6	511.7	441.4	606.0	533.7	774.6	583.6	882.1	530.9	867.8	526.2	933.4	509.9	1 034.9
Hungary	481.1	314.4	407.2	337.6	377.1	380.8	411.0	462.6	391.4	475.9	393.5	505.5	347.8	497.3	368.1	574.7
Iceland	668.3	899.5	533.4	756.1	514.9	793.9	672.5	1 103.6	773.8	1 304.8	870.6	1 567.9	844.8	1 548.5	1 007.5	1 857.2
Ireland	614.9	591.9	558.6	642.1	661.8	814.3	770.4	998.0	894.8	1 243.6	816.0	1 227.8	765.1	1 259.3	831.3	1 429.3
Italy	365.9	430.0	354.3	474.9	381.7	527.5	428.8	633.9	460.8	734.3	440.6	770.0	401.3	759.6	405.1	827.2
Japan	1 261.7	1 287.1	1 126.4	1 233.2	858.4	1 015.0	850.7	1 090.1	770.0	1 054.6	743.0	1 033.4	708.5	1 016.5	716.8	1 051.0
Korea	439.4	502.7	332.9	434.1	343.2	484.4	367.3	510.5	474.4	694.4	536.2	787.2	588.0	926.9	605.8	1 001.6
Luxembourg	616.8	775.5	543.0	843.1	540.5	883.8	590.9	1 047.5	564.1	1 151.6	549.7	1 218.7	578.2	1 295.5	632.9	1 406.7
Mexico	543.1	146.3	450.5	161.3	411.5	168.0	364.4	167.6	325.3	182.0	316.7	210.3	321.6	245.7	309.6	271.2
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	687.3	1 175.1	767.4	1 340.9
New Zealand	563.7	576.3	501.7	544.8	559.3	625.3	651.0	739.4	705.9	880.4	725.2	1 018.8	675.9	1 003.0	692.5	1 134.5
Norway	464.1	584.5	469.4	623.6	534.3	739.9	601.2	875.6	606.6	972.7	619.6	1 031.4	610.0	1 037.6	652.4	1 131.4
Poland	306.7	141.9	296.9	172.1	266.8	180.6	259.1	200.3	268.9	251.2	279.2	299.9	257.2	337.0	267.0	379.0
Portugal	482.7	493.7	507.6	582.4	490.8	622.3	555.5	751.2	603.3	859.9	572.3	873.8	542.0	871.4	548.3	937.1
Slovak Republic	268.8	148.9	254.2	175.0	236.0	190.3	269.9	250.1	290.8	301.6	316.3	344.7	308.8	363.3	331.9	469.5
Spain	544.7	564.7	504.5	589.2	600.6	761.5	678.5	924.0	762.2	1 071.3	760.6	1 177.2	732.2	1 199.3	789.5	1 349.7
Sweden	353.3	497.8	351.4	537.0	354.2	578.9	399.0	696.6	426.9	755.8	408.0	735.2	388.7	728.9	413.3	809.0
Switzerland	936.0	1 150.7	916.9	1 213.9	929.4	1 311.5	1 034.5	1 554.2	1 117.3	1 753.0	1 028.0	1 729.0	988.3	1 750.5	978.0	1 869.0
Turkey	184.3	91.4	157.1	85.5	158.4	96.4	222.1	147.4	210.6	159.4	193.1	171.9	161.9	164.8	192.2	221.2
United Kingdom	669.8	765.2	605.0	788.6	600.3	831.2	654.6	956.0	679.0	1 097.5	626.1	1 095.5	613.4	1 139.9	653.9	1 277.2
United States	1 070.1	1 134.9	1 041.2	1 169.9	972.1	1 178.6	939.8	1 171.4	879.5	1 179.1	847.0	1 227.4	813.3	1 258.9	811.7	1 302.4
OECD	768.4	721.5	709.0	736.4	666.3	742.3	689.0	811.2	681.2	871.3	660.7	907.5	631.8	930.7	641.0	1 002.3

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.

StatLink http://dx.doi.org/10.1787/624300631088

Table 3.4. Mobile telecommunication revenue

USD millions

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	% of total revenue										
												1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	2 510	3 564	3 861	3 686	3 488	2 947	5 054	11 369	11 672	*12 540*	*15 283*	18.6	27.7	23.6	25.2	22.6	19.3	26.1	46.6	43.9	43.9	43.9
Austria	763	1 358	1 736	2 126	2 438	2 759	3 574	4 396	4 678	4 648	4 878	20.5	33.0	34.8	48.1	48.3	52.0	53.7	58.5	60.5	61.5	62.3
Belgium	659	1 167	1 600	1 581	2 613	3 063	4 014	4 900	5 155	5 422	5 737	15.6	22.9	27.1	21.8	38.7	41.1	42.4	44.9	45.0	44.6	38.6
Canada	2 092	2 957	2 955	3 604	3 852	4 593	5 759	7 292	9 105	11 236	13 527	12.2	15.4	15.3	17.5	18.5	21.7	25.2	28.3	31.9	35.2	38.1
Czech Republic	368	597	850	1 162	1 414	1 651	2 208	974	1 315	1 499	*1 624*	25.3	32.6	40.3	50.2	55.3	50.5	55.2	21.9	26.9	27.8	28.6
Denmark	762	829	897	983	1 037	1 276	1 768	2 133	2 418	2 652	3 215	21.9	22.1	20.3	23.6	24.4	29.1	32.0	33.6	36.8	39.1	39.4
Finland	5 299	1 295	1 588	1 666	1 796	2 137	2 528	2 948	2 672	2 825	3 078	172.0	35.6	39.3	41.6	42.9	45.2	48.9	52.0	50.3	50.1	50.2
France	4 708	4 385	6 393	7 146	8 954	11 121	14 880	18 356	20 254	21 066	24 408	16.4	13.9	17.9	19.9	23.2	26.4	28.8	30.8	30.9	32.2	33.3
Germany	10 092	10 556	13 936	15 963	17 143	18 774	23 708	28 148	28 750	28 875	30 274	23.2	21.5	27.2	31.0	31.7	32.1	33.0	34.1	34.2	34.8	34.6
Greece	787	1 127	1 564	1 819	2 096	2 925	4 045	5 062	4 949	*5 663*	*6 293*	23.9	26.3	36.9	35.7	37.4	43.9	47.4	51.9	51.4	54.4	54.4
Hungary	768	712	764	1 043	1 312	1 574	2 016	2 249	2 582	2 731	3 375	35.9	28.3	24.9	32.5	38.1	40.7	43.0	46.8	50.6	54.5	58.4
Iceland	27	36	46	111	104	96	112	159	199	220	254	17.9	21.4	24.2	43.8	48.2	42.2	35.2	41.8	42.9	46.8	43.8
Ireland	291	385	777	1 045	1 252	1 110	1 569	2 230	2 282	2 407	2 788	13.7	20.2	40.3	46.5	50.5	34.7	39.4	44.2	44.8	44.9	44.9
Italy	6 630	7 706	8 785	9 404	12 411	14 386	17 865	22 469	24 500	22 606	25 510	27.8	29.2	33.0	38.4	45.9	47.7	48.9	52.6	54.3	50.5	52.0
Japan	43 619	45 697	60 028	74 948	75 383	74 706	74 706	78 942	82 983	87 140	95 804	37.4	40.4	41.9	45.9	48.1	57.8	53.7	58.6	62.8	67.1	71.4
Korea	3 489	3 798	7 758	10 735	10 617	12 172	13 182	15 039	17 634	19 574	21 776	38.3	29.7	48.7	45.4	51.6	52.8	53.9	45.1	46.5	43.7	44.9
Luxembourg	23	26	81	82	112	123	193	242	284	310	344	7.4	7.6	22.2	24.1	30.0	31.2	40.9	45.9	50.2	50.6	50.9
Mexico	659	1 025	1 772	3 511	4 983	6 226	6 978	8 660	10 958	13 661	16 366	7.5	10.6	15.7	24.4	31.0	36.8	40.9	46.2	50.2	53.1	57.1
Netherlands	1 423	2 164	2 580	3 412	4 129	4 434	6 067	5 108	5 136	*5 128*	*5 790*	18.0	22.8	24.1	33.6	35.6	34.1	36.5	27.4	27.0	26.7	26.4
New Zealand	207	315	481	625	612	660	828	1 121	1 380	1 251	1 452	9.2	15.4	22.2	28.1	28.9	26.8	27.9	31.3	33.0	30.1	30.6
Norway	830	622	760	898	997	1 319	1 588	1 850	2 091	2 238	2 534	23.0	25.2	29.2	34.2	35.4	39.3	39.7	41.4	43.9	46.3	47.6
Poland	368	668	1 416	1 931	2 621	2 941	3 617	4 704	5 282	6 092	6 071	14.2	18.5	30.8	35.6	39.8	42.6	47.3	49.1	46.2	47.4	42.0
Portugal	984	1 155	1 541	1 721	1 791	2 015	2 618	3 224	3 358	3 432	3 994	24.9	27.4	32.6	34.1	29.9	31.2	33.4	35.7	36.4	37.2	40.2
Slovak Republic	24	25	13	276	354	415	718	951	1 118	1 272	1 635	5.3	5.3	2.8	34.3	37.6	40.6	53.4	58.6	60.2	64.9	64.5
Spain	3 183	4 327	3 638	4 490	5 639	7 025	9 848	12 712	14 977	16 564	20 233	17.7	22.0	16.3	19.7	23.5	22.3	25.4	27.8	29.3	31.3	33.4
Sweden	1 104	1 346	1 515	1 538	1 560	1 707	2 047	2 199	2 242	2 278	2 757	16.0	18.2	32.8	34.8	32.7	33.0	32.8	32.4	33.8	34.4	37.3
Switzerland	946	1 237	1 670	1 868	2 298	2 703	3 313	3 820	3 854	3 792	4 036	13.9	16.1	19.1	22.7	26.3	28.4	29.1	29.6	30.1	29.0	28.8
Turkey	575	336	669	854	756	2 512	3 658	4 750	6 436	6 758	9 841	14.3	6.7	12.3	13.9	12.9	37.4	35.1	41.5	51.9	56.2	60.5
United Kingdom	5 093	6 067	7 863	9 800	11 478	13 465	17 240	21 766	23 727	25 615	30 243	14.2	17.0	19.4	21.7	24.6	27.3	30.3	33.1	36.0	37.1	39.0
United States	32 950	36 775	48 495	62 000	74 687	81 521	89 718	98 568	107 861	*107 076*	*123 841*	13.4	14.1	16.8	19.3	22.4	24.0	26.3	28.5	29.6	28.4	31.5
OECD	131 233	142 257	188 539	229 455	257 928	282 356	325 419	376 341	409 852	438 729	492 747	21.1	21.5	25.3	28.1	30.8	33.2	34.7	37.1	38.6	40.0	41.5

Note: Figures in italics are estimates.

StatLink http://dx.doi.org/10.1787/624335577554

Table 3.5. Cellular mobile telecommunication revenue per cellular mobile subscriber

USD

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Monthly 2007
Australia	881	792	533	548	667	609	460	314	233	353	690	634	635	719	60
Austria	..	..	..	655	590	404	347	373	410	504	550	559	502	495	41
Belgium	1 932	1 787	..	676	664	502	281	340	378	466	537	537	561	561	47
Canada	703	642	610	499	553	428	413	362	383	433	485	535	599	667	56
Czech Republic	2 965	2 452	755	705	618	437	267	204	192	227	90	112	126	124	10
Denmark	462	380	581	528	429	341	292	262	285	371	413	444	455	509	42
Finland	2 995	2 952	2 765	2 533	455	485	447	430	473	533	590	496	498	506	42
France	875	1 487	1 329	818	391	310	241	242	288	357	412	421	408	441	37
Germany	1 129	1 829	1 571	1 234	759	594	331	305	318	366	379	363	337	312	26
Greece	215	1 075	915	839	548	402	307	263	314	392	458	398	408	388	32
Hungary	1 021	1 073	1 284	1 088	687	477	339	264	229	254	258	277	274	306	25
Iceland	428	426	434	413	337	267	515	441	369	402	549	654	683	774	64
Ireland	..	..	698	569	407	486	518	452	355	459	589	542	513	561	47
Italy	886	726	724	564	380	292	222	243	271	315	356	341	281	284	24
Japan	3 132	2 160	1 388	1 140	966	1 056	1 122	1 008	921	862	863	860	857	893	74
Korea	1 232	1 351	1 338	506	272	331	400	366	376	392	411	460	487	501	42
Luxembourg	960	571	465	335	199	387	271	258	260	359	375	395	434	502	42
Mexico	1 570	653	501	378	306	229	249	229	240	232	225	233	240	240	20
Netherlands	1 543	1 601	732	843	647	380	310	359	376	463	321	315	301	314	26
New Zealand	412	488	0	292	251	312	286	253	260	319	370	391	329	342	29
Norway	488	488	572	495	300	285	277	277	348	391	409	440	447	488	41
Poland	..	..	0	453	347	363	286	244	212	208	204	181	166	147	12
Portugal	1 176	1 166	1 023	653	376	330	258	225	219	262	305	293	281	297	25
Slovak Republic	..	290	0	120	55	19	213	165	142	195	223	246	260	269	22
Spain	842	660	767	735	614	244	188	190	210	265	329	351	362	418	35
Sweden	407	422	444	348	328	296	248	222	219	236	254	250	240	269	22
Switzerland	1 007	1 210	1 134	906	728	546	403	436	471	535	609	564	510	492	41
Turkey	353	126	345	357	96	86	57	41	108	131	137	148	128	159	13
United Kingdom	0	465	571	602	467	328	277	257	272	327	365	362	367	411	34
United States	630	593	532	596	531	564	566	605	552	565	534	506	443	471	39
OECD	917	978	882	770	579	525	454	427	416	439	450	439	424	434	36

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

StatLink http://dx.doi.org/10.1787/624335727458

Table 3.6. Domestic telephone traffic per fixed telephone access path

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007 (monthly)
Australia	..	..	..	..	..	..	..	..	..	..	..	..	..
Austria	..	..	..	..	2 892	2 787	2 723	2 707	2 580	2 368	..	..	..
Belgium	..	..	..	4 514	5 396	5 517	4 759	4 279	3 833	3 480	3 299	3 161	263
Canada	..	1 118	1 311	1 718	1 429	1 395	1 372	1 252	..	..	..	..	..
Czech Republic	..	..	..	..	2 727	3 265	3 798	4 682	4 337	4 049	5 766	..	..
Denmark	..	..	..	..	..	..	..	..	..	7 001	3 428	3 763	314
Finland	1 297	1 314	1 319	1 286	5 883	5 919	4 948	..	..		2 638	2 186	182
France	..	..	3 598	3 608	3 542	3 440	3 249	3 123	3 023	3 105	3 234	3 198	267
Germany	..	..	..	..	..	..	..	..	..	..	..	..	..
Greece	..	..	..	..	..	3 577	3 435	3 355	3 350	3 332	3 270	3 150	262
Hungary	..	..	2 718	2 943	3 243	3 444	3 679	3 346	3 254	3 216	2 085	1 950	163
Iceland	..	..	..	..	11 073	9 899	..	7 955	6 131	4 485	3 913	3 496	291
Ireland	..	..	..	..	..	..	3 931	3 877	3 455	3 447	3 322	3 038	253
Italy	..	..	3 820	4 241	5 062	5 837	7 009	6 406	3 362	3 379	3 610	3 837	320
Japan	..	3 720	3 921	4 398	4 987	4 466	3 604	2 999	2 449	2 170	2 026	1 916	160
Korea	..	..	..	6	6	2 980	2 750	3 051	2 753	2 702	2 335	2 119	177
Luxembourg	..	..	..	..	..	..	..	..	..	5 094	4 105	3 294	275
Mexico	891	988	1 180	7 387	7 868	8 699	9 766	9 994	9 532	9 199	9 197	8 893	741
Netherlands	..	..	..	..	..	..	..	..	..	..	908	1 066	89
New Zealand	..	..	..	..	..	..	..	3 208	3 085	2 794	3 032	2 711	226
Norway	..	..	6 284	7 882	9 443	10 182	9 466	9 079	9 242	10 042	11 500	12 162	1 013
Poland	..	..	..	..	..	..	2 195	1 813	2 172	2 340	2 124	1 996	166
Portugal	..	..	..	..	2 378	2 210	2 084	1 993	1 958	1 882	1 891	1 963	164
Slovak Republic	..	..	..	..	..	2	673	1 405	1 270	1 289	1 254	1 276	106
Spain	..	..	..	..	6 600	9 081	6 589	5 710	4 983	4 042	3 458	3 233	269
Sweden	..	..	..	..	9 523	9 915	9 283	9 074	9 021	8 910	8 655	8 929	744
Switzerland	..	..	3 991	4 454	4 190	4 204	4 204	3 645	3 545	3 463	3 411	3 301	275
Turkey	..	..	..	..	..	..	..	..	4 011	3 374	2 116	1 529	127
United Kingdom	4 191	4 415	4 348	4 327	4 190	4 033	3 999	3 887	3 799	3 644	3 540	3 271	273
United States	24 551	25 865	27 367	22 190	23 822	22 538	..	..	..	..	..	..	..

StatLink http://dx.doi.org/10.1787/624367742768

Table 3.7. Total outgoing mobile minutes

In millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	..	..	..	..	..	..	..	..	..	..	..	..
Austria	..	..	..	3 674	5 760	7 055	7 902	9 130	10 408	11 590	13 728	16 977
Belgium	..	..	..	..	..	..	6 961	7 686	8 308	9 371	11 373	12 951
Canada	..	..	10 924	12 611	18 270	21 705	29 820	41 166	49 243	64 253	..	..
Czech Republic	..	..			1 316	2 442	2 853	3 456	3 691	4 010	9 598	..
Denmark	979	1 301	1 621	2 117	2 600	3 023	3 501	4 165	5 149	6 485	7 569	8 718
Finland	919	1 832	3 198	4 514	5 294	6 520	7 276	8 161	9 643	10 848	12 493	13 546
France	..	..	9 968	20 571	35 437	44 419	51 844	63 469	74 248	81 711	94 026	99 633
Germany	..	..	..	17 401	25 004	31 288	33 970	37 089	41 019	..	..	..
Greece	..	..	..	..	..	..	4 738	6 826	9 053	11 309	13 997	16 854
Hungary	..	..	..	1 664	2 766	4 055	5 028	6 114	7 453	9 454	11 582	13 610
Iceland	..	..	..	..	187	220	..	360	410	476	472	547
Ireland	..	..	..	..	..	..	..	4 188	4 552	5 500	7 096	8 770
Italy	..	..	..	..	34 216	42 355	46 253	51 110	61 838	71 027	80 355	93 358
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
Korea	..	..	..	..	..	37 350	45 236	50 913	60 040	64 610	69 020	74 780
Luxembourg	..	..	..	..	..	..	..	383	444	488	535	570
Mexico	1 241	1 480	2 762	5 151	10 973	15 919	19 991	26 386	38 460	51 506	65 963	98 016
Netherlands	..	..	..	..	..	9 700	..	..	..	..	..	..
New Zealand	..	..	..	..	..	..	..	1 700	1 900	2 200	2 700	2 920
Norway	..	..	2 235	2 623	2 993	3 595	4 164	4 736	5 637	6 750	7 897	9 284
Poland	..	..	..	..	..	11 900	8 659	12 577		16 352	26 238	34 692
Portugal	..	..	..	..	6 187	8 691	9 346	10 004	10 649	11 608	12 452	13 646
Slovak Republic	70	226	483	662	626	526	919	942	1 119	1 147	1 252	1 471
Spain	..	..	..		15 041	20 210	24 816	30 942	37 120	48 267	57 857	67 981
Sweden	..	..	..	3 988	5 021	5 529	6 283	6 739	7 619	9 924	12 642	15 631
Switzerland	..	..	..	786	1 513	1 839	2 084	2 300	2 503	2 866	3 544	4 604
Turkey	..	..	..	..	..	5 859	6 255	11 715	20 319	35 508	48 118	57 664
United Kingdom	6 306	8 782	12 903	22 154	35 384	44 633	52 179	60 589	64 893	71 578	82 355	99 588
United States[1]	28 654	47 767	94 280	166 021	295 792	426 733	485 279	575 845	645 219	721 818	770 881	888 931

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

StatLink http://dx.doi.org/10.1787/624370403553

Table 3.8. **Cellular mobile traffic per mobile subscriber per year**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007 (monthly)
Australia	..	..	..	..	..	..	..	..	..	..	..	..	
Austria	..	..	..	855	942	1 079	1 173	1 287	1 302	1 385	1 483	1 723	144
Belgium	..	..	..	..	..	..	859	893	910	976	1 177	1 266	105
Canada	..	..	2 043	1 825	2 094	2 038	2 486	3 097	3 278	3 776	..	..	
Czech Republic	..	..	..	..	303	352	331	356	342	341	808	..	
Denmark	743	901	840	805	772	763	782	874	997	1 190	1 299	1 381	115
Finland	622	876	1 124	1 379	1 420	1 561	1 611	1 719	1 929	2 015	2 203	2 228	186
France	..	..	889	998	1 194	1 201	1 343	1 522	1 667	1 699	1 820	1 800	150
Germany	..	..	..	..	..	..	..	..	..	..	..	..	
Greece	..	..	..	..	..	..	509	661	819	908	1 007	1 039	87
Hungary	..	..	..	1 040	899	816	730	770	854	1 014	1 162	1 234	103
Iceland	..	..	..	..	871	933		1 289	1 414	1 564	1 461	1 671	139
Ireland	..	..	..	..				1 224	1 203	1 305	1 513	1 764	147
Italy	..	..	..	..	809	829	871	901	979	989	999	1 040	87
Japan	711	893	1 061	1 198	1 306	1 308	1 297	1 304	1 197	1 171	1 160	1 147	96
Korea	..	..	..	..	..	1 286	1 399	1 516	1 641	1 685	1 717	1 719	143
Luxembourg	..	..	..	..	..	..	..	711	687	678	749	833	69
Mexico	1 215	850	824	666	779	732	771	877	1 000	1 093	1 157	1 436	120
Netherlands	..	..	..	..	..	843	..	..	..	..	..	..	
New Zealand	..	..	..	..	..	..	..	654	628	623	710	688	57
Norway	..	..	1 079	985	922	1 000	1 099	1 166	1 246	1 420	1 577	1 788	149
Poland	..	..	..	..	..	1 107	623	723		561	714	838	70
Portugal	..	..	..	..	928	1 089	1 016	1 000	1 007	1 014	1 018	1 014	85
Slovak Republic	2 428	1 131	1 038	998	484	245	314	256	262	253	256	242	20
Spain	..	..	..	..	628	681	740	831	961	1 131	1 266	1 404	117
Sweden	..	..	..	778	811	786	804	777	880	1 105	1 332	1 523	127
Switzerland	..	..	..	257	326	349	363	372	399	419	477	561	47
Turkey	..	..	..	..	..	318	268	420	585	814	914	930	78
United Kingdom	925	1 038	992	925	1 000	1 000	1 053	1 148	1 087	1 093	1 180	1 354	113
United States	..	..	..	..	..	..	2 727	3 371	3 368	3 967	4 127	5 316	443

StatLink http://dx.doi.org/10.1787/624443640662

Table 3.9. International telecommunication traffic

	Outgoing MiTT per capita										Outgoing MiTT per access path (fixed + mobile)									
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	89.8	111.1	..	..	..	..	..	..	..	..	107.9	121.0	..	..	..	..	..	..	..	..
Austria	139.5	147.4	158.8	129.8	135.8	148.7	144.5	149.4	..	..	235.2	204.7	139.0	110.6	115.7	123.4	111.5	112.5	..	..
Belgium	..	..	94.9	125.8	133.8	150.2	165.9	169.5	151.7	143.7	..	..	100.6	111.7	115.6	125.5	134.3	133.1	119.9	110.2
Canada	159.3	191.8	171.3	185.6	202.1	..	..	..	..	..	209.5	234.2	186.9	189.8	203.5	..	..	..	..	..
Czech Republic	33.0	44.2	42.3	47.1	52.3	50.0	50.6	50.5	59.4	..	89.4	96.6	52.9	45.7	45.0	39.8	37.8	35.7	42.7	..
Denmark	109.8	123.2	164.0	162.2	147.2	149.5	154.4	156.2	156.1	155.2	126.3	127.7	141.3	129.2	110.5	109.0	108.0	106.8	104.0	100.7
Finland	79.8	83.5	90.4	104.2	90.3	..	..	..	..	..	82.0	74.3	71.1	77.5	64.8	..	..	..	..	..
France	66.6	72.7	73.3	75.3	78.0	79.1	68.6	65.5	77.7	101.9	105.5	103.8	75.1	69.6	71.2	69.7	58.6	54.1	62.8	79.2
Germany[1]	71.6	96.3	..	..	..	..	..	..	..	..	120.2	145.4	..	..	..	..	..	..	..	..
Greece	63.2	67.1	..	65.6	73.7	105.0	120.8	125.9	137.8	152.6	107.5	96.1	..	52.9	55.0	74.5	82.8	80.4	82.2	81.1
Hungary	28.9	31.9	32.3	30.5	29.4	30.0	35.9	39.2	42.4	45.2	76.8	72.1	50.2	37.7	29.9	27.6	31.0	32.6	32.4	32.4
Iceland	166.1	181.7	151.4	147.6	..	147.1	112.5	106.5	162.2	139.2	205.7	190.1	118.5	112.0	..	102.5	77.7	71.9	108.6	93.8
Ireland	238.5	270.6	..	..	289.6	258.8	282.4	272.5	300.6	300.7	440.1	401.1	..	..	240.8	205.3	213.3	194.3	202.3	193.6
Italy	40.2	44.7	49.0	53.9	64.5	64.0	101.1	103.0	122.0	140.5	61.7	56.0	43.0	41.9	49.1	46.2	68.7	64.5	71.2	76.4
Japan	14.4	14.1	17.2	20.3	20.5	20.9	26.8	30.1	30.9	..	18.0	16.2	18.3	20.5	19.7	19.3	23.9	26.1	26.4	..
Korea	19.5	20.6	13.7	40.4	41.3	41.9	49.5	51.4	63.2	74.2	32.5	27.6	13.1	36.9	35.3	37.2	41.9	42.4	49.1	55.0
Luxembourg	688.9	737.8	867.8	893.7	..	823.7	811.1	771.7	742.7	707.9	897.5	892.3	746.8	632.5	..	523.8	457.6	406.1	398.9	397.7
Mexico	13.7	16.1	19.2	20.5	19.8	20.8	22.3	21.4	24.0	26.7	119.7	117.7	71.4	57.4	48.8	45.7	40.6	33.4	32.7	31.8
Netherlands	114.9	136.0	..	..	..	..	..	..	21.0	19.1	166.9	193.4	..	..	..	..	..	..	15.9	14.3
New Zealand	124.0	148.8	162.7	156.7	..	140.1	150.0	151.0	204.0	208.8	192.0	189.2	159.6	145.5	..	126.4	125.1	115.1	149.6	142.1
Norway	104.2	127.1	120.7	126.7	126.0	121.8	114.8	123.8	..	..	111.3	124.7	110.0	111.3	108.4	101.5	89.3	94.5	..	..
Poland	15.6	16.1	17.7	11.2	11.7	9.5	11.7	11.1	10.5	11.0	72.4	59.9	38.5	19.5	17.6	12.7	13.0	10.8	8.5	8.3
Portugal	46.4	40.3	50.0	53.5	52.2	51.0	48.4	56.1	51.9	53.4	87.5	58.8	49.9	48.0	42.9	39.9	36.6	40.3	35.9	34.6
Slovak Republic	28.6	30.1	30.0	32.1	31.1	39.9	36.9	31.2	46.3	54.3	97.0	81.0	54.4	47.0	39.1	43.6	36.4	29.6	41.5	40.8
Spain	34.4	41.4	54.5	65.9	67.1	77.5	86.4	108.4	120.2	122.1	66.9	70.3	53.5	57.0	54.2	59.2	65.2	75.7	82.2	81.0
Sweden	143.0	171.1	123.0	152.8	152.8	153.4	156.2	156.1	158.5	197.2	136.9	148.7	91.1	107.1	101.8	97.0	99.9	99.1	99.4	120.2
Switzerland	285.2	336.8	393.1	421.2	440.6	403.1	431.9	385.8	373.2	403.8	381.7	407.6	351.1	356.3	359.2	317.7	342.5	293.2	269.4	273.4
Turkey	10.1	11.7	10.8	9.8	9.3	9.0	10.0	10.0	9.4	8.7	37.1	36.7	21.9	18.1	15.4	13.7	13.3	11.5	9.6	7.9
United Kingdom	93.6	110.9	114.7	119.0	105.8	105.1	103.8	95.4	94.3	100.5	142.9	146.4	101.9	93.0	78.8	75.7	69.5	60.6	57.9	59.7
United States	87.8	102.1	106.6	116.6	124.9	164.9	216.4	236.4	242.1	..	124.9	135.1	103.3	108.5	109.5	143.9	179.5	184.5	180.7	..

Note : MiTTs is minutes of international telecommunications traffic. 1. For Germany the MiTT (without local traffic) are not available.

Source: OECD, ITU.

StatLink http://dx.doi.org/10.1787/624453416744

Table 3.10. R&D expenditures for PTOs

USD millions

PTO	1997		1999		2001		2003		2005		2007	
	R&D expenditure	R&D as a % of total revenue	R&D expenditure	R&D as a % of total revenue	R&D expenditure	R&D as a % of total revenue	R&D expenditure	R&D as a % of total revenue	R&D expenditure	R&D as a % of total revenue	R&D expenditure	R&D as a % of total revenue
NTT	2 388.4	3.1	3 140.0	3.4	3 216.0	3.3	3 061.0	3.2	2 886.0	2.9	2 619.5	2.9
BT	502.5	2.0	556.5	1.6	525.0	1.7	548.0	1.8	1 321.8	3.7	2 504.0	6.0
France Telecom	917.6	3.5	632.0	2.2	506.0	1.3	507.0	1.0	750.7	1.5	1 232.9	1.7
Telefonica[1]	153.0	0.8	96.0	0.4	153.0	0.6	494.0	1.6	666.3	1.4	813.7	1.1
Vodafone	55.0	1.4	74.0	0.6	104.0	0.3	280.0	0.51	374.5	0.5	468.0	0.7
Korea Telecom	113.4	2.2	258.3	2.6	293.0	2.4	195.0	2.0	251.3	2.2	313.2	1.6
Deutsche Telekom	692.0	1.8	697.1	2.0	804.0	1.9	1 011.0	1.6	250.0	0.3	274.0	0.3
TeliaSonera	201.7	3.3	190.1	3.0	126.0	2.3	..	..	384.9	3.3	256.2	1.8
SK Telecom	41.3	1.7	89.0	2.4	119.0	1.8	232.0	2.9	74.0	0.8	235.3	2.0
Telecom Italia	..	..	352.1	1.2	123.0	0.4	166.0	0.5	121.3	0.3	167.1	0.4
KDDI	..	..	..	..	..	..	115.0	0.5	139.1	0.5	166.2	0.5
Telenor	112.7	3.1	67.7	1.6	102.0	2.0	65.0	0.9	62.3	0.6	99.8	0.6
Telekom Austria	..	..	20.0	0.6	19.0	0.5	48.0	1.08	53.8	1.0	64.8	1.0
KPN Telecom	60.0	0.8	59.4	0.6	41.0	0.4	26.0	0.2	25.0	0.2	21.9	0.1
Telstra	43.0	0.3	18.7	0.1	..	..	17.0	0.12	17.6	0.1	7.5	0.0
Telecom New Zealand	3.6	0.2	5.0	0.1	3.4	0.1	5.8	0.2	6.3	0.2	6.6	0.2
Portugal Telecom	..	..	..	..	..	..	30.0	0.5	..	..	6.6	0.1
Sprint	..	..	..	..	..	..	..	..	47.0	0.1	..	..
Swisscom	..	..	..	..	..	..	..	..	31.2	0.4	..	..
Elisa	..	..	16.3	1.4	32.0	2.5	27.0	1.6	10.0	1.1	..	..
Hanaro Telecom	..	..	5.5	28.4	10.0	1.6	8.0	0.7	4.3	0.3	..	..
AT&T	829.0	1.6	550.0	0.9	325.0	0.6	277.0	0.8	..	..	..	..
Dacom	2.9	0.6	6.2	1.0	4.0	0.5	..	..	..	..	..	..
Qwest	..	..	36.3	0.9	..	..	..	..	..	..	..	..
OTE	..	..	11.0	0.3	..	..	3.0	0.1	..	..	..	..
Belgacom	18.5	0.4	7.2	0.1	..	..	..	..	..	..	..	..
TPSA	..	..	..	..	..	..	15.0	0.3	..	..	..	..
MMO2	..	..	..	..	..	..	16.0	0.2	..	..	..	..
Cable & Wireless	168.6	1.2	17.7	0.1	..	..	..	..	..	..	..	..
Total/average of above	6 134.5	1.7	6 888.5	2.5	6 505.4	1.3	7 130.8	1.0	7 477.4	1.1	9 257.2	1.2

1. Telefonica used a different methodology to calculate R&D prior to 2001.

StatLink http://dx.doi.org/10.1787/624482061042

Table 3.11. US Patent Office: Telecom patents aquired by selected equipment manufacturers

Manufacturer	2000	2001	2002	2003	2004	2005	2006	2007	Oct. 2008
Cisco	11	9	17	34	46	53	66	54	33
Nokia	36	39	51	51	68	41	58	36	33
Samsung Electronics	34	26	31	19	21	29	26	28	29
Lucent	106	84	68	60	67	35	58	23	26
Fujitsu	25	32	24	26	37	21	21	17	22
Siemens	48	36	52	51	65	47	67	40	22
NEC	36	39	38	38	42	31	43	33	16
Nortel	69	64	45	53	74	36	34	28	12
Ericsson	80	73	63	62	49	34	44	15	11
Motorola	52	18	38	19	21	15	30	22	8
Alcatel	44	50	35	39	38	25	31	12	8
LG Electronics	1	0	0	4	11	17	21	11	7
Matsushita	14	22	26	23	25	25	22	21	5
Qualcom	7	8	14	8	8	9	9	2	2
3Com	11	18	18	19	30	8	5	3	2
Corning	0	0	1	3	2	2	2	1	0
Apple	.. ..	..	..		2	1	3	2	0
Total	574	518	521	509	606	429	540	348	236
Average	35.9	32.4	32.6	31.8	35.6	25.2	31.8	20.5	13.9

Note: Number of patents filed with the USPTO in the classification: 379 (telephonic communications), with the manufacturer as the primary assignee.

Source: USPTO, *http://patft.uspto.gov* and *www.uspto.gov.*

StatLink http://dx.doi.org/10.1787/624504646812

Table 3.12. **US Patent Office: number of patents granted to selected telecommunication operators**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total (1995-2007)
AT&T[1]	..	..	46	150	278	294	239	230	179	172	151	264	273	2 276
BT	55	48	35	70	77	70	94	56	48	30	31	40	56	710
NTT (including mobile)	3	12	25	49	32	67	78	60	70	81	106	211	209	1 003
France Telecom	35	47	36	63	47	39	35	24	29	37	19	31	44	486
Deutsche Telekom	0	0	2	8	9	6	25	19	26	16	16	14	21	162
Telecom Italia (SIP and CSELT)	7	15	16	11	7	7	11	5	10	9	7	7	15	127
TeliaSonera	..	..	0	0	2	2	1	11	9	7	3	2	0	37
KPN	0	0	0	0	13	16	1	6	8	9	8	14	5	80
Qwest Communications International	..	..	..	..	..	..	40	37	39	35	27	40	30	248
SK Corportation	..	..	0	0	1	6	5	9	5	6	4	8	17	61
Korea Telecom	0	1	0	0	4	0	6	8	5	14	11	3	1	53
Telstra	1	3	3	5	5	0	3	0	0	2	2	0	0	24
Bell Canada	2	0	1	1	2	2	2	4	2	0	0	0	0	16
Telefonica	0	2	1	8	1	2	0	0	0	0	0	0	0	14
Swisscom						1	2	4	3	12	13	10	11	56
Total	103	128	165	365	478	512	542	473	433	430	398	644	682	5 353

Note: Data include all patents, not simply telecommunication-related. Data do include patents filed domestically, but not subsequently filed in the US market.

1. Data for AT&T prior to 1997 included Lucent.

Source: USPTO, *www.uspto.gov/web/offices/ac/ido/oeip/taf/asgstc/regions.htm.*

StatLink http://dx.doi.org/10.1787/624533302543

Table 3.13. Telecommunications patent applications filed at the European Patent Office (EPO)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Australia	4	15	8	11	10	18	21	41	62	48	52	52	51	57	57
Austria	1	3	1	4	3	10	10	15	30	23	29	37	40	24	45
Belgium	1	2	1	2	4	2	5	7	7	8	11	13	15	20	28
Canada	17	13	27	37	52	61	77	77	101	183	173	181	164	237	290
Czech Republic	0	0	0	0	0	0	0	1	0	0	2	1	0	3	2
Denmark	2	3	0	2	3	7	12	18	24	25	38	32	48	36	42
Finland	7	37	32	44	49	91	124	184	279	312	281	273	250	367	371
France	13	7	16	23	35	50	81	77	129	223	234	215	276	316	365
Germany	23	38	28	54	77	142	212	326	429	434	487	503	604	561	501
Greece	1	0	0	0	1	0	1	1	0	3	4	3	3	2	4
Hungary	0	0	0	3	0	1	3	5	11	17	18	8	15	12	14
Iceland	0	0	1	0	0	1	2	4	4	3	1	0	2	0	1
Ireland	1	2	0	3	6	4	11	8	12	18	24	15	8	15	12
Italy	7	2	4	6	4	6	15	14	9	35	34	47	65	80	86
Japan	15	13	15	28	38	60	112	141	290	454	501	532	618	790	737
Korea	1	2	0	1	3	3	10	33	62	96	87	100	155	261	352
Luxembourg	0	0	0	0	0	1	0	1	1	0	0	0	0	0	1
Mexico	0	0	0	0	0	0	0	3	6	3	2	1	1	0	4
Netherlands	2	3	10	20	37	77	64	97	114	178	227	139	126	155	163
New Zealand	1	2	4	1	1	1	4	1	3	9	14	5	10	3	2
Norway	0	0	3	2	4	13	23	14	22	36	29	18	26	20	27
Poland	0	0	0	0	0	0	1	0	1	1	2	3	4	5	5
Portugal	0	0	0	0	0	0	0	1	1	0	1	1	1	2	14
Slovak Republic	0	0	0	0	0	0	0	0	0	1	0	0	2	1	2
Spain	1	2	1	4	2	3	3	5	8	14	26	28	41	25	24
Sweden	14	33	36	59	87	126	193	181	290	264	202	162	175	206	260
Switzerland	2	3	8	8	10	18	19	21	22	32	37	28	39	41	19
Turkey	0	0	0	0	0	0	0	0	0	1	2	3	1	1	2
United Kingdom	33	35	47	71	100	104	124	137	185	335	247	264	263	284	247
United States	170	195	321	351	529	888	997	1190	1798	2149	1964	1871	1898	2113	2436
OECD	316	410	564	734	1054	1685	2126	2604	3902	4908	4730	4536	4901	5640	6113
Total	318	413	576	749	1081	1721	2198	2704	4073	5179	5014	4848	5438	6455	7581
Argentina	0	0	0	0	0	0	0	0	0	1	1	0	0	3	2
Brazil	0	0	1	1	0	0	0	3	1	2	8	3	9	3	6
Bulgaria	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Chile	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
China	0	0	0	0	1	0	2	8	16	29	66	141	229	391	920
Cyprus	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Estonia	0	0	0	0	0	0	0	1	0	0	0	1	2	2	1
Hong Kong, China	0	0	1	0	2	1	0	0	0	0	0	0	0	1	1
India	0	0	1	0	1	1	0	2	4	7	14	14	17	22	36
Israel	2	2	6	8	15	24	49	61	106	156	99	80	93	80	106
Latvia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Malta	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Romania	0	0	0	0	0	0	0	1	0	0	1	1	0	2	0
Russian Federation	0	1	0	0	2	2	4	7	5	13	12	6	27	31	30
Singapore	0	0	0	4	3	5	4	8	14	21	38	39	29	51	33
Slovenia	0	0	0	0	0	0	0	0	1	3	1	1	1	1	2
South Africa	0	0	2	1	0	1	6	6	10	12	13	10	20	7	5
Chinese Taipei	0	0	1	0	2	0	1	0	2	0	2	4	6	9	1

StatLink http://dx.doi.org/10.1787/624541781843

ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Chapter 4

Network Dimensions and Development

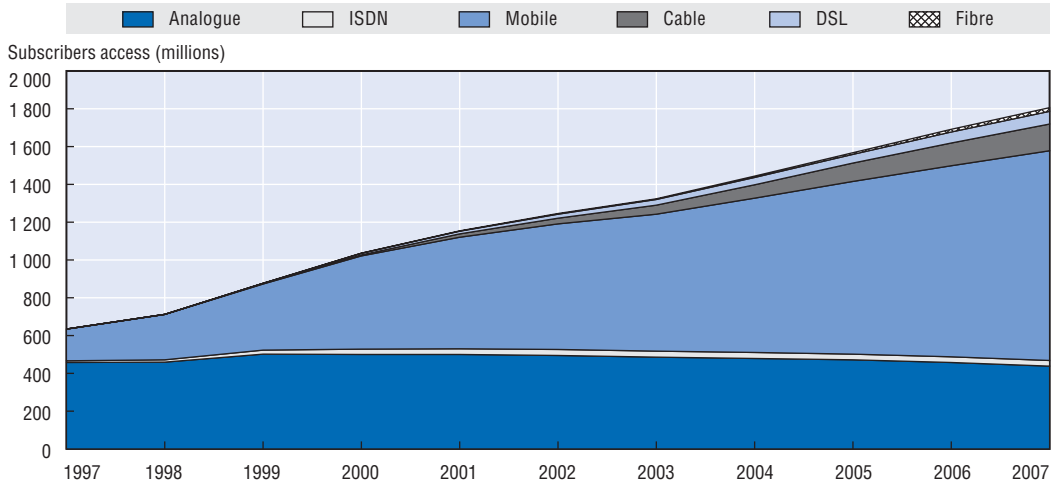
There have been two major growth areas in telecommunication services in the previous two years – mobile and broadband. Mobile and broadband subscriptions together accounted for 74% of all communication subscriptions in 2007. Mobile alone accounts for 61% of all subscriptions while standard phone lines have dropped to 26%. This is a dramatic turnaround from the year 2000 when there were more fixed line subscribers than mobile. Telecommunications investment reached USD 185 billion in 2007, an increase of 9% each year from 2005. Investment grew over the past four years, in sharp contrast to the strong investment declines observed between 2000 and 2003.

Introduction

There have been two major growth areas in telecommunications over the past two years in the OECD – mobile and broadband. This growth has resulted in the number of mobile and broadband subscribers as a percentage of all telecommunication subscriptions or "access paths" accounting for 74% of all communication paths in 2007. Mobile alone accounts for 61% while standard phone lines only account for 26%. This is a dramatic shift from the year 2000 when there were more fixed line access paths (51%) than mobile (Table 4.1). This chapter examines developments in each of the key telecommunication markets (fixed, mobile and broadband) as well as investment.

The number of fixed analogue lines across the OECD fell by 37 million between 2005 and 2007 but the growth of broadband lines and mobile subscribers (77 million and 201 million respectively) over the same period more than compensated for the fixed line losses. Figure 4.1 shows the growth of access paths in the OECD over the previous 11 years.

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



StatLink http://dx.doi.org/10.1787/620378131057

Mobile has been the most important growth area over the previous decade for OECD telecommunication operators but many markets are nearing mobile saturation levels. There were 96.1 mobile subscribers per 100 inhabitants at the end of 2007 so operators will face an increasingly difficult time attracting new customers and will need to migrate customers to 3G services and focus more on growing mobile data markets.

An examination of the growth rate of access paths by technologies helps place telecommunication technologies into stages of general technology life cycles (Figure 4.2). Fibre broadband is clearly in the ascent phase with 56% compound annual growth since 2005. Fibre's high growth rate is the result of a combination of rapid adoption and lower

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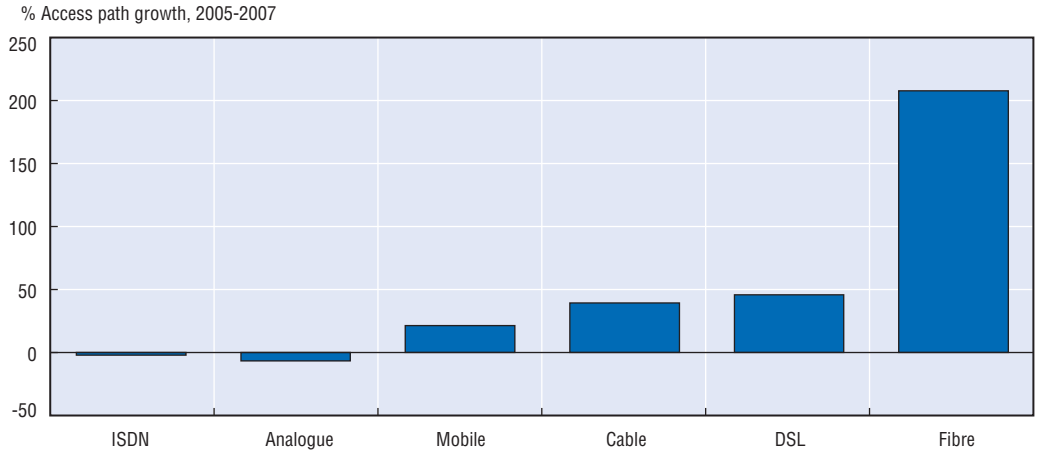
total subscriber numbers to start with. DSL and cable broadband are still in their ascent phases, although at lower rates than fibre. DSL grew at a compounded rate of 21% per year and cable at 18%. Mobile markets grew by 10% each year since 2005 but may be nearing saturation levels in a number of OECD markets. The analysis does show two technologies clearly in the declining stage, analogue and ISDN lines. Analogue lines fell 4% each year since 2005.

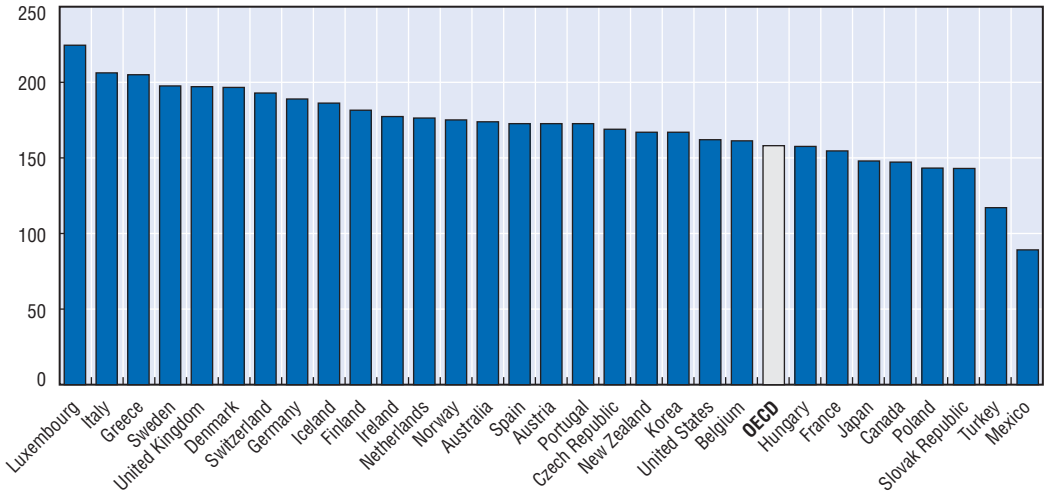
Figure 4.2. **Percentage growth in communication access paths, by technology, 2005-07**



StatLink http://dx.doi.org/10.1787/620423417167

There were 1.8 billion communication paths in 2007 in OECD countries (Table 4.2). The number of access paths grew an average of 8% per year since 2000. If all communication paths are taken into account, Luxembourg continues to lead the OECD with the number of communication access paths per 100 inhabitants at 222 (Figure 4.3 and Table 4.10). Three countries had more than two access paths per capita in 2008: Luxembourg, Italy and Greece. The lowest penetration rate of access paths was in Mexico with 88 paths per

Figure 4.3. **Total communication access paths per 100 inhabitants, 2007**



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

StatLink http://dx.doi.org/10.1787/620452383317

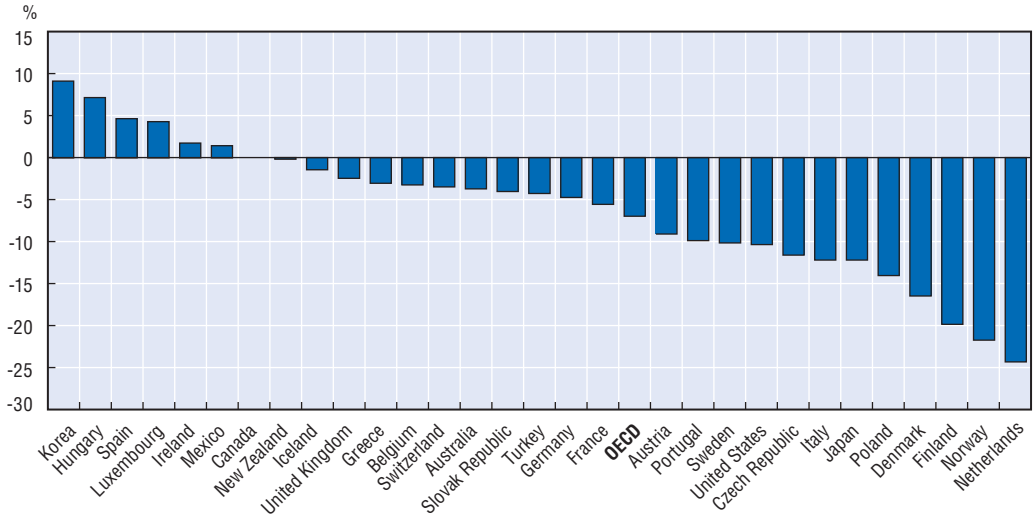
100 inhabitants. The high penetration rates in some countries are partially the result of subscribers with multiple mobile subscriptions (using prepaid cards) (Table 4.14).

Fixed-line developments

The decline in fixed lines has been most pronounced among analogue lines. The number of analogue subscribers fell by 34 million between 2005 and 2007 (Table 4.4). To put this into perspective, the number of lost analogue lines is larger than the *entire* ISDN market within the OECD (30 million) (Table 4.5). The shift to broadband has led to particularly steep declines in analogue markets for several reasons. Broadband offers often include VoIP services which substitute for PSTN services, eliminating the need for fixed PSTN lines. The decline of Internet dial-up services also means that many households no longer need a second analogue line. Finally, the number of "mobile-only" subscribers has increased.

The number of fixed telephone access paths (analogue + ISDN lines) increased in only five countries between 2005 and 2007 (Table 4.3 and Figure 4.4). Korea had the largest increase across the OECD at 9% over the two years. Hungary, Spain, Luxembourg, Ireland and Mexico also had increases during the period. By contrast, the Netherlands, Norway, Finland and Denmark each lost more than 15% of lines.

Figure 4.4. **Net additions of fixed telephone access paths (analogue + ISDN lines), 2005-07**



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The penetration rate for fixed telephone lines (analogue and ISDN) in 2007 was 41 subscribers per 100 inhabitants, which was less than the penetration rate ten years earlier. Overall, the penetration rate rose from 43% in 1996 to a maximum of 47% in 2000, only to decline again to 41% in 2007. The year 2000 appears to be the turning point in the technological life cycle of fixed-line telephony.

Canada had the highest fixed-line penetration in 2007 with a penetration rate of 54 subscribers per 100 inhabitants (54%). Sweden, Luxembourg and the United States all had penetration rates greater than 50 per 100 inhabitants. Mexico, the Slovak Republic and Poland had the lowest penetration rates in 2007.

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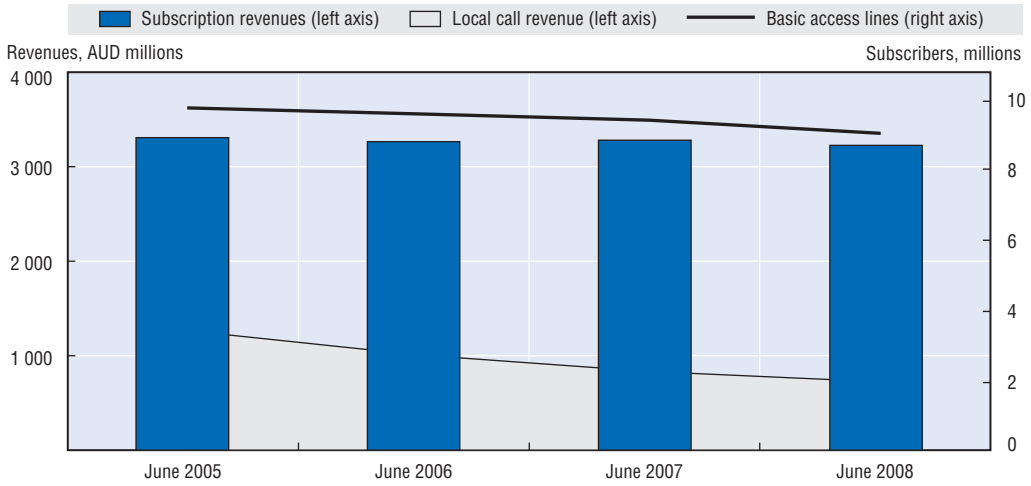
ISDN subscriptions only accounted for 6% of total fixed telephone lines in 2007. ISDN lines provide multiple voice "channels" and each supports a voice or data connection. An ISDN "basic rate" connection has two 64 kbit/s equivalents (comparable to two analogue phone lines). An ISDN "primary rate" connection includes either 23 or 30 channels (equivalent to 23 or 30 analogue lines) of 64 kbit/s of bandwidth each. ISDN accounts for 16% of the 64 kbit/s voice equivalents provided over fixed telecommunication networks. This ratio has remained stable since 2002.

Operators still believe that fixed-line networks will serve an important role for many years to come – despite declining subscribers. For example, TeliaSonera's annual report for 2007 states:

> "TeliaSonera believes that fixed lines will be the most efficient technology for many years to service fixed locations, *i.e.* homes and offices, in regions where fixed networks already exist. Complementary wireless technologies are being explored to support areas where economies are not supporting fixed network presence. In this context, an operator such as TeliaSonera is faced with both numerous opportunities and challenges."[1]

Fixed-line subscribers, while decreasing in number, remain an important revenue stream for operators. Subscribers who do choose to retain their lines have seen the prices they pay for calls fall, but subscriptions have remained relatively stable over time as has been the case in Australia (Figure 4.5).

Figure 4.5. **Australia: Declining local call revenues but subscription revenues hold steady, Telstra**



Source: Telstra, Financial Result 2008.

StatLink http://dx.doi.org/10.1787/620520788605

Competition from new voice services

The widespread availability of VoIP services over broadband continues to push down PSTN calling prices, as seen in Figure 4.5. Incumbent operators in countries such as France, Spain and the United States have chosen to offer flat-rate national calling over the PSTN to compete with VoIP offers which were the first to offer flat-rate services.

Much of the competition for fixed-line voice services is coming from other competitive networks such as cable. The penetration rate of telephony over cable is the highest in the United Kingdom at 7.4 subscribers per 100 inhabitants, followed by the Netherlands (7.3)

and Canada (7.1). The United States has the highest total number of cable voice subscribers at 8.4 million, or 2.8 subscribers per 100 inhabitants (Table 4.6).

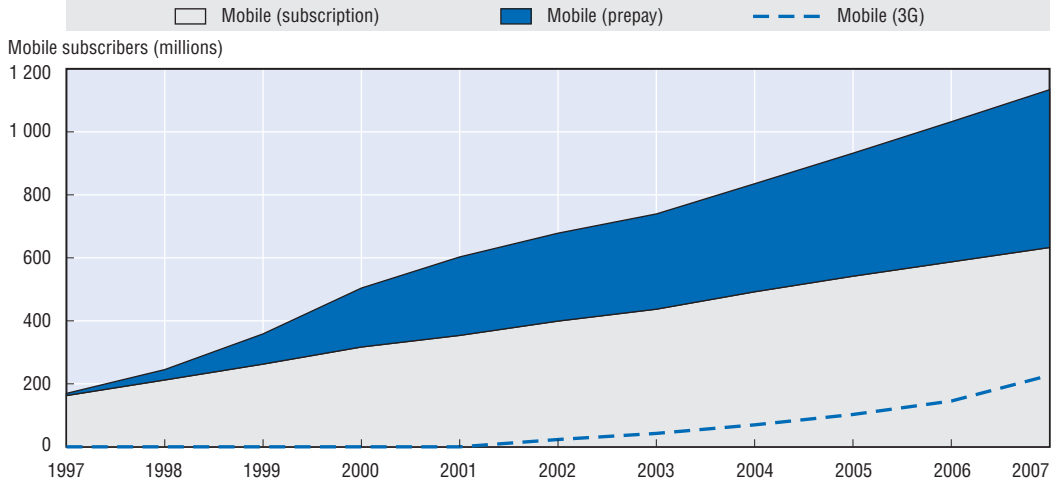
A few incumbent PSTN operators such as BT, Orange and KT have introduced dual-mode phones which can make both fixed line and mobile calls as a way to add value to fixed telephony services. These offers, however, have not been successful in their respective markets.

Mobile developments

As Chapter 3 highlighted, mobile revenues now account for nearly half of all telecommunication revenues (41% in 2007), up from 22% ten years earlier. Most of this revenue growth is from new subscriptions as revenues per mobile subscriber have remained relatively stable since 2000.

These new mobile subscriptions helped push the number of OECD mobile subscriptions past the 1 billion mark in 2006 to 1.14 billion by 2007 (Figure 4.6). Mobile subscriptions grew at a compounded annual growth rate of 10% over the previous two years. The Slovak Republic had the largest one-year growth in total mobile subscribers between 2006 and 2007 at 24%, followed by Mexico (20%) and Turkey (18%).

Figure 4.6. **Cellular mobile subscribers in OECD countries**



StatLink http://dx.doi.org/10.1787/620540260306

The percentage of prepaid mobile subscriptions to total mobile subscriptions continues to grow. Just under half of all mobile subscriptions are prepaid (44%), up 2 percentage points from two years before (Figure 4.6). Interestingly, the percentage of prepaid subscribers varies widely among OECD countries. In Japan and Korea only 2% of mobile subscriptions are prepaid. By contrast, prepaid accounts for 92% of subscribers in Mexico and 89% in Italy (Table 4.14).

There were 96.1 mobile subscribers per 100 inhabitants in the OECD in 2007. Italy had the highest penetration rate with 151 subscribers per 100 inhabitants (Figure 4.7). Only nine countries had less than one subscription per person. Japan, Korea and the United States all had less than 100% penetration largely due to their relatively lower percentages of prepaid accounts. Statisticians have much more difficulty counting active GSM accounts due to the fact that some SIM cards may no longer be in use but are still counted. In contrast, the number of active users on CDMA networks is tied directly to the number of

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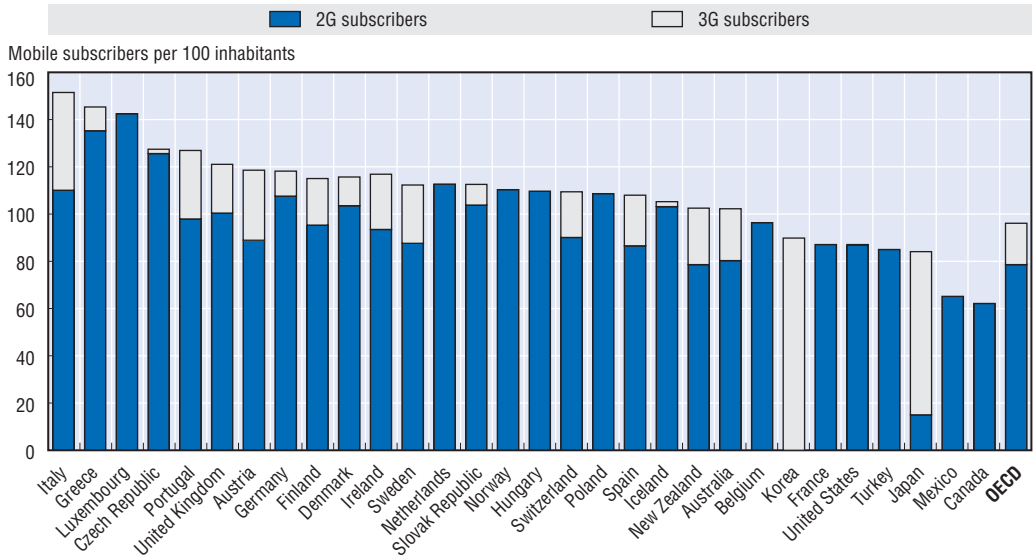
handsets actually in use. The strongest penetration growth between 2005 and 2007 was in the Slovak Republic, Mexico and Turkey.

Figure 4.7. **Cellular mobile subscribers per 100 inhabitants, 2007**

2G and 3G



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

StatLink http://dx.doi.org/10.1787/620604300202

Mobile 3G growth was very strong in a number of countries as operators effectively convinced subscribers to upgrade from 2G networks. In Switzerland the number of 3G subscribers grew 300% in one year, from 360 000 to 1.4 million. Growth in 3G subscribers was also very strong in Australia, Spain, the Slovak Republic, Greece and Denmark where subscriptions doubled in the space of one year (Table 4.12).

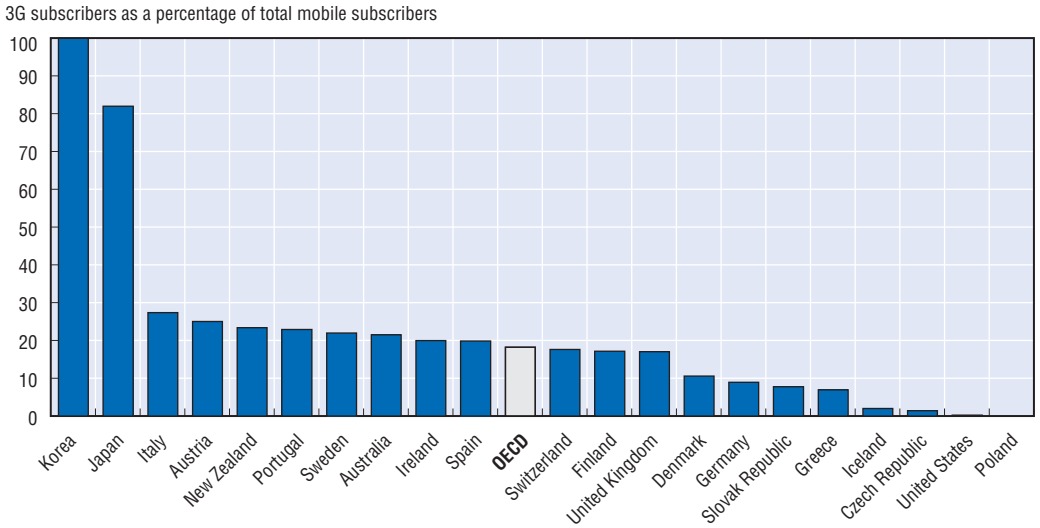
Figure 4.8 shows the percentage of 3G in total mobile subscriptions. Korea leads with nearly 100% of mobile subscribers with 3G handsets. The majority of Korean connections are on CDMA-2000 networks which are officially considered part of the IMT-2000 family by the International Telecommunication Union. However, Korean mobile operators are building out new WCMDA-based networks which are the typical upgrade path for GSM-based networks.

After Korea, Japan has the second highest percentage of 3G subscriptions at 82%. Apart from Korea, Japan and Italy the remaining OECD countries all have reported 3G penetration levels which are less than one quarter of total mobile subscriptions. This shows there is still room for growth among OECD countries. The average reported 3G penetration level in the OECD was 18.2% in 2007.

Much of the growth in mobile subscriptions has been at the expense of fixed-line connections. Mobile operators have been the welcoming beneficiaries of subscribers leaving fixed networks despite the efforts of incumbent operators to slow the decline in fixed-line subscriptions. At the same time, mobile operators themselves have come under pressure from VoIP operators offering very inexpensive calls over fixed networks. Termination rate differentials between mobile and fixed networks give users an incentive to make calls on the same type of networks. Users call other mobiles with their mobiles (to

Figure 4.8. **3G cellular mobile adoption**

3G subscribers as a percentage of total subscribers



Note: Korea's 100% penetration rate is due to the fact that Korea's early mobile technology, CDMA-2000, was recognised as an official IMT-2000 (3G) technology by the ITU.

StatLink http://dx.doi.org/10.1787/620626378562

avoid high fixed-to-mobile termination charges) and use fixed lines for fixed calls, particularly in markets with national or international flat-rate calling plans.

One emerging strategy is for mobile operators to capture these fixed-line calls by routing calls made from a mobile at home through the subscriber's broadband connection. As mentioned earlier, this was the goal of several landline operators when they introduced dual-function phones. Mobile operators chose a different tack by creating small, localised mobile cells in individual homes (femtocells) to redirect mobile communications onto the fixed network via broadband.

The benefit of femtocells is that users can continue to use their existing mobile phones but must install the femtocell equipment at home and attach it to their existing broadband connection. Belgacom and KT are just two national operators that have reported allocating significant research and development funds to femtocell technologies. Vodafone also announced that they were considering using femtocells to address capacity and coverage needs in certain network deployments.

Mobile operators with femtocells are using fixed broadband connections at homes to route calls but also are trying to convince more users to use mobile broadband when away from home. In the 2007 *Communications Outlook*, mobile Internet connections were available but at higher prices than most consumers were willing to pay. Business users were the initial large users of mobile broadband connections with consumers joining the network later. The previous two years brought lower prices and more adoption by consumers.

Broadband developments

Shift from dial-up to broadband

There has been an impressive shift away from dial-up fixed Internet connections to broadband. In 2005, dial-up connections still accounted for 40% of fixed Internet connections. Just two years later that percentage fell to 10%. Dial-up has practically

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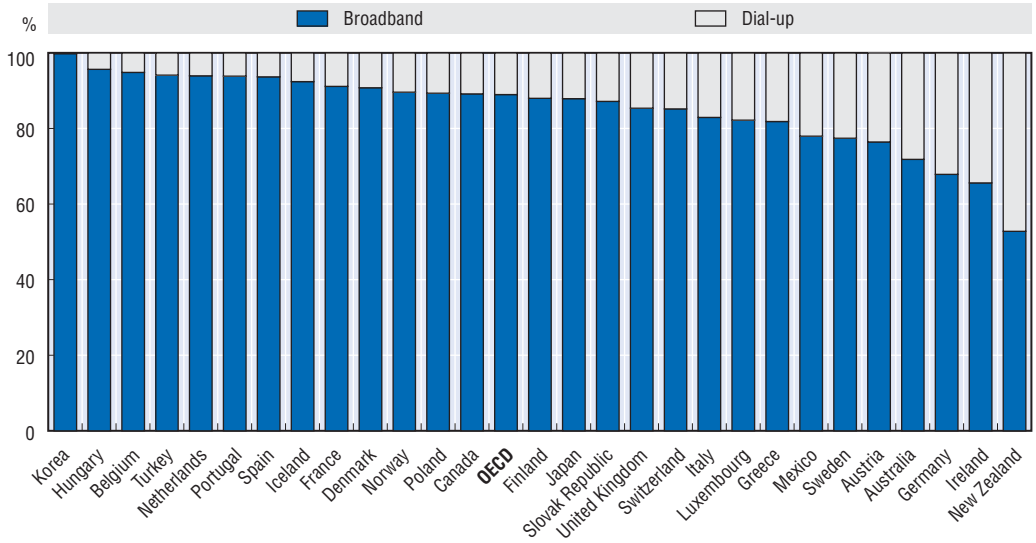
disappeared in Korea where it now only accounts for less than two out of every 1 000 Internet connections (0.2%) (Figure 4.9). Broadband now is the dominant fixed access method in all OECD countries.

Figure 4.9. **Dial-up and broadband shares of total fixed Internet subscribers, December 2007**



StatLink http://dx.doi.org/10.1787/620650283640

Growth of broadband connections

Broadband is maturing in OECD markets with networks now available to most households, and penetration rates in some countries are nearing or surpassing those for fixed lines. Both the Netherlands and Norway have more broadband than fixed telephone subscribers. Broadband is quickly replacing standard analogue and ISDN lines.

Broadband network coverage continues to improve and most households can subscribe to at least one provider. DSL network coverage is greater than 90% in 22 of the 30 OECD countries. Belgium, Korea, Luxembourg and the Netherlands report 100% coverage in their territories (Table 4.15). Cable coverage is extensive in some countries such as the United States (96%) and Luxembourg (70%), but non-existent in others such as Greece, Iceland and Italy (see Table 4.16).

The diffusion of broadband is typically measured by counting the number of subscriber lines. Subscriber data is the most accurate and timely since it comes directly from Internet providers on a regular basis. However, it is more difficult to interpret for policy makers because the data does not differentiate business and household lines.

Using this measurement, broadband subscriptions reached 251 million in June 2008, growing an average of 20% between 2005 and 2007 compounded annually (Table 4.7). The number of broadband subscriptions corresponds to 21.2 subscribers per 100 inhabitants in the OECD (Table 4.9). In Denmark, the Netherlands, Norway, Switzerland, Iceland, Sweden and Korea, DSL remains the leading broadband technology, accounting for 60% of all broadband subscriptions in June 2008 (Table 4.8). Cable represents 29% while fibre-based connections (FTTH and FTTB) are 9%. The remaining 2% of connections are over fixed-wireless, satellite and broadband-over-power lines. In June 2008, Japan and Korea became

the first two countries to have more fibre-based subscriptions than either DSL or cable. The United States remains the largest broadband market, comprising 30% of all OECD broadband subscriptions.

Upgrading broadband

The growth of broadband, defined as connections capable of download speeds of at least 256 kbit/s, has been rapid as shown by the significant decline in dial-up subscribers in most OECD countries. There appears to be a second wave of upgrades now where users replace existing DSL and cable subscriptions for fibre-based connections. This upgrade is seen in a number of countries and among fibre operators.

The number of DSL subscribers in Korea fell by 16% in one year between June 2007-08. The situation was similar in Japan with DSL subscribers declining by 11% across the country as users upgraded to faster fibre-based subscriptions. This trend is visible as well among incumbent operators upgrading copper lines to fibre to households. Verizon's DSL subscriptions fell by 286 000 (4%) between June 2007-2008 during which time fibre subscribers grew by 900 000 (82%). The growth in Verizon's fibre subscribers has more than compensated for the decline in DSL.

Other incumbent operators such as Telefonica, Deutsche Telekom and KPN have chosen a stepped approach to next-generation access networks laying fibre directly to customers in some areas but upgrading existing ADSL connections to VDSL in most others. This is done by extending fibre access to neighbourhoods and using existing copper loops to deliver the remaining several hundred meters of the connection. VDSL is often viewed as a less-expensive investment in the short term but the networks also face bandwidth limitations not found in fibre-to-the-home rollouts.

Cable operators typically chose a stepped approach as well by extending fibre connections into neighbourhoods and then diffusing the connections along existing coaxial cabling. A number of operators such as Numericable (France), ComHem (Sweden), Cabovisao (Portugal), J:COM (Japan), SK (Korea) and Welho (Finland) upgraded their networks by installing fibre to neighbourhood aggregation points and using the cable modem standard DOCSIS 3.0 to offer much higher data speeds to customers.

One of the key differences among operators' upgrade strategies is how close to bring fibre connections to consumers. The fibre for a typical ADSL connection terminates in the exchange and copper local loops distribute data from there. Cable and VDSL operators chose to install fibre into neighbourhoods but still rely on their existing copper-based infrastructure for the segment of the network closest to the consumer. Finally, fibre-to-the-home operators install fibre-optic cabling all the way to the consumer's premises. Despite the differences in network topologies and speeds available to consumers, a number of cable operators and VDSL service providers market their connections as "fibre networks".

Broadband speeds

The result of these broadband upgrades can be seen in the advertised bandwidth (*i.e.* speeds) promoted by operators. An analysis which followed the evolution of broadband plans over four years shows that speeds increased by 28% for DSL and 72% for cable on average between 2007 and 2008. In many cases, the speeds offered in 2005 are no longer available from operators in 2008.

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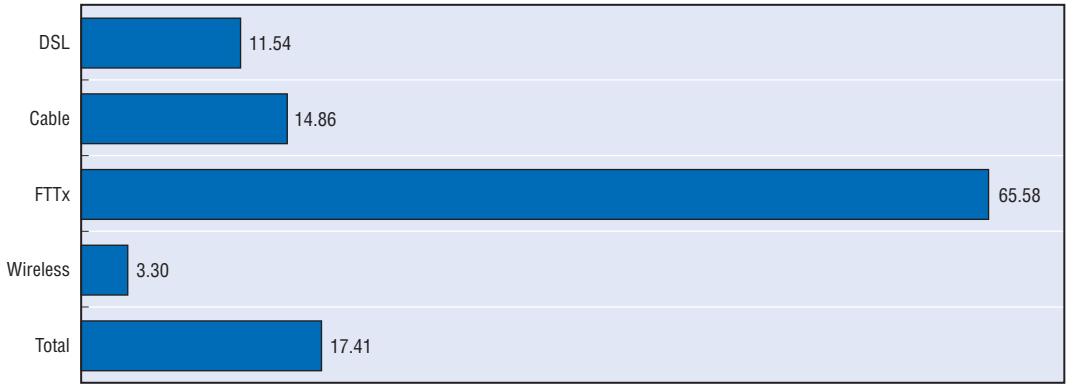
A survey of 613 broadband offers covering all OECD countries shows the average advertised speed grew between 2007 and 2008 across all platforms except for fibre. The average advertised DSL speed increased 25% from 9.3 Mbit/s in 2007 to 11.5 Mbit/s in 2008 (Figure 4.10). DSL remains the dominant broadband platform and the speed increase reflects upgrades to operators' networks. Operators continued upgrading exchanges with ADSL2+ in order to provide theoretical speeds of up to 24 Mbit/s. The inclusion of high speed VDSL offers at 50 Mbit/s from DT and 100 Mbit/s from KT and NTT also helped boost averages for DSL-based technologies.

Figure 4.10. **Average advertised speed, by technology, September 2008**

Mbit/s



Note: The methodology used for the data survey is available at *www.oecd.org/sti/ict/broadband/prices*.

StatLink *http://dx.doi.org/10.1787/620658050755*

In 2006, advertised cable speeds were nearly identical to DSL at 6 Mbit/s. By 2008 cable's average advertised speed of 15 Mbit/s is more than double that of two years before. Cable network operators are in the process of upgrading their own networks by installing fibre closer to consumers and using the new DOCSIS 3.0 standard, which allows much higher cable speeds. The fastest advertised cable speed in the OECD in 2008 was 160 Mbit/s from the Japanese cable operator J:COM.

The average advertised fibre speed of 66 Mbit/s is significantly higher than any other broadband platform. Operators with fibre networks to consumers continue increasing speeds they offer by upgrading the electronic equipment on each end of the fibre. The fastest residential broadband offer in the OECD in October 2008 was 1 Gbit/s from the Japanese operator K Opticom. Operators in Germany, Finland, France, Iceland, Japan, Korea and Sweden have fibre offers at 100 Mbit/s, albeit in limited geographic areas.

The average advertised fibre speed declined between 2007 and 2008 as operators included new entry-level offers at speeds below 100 Mbit/s. For example, Dansk Broadband in Denmark offers symmetric broadband offers over fibre at speeds between 512 kbit/s and 100 Mbit/s. The total number of observed fibre offers increased from 43 to 61 and accounted for nearly one-tenth of all observed offers.

The average fixed wireless offer was 3 Mbit/s, up from 1.8 Mbit/s just a year earlier. Fixed wireless speeds grew by 64% but remain only one-quarter of the average advertised speeds of DSL providers. The average cable offer is five times faster. The contrast between

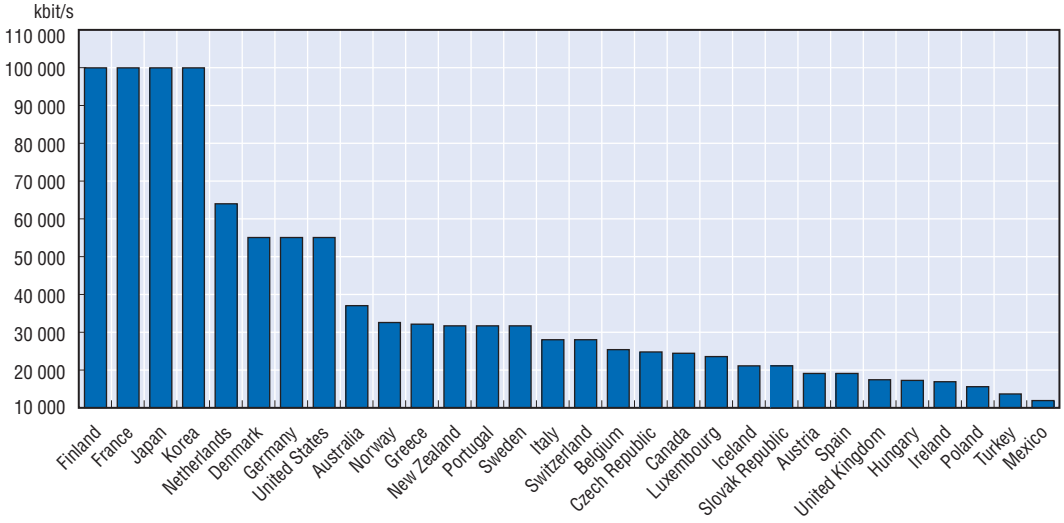
fibre and wireless is the greatest where the average advertised speed of fibre is 22 times faster than wireless offers.

The largest yearly increase in average broadband speeds was in the Netherlands. The average observed offer increased from 5.3 Mbit/s in 2007 to 18.2 Mbit/s a year later. Iceland, Turkey and Austria were the other countries with the largest yearly speed growth. The countries with the highest average advertised speed across markets were Japan, Korea, France, Finland and the Netherlands.

There is a wide range in the maximum speeds offered by incumbent operators (Figure 4.11). At the top end, operators in Finland, France, Japan and Korea have 100 Mbit/s offers, although these may be available only in a small geographic area. The lowest "top" offer among incumbent operators was from Telmex in Mexico at 2 Mbit/s in September 2008. Averaging the fastest offer from each incumbent yields an OECD average of 32 Mbit/s. This high average reflects the upgrades of older ADSL equipment to VDSL and fibre.

Figure 4.11. **Fastest residential broadband download speed advertised by the incumbent telecommunications operator, September 2008**

Kbit/s



Note: The connections represented are either over DSL, cable or fibre and they refer to the fastest consumer speed available in September 2008 from the incumbent operator on the date the data was gathered. The top speed plan in the United States is from Verizon.

StatLink http://dx.doi.org/10.1787/620730260418

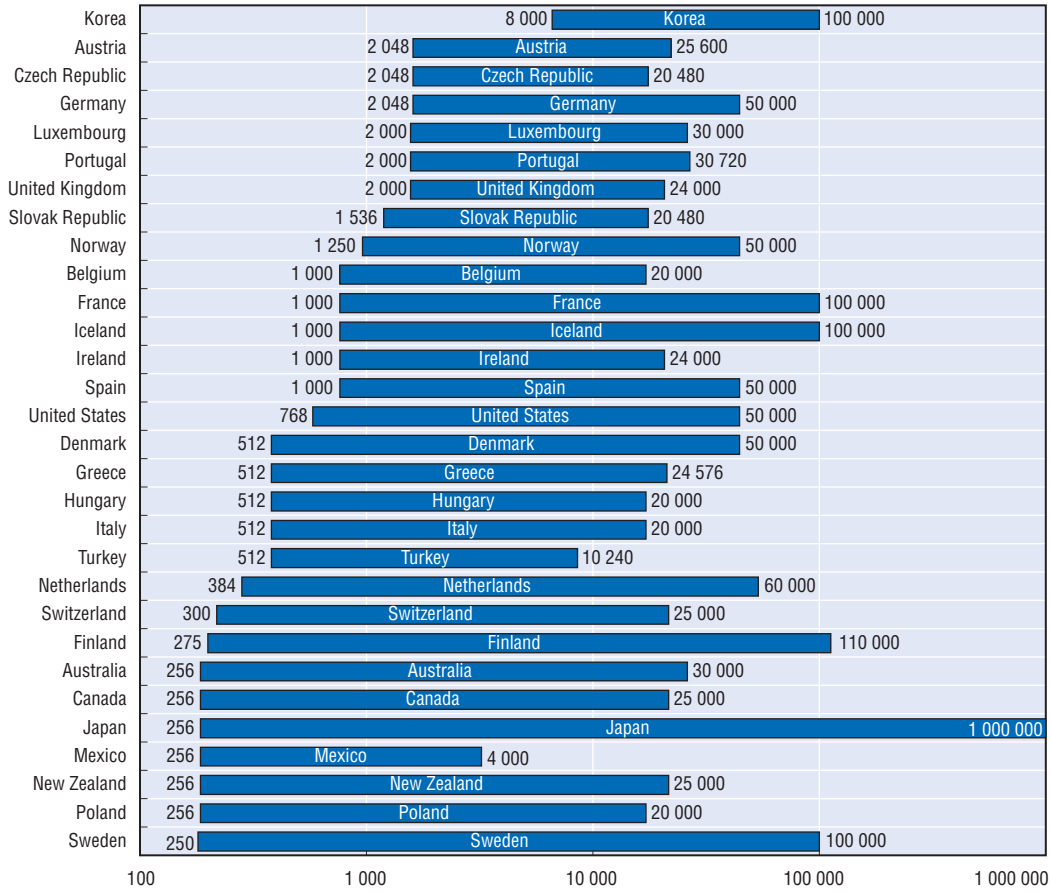
Figure 4.12 shows the range of advertised offers available in each OECD country among the surveyed firms in September 2008. There are only eight remaining OECD countries where operators still offer 256 kbit/s speeds. Entry-level offers are at least 1 Mbit/s in nearly half of all countries. Korea had the fastest entry-level offer at 8 Mbit/s in September 2008.

Actual speeds

Fixed broadband operators typically offer differentiated services based on theoretical download speeds as a way to segment the market for Internet access. Subscribers who need faster connections often must pay more for higher bandwidth. Mobile operators also commonly cite the data capacity at the cell in advertising literature – rather than what an individual user could realistically experience. The efficiency of this approach is now being

Figure 4.12. **Advertised broadband speed ranges, September 2008**

Kbit/s, logarithmic scale



Note: The methodology for the data survey is available at *www.oecd.org/sti/ict/broadband/prices*.

StatLink *http://dx.doi.org/10.1787/620734434166*

questioned as the speeds consumers actually receive can be significantly lower than the advertised "headline" speeds. Regulators are looking for ways to help alleviate this information gap.

For example, Ofcom in the United Kingdom published a Code of Practice on broadband speeds which came into force in December 2008. The goal was to ensure that consumers had a better understanding of the line speeds of their broadband connections. A total of 32 ISPs, accounting for 90% of broadband customers, agreed "to honour both the letter and the spirit of the Code" as a way to provide consumers a better understanding of the speeds they will receive and to ensure that they have subscribed to an appropriate broadband package.[2]

Operators in other countries have taken steps already to provide users a clearer picture of the speeds they are likely to receive on their broadband connections. Telia and Glocom in Sweden now advertise their offers in speed bands rather than as one headline download speed (*e.g.* 1.5-2 Mbit/s).[3] Swisscom has begun listing a guaranteed speed band for connections on its website as well.[4]

Consumers groups have taken notice and are urging that policies require operators to provide a realistic picture of the data speeds users can typically expect. The Finnish

Consumer Agency released a new policy outline in June 2008 detailing the legislative requirements of operators. It states that operators must give consumers a real picture of the transmission speeds available to them in marketing materials. Any marketing must also include information on whether there are geographical differences which would affect speed.[5]

Regulators and consumer groups use other methods as well to compare advertised speeds with actual throughput. One way to do this is by setting up testing equipment in various physical locations that continually run data tests over the subscription. For example, the private company Epitiro has a network of equipment across the world testing various technical aspects of Internet subscriptions.[6]

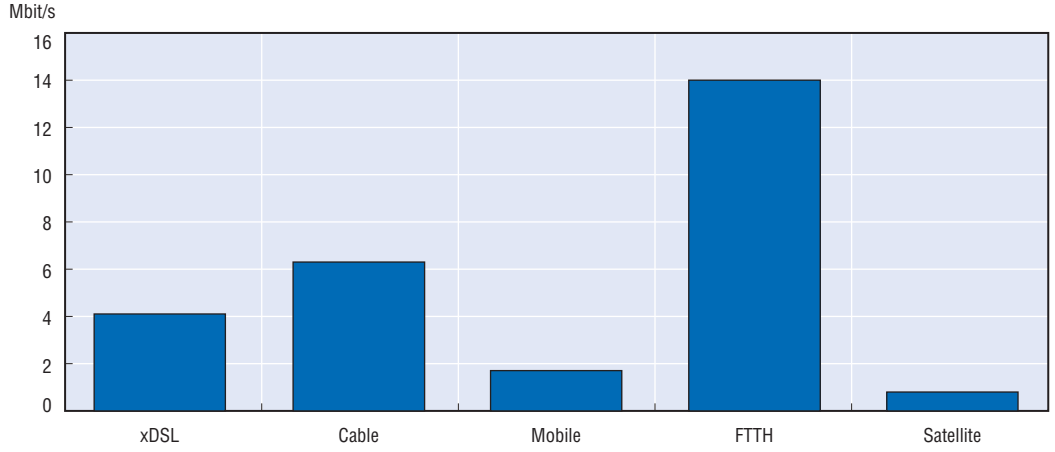
Epitiro installed test equipment on dedicated subscriptions from the top 5 ISPs in each country (where possible) in order to obtain benchmarking results. Their equipment gathered data between November 2008 and February 2009, running over 11 million tests in total. A typical subscription had roughly 100 test routines on the line each day.

Epitiro's data suggest that actual TCP throughput can be much lower than published, theoretical speeds. In this type of comparison it is important to note actual TCP throughput will be slightly lower than the capacity of the line because TCP requires a certain amount of bandwidth to be used as "protocol overhead".

Epitiro's data shows that fibre connections provided the highest average TCP download throughput within the OECD (Figure 4.13). The average actual speed of the sampled connections was 14 Mbit/s and was more than double that of any other technological platform. Cable throughput was just over 6 Mbit/s on average while DSL was slightly lower at 4 Mbit/s. Mobile and satellite connections had the lowest actual throughput of 1.7 Mbit/s for mobile and 800 kbit/s for satellite.

Figure 4.13. **Observed download speeds, November 2008-January 2009**

TCP throughput (download), average across countries by technology



Source: Epitiro, *www.epitiro.com*.

StatLink http://dx.doi.org/10.1787/620743642152

Epitiro's data also includes actual upload throughput. Upload speeds are significantly lower than download speeds across all platforms (Figure 4.14). Upload speeds were again highest on fibre networks at just over 2 Mbit/s, on average, across the OECD. All other platforms delivered an average of less than 1 Mbit/s of actual TCP throughput.

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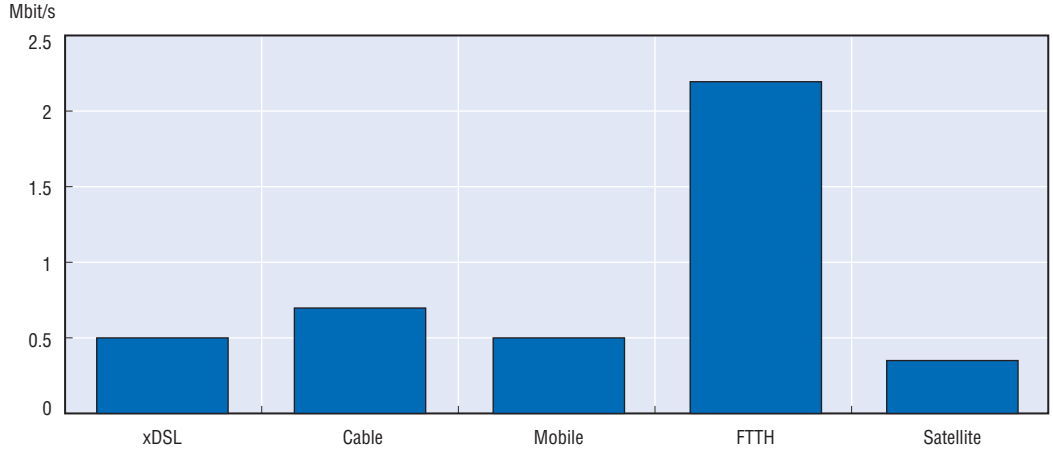
Figure 4.14. **Observed upload speeds, November 2008-January 2009**

TCP throughput (upload), average across countries by technology



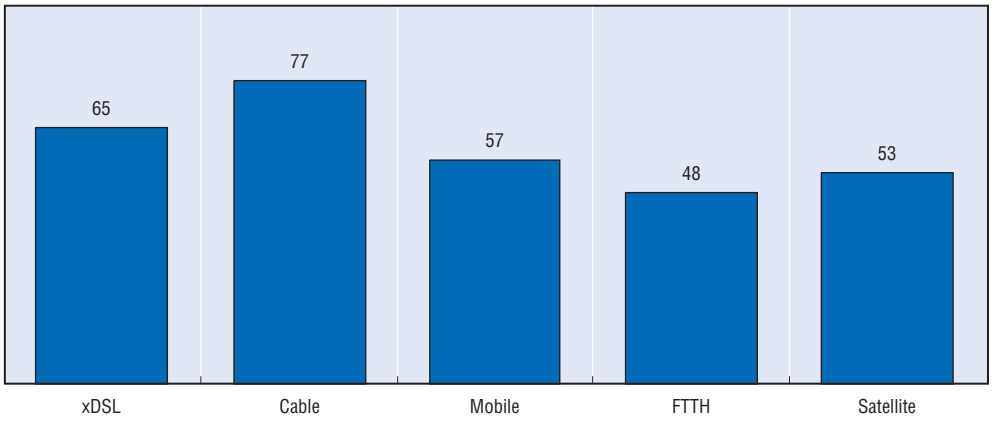
Source: Epitiro, *www.epitiro.com*.

StatLink http://dx.doi.org/10.1787/620836030727

Finally, the Epitiro data set provides information on the actual throughput of lines compared to their advertised speeds. Among the connections tested, cable platforms delivered the highest TCP throughput compared with their advertised rates, proving an average of 77% of advertised speeds (Figure 4.15). Fibre connections, while providing the fastest total speeds in the sample, delivered less than half the download speed, on average, of their advertised capacity.

Figure 4.15. **Actual observed download speeds as a percentage of advertised speeds, November 2008-January 2009**

Averaged across OECD countries by technology



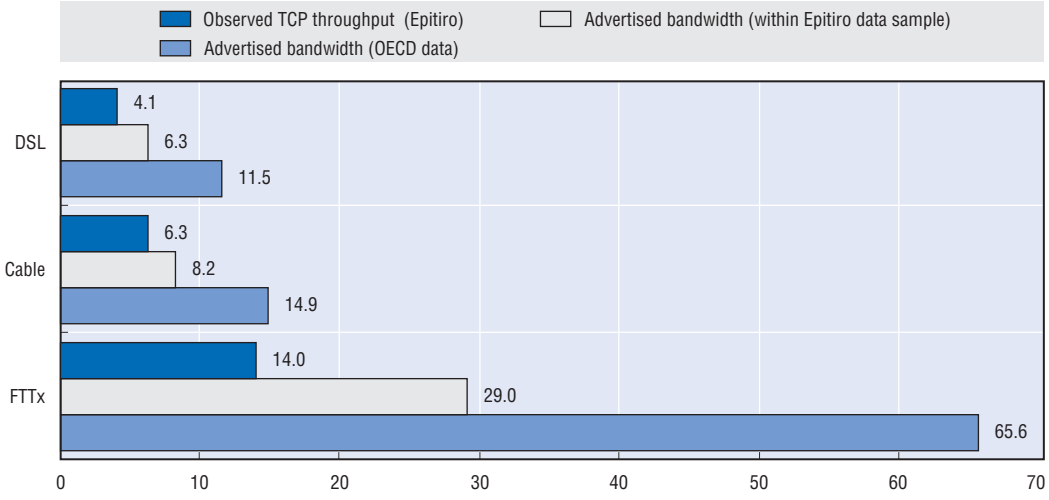
Source: Epitiro, *www.epitiro.com*.

StatLink http://dx.doi.org/10.1787/620880021778

Comparing the Epitiro data on actual throughput with OECD data on advertised speeds shows large differences. The two data sets must be compared with caution because they do not cover the same connections, or even countries. They do, however, show generally that actual connection speeds can be significantly lower than advertised headline speeds (Figure 4.16).

Figure 4.16. **Comparing two data collections: Advertised vs. observed throughput**

OECD data (September 2008), Epitiro (November 2008-January 2009), Mbit/s



Note: The two data sets are not directly comparable since they cover slightly different countries and different offers. The chart can still be illustrative though if used to compare ratios between the data sets.

Sources: Epitiro for observed data (*www.epitiro.com*); average advertised speeds from OECD.

StatLink http://dx.doi.org/10.1787/621031185425

Mobile broadband

The majority of broadband connections are over wired connections but mobile broadband is increasingly marketed as a fast, mobile way to access the Internet. High mobile headline data speeds can seem to imply that these mobile connections are used for large downloads. Evidence points to the contrary among specific operators. The amount of data traffic over mobile networks remains small in relation to other broadband data networks. For example, Telstra in Australia reported in a 2008 investor briefing that data browsing increased from 100 kilobytes per month per user in 2007 to 250 kilobytes in 2008.[7] Data from the Netherlands also show relatively low data traffic in the first half of 2008. Between January and June 2008, Dutch mobile broadband subscribers downloaded 358 gigabytes of data over mobile networks. It is possible to calculate an estimate of mobile data traffic per 3G subscriber per month in the Netherlands by making a few assumptions. If the ratio of 3G to total mobile subscriptions in the Netherlands is equivalent to the OECD average of 18%, then the average amount of data traffic per 3G subscription per month in the Netherlands works out to be only 18 kilobytes per month. This is significant, but not in comparison to fixed-line traffic.

Of 52 mobile broadband packages evaluated in September 2008, the average headline speed was 2.5 Mbit/s. Subscribers to these plans were allowed an average of 4.5 gigabytes of data traffic per month. This is much smaller than the caps typically found on wired networks.

Contention ratios

One reason actual speeds vary from headline advertised speeds is contention on the line. Operators sell 1 Mbit/s to a consumer knowing that they will only be using the connection for a certain percentage of the time. This allows operators to allocate a single 1 Mbit/s channel of backhaul capacity to multiple subscribers. The more lines connected to a backhaul trunk line, the more congested the backhaul becomes.

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Only a few operators publish data relating to contention levels on their lines but it is becoming more common as subscriber demands on the network increase. Lines with higher levels of contention may not be sufficient for certain applications which require high bandwidth during peak periods.

The Czech broadband provider GTS Novera markets its connections by contention ratio. There are two choices for consumer lines, 50:1 and 20:1. This means that a subscriber on a 2 Mbit/s monthly broadband plan shares 2 Mbit/s of allocated backhaul with either 50 or 20 other subscribers. A 20:1 contention ratio offers 150% more average bandwidth than a 50:1 contended line. A 20:1 contended line from GTS Novera is correspondingly 150% more expensive.[8]

The 20:1 and 50:1 ratios are common among other carriers as well. Tiscali in the UK offers the same contention ratios for their business broadband connections.[9] Irish broadband providers such as Digiweb and Imagine also provide subscribers with contention information. Digiweb and Irish Broadband both offer consumer DSL subscriptions with contention ratios of 48:1 or 24:1.

Network designers take usage patterns into account when calculating how much bandwidth to provision to groups of users. There is some concern though that contention ratios developed for simple web-browsing will need to be reassessed as households make more use of streaming and high bandwidth content. The distance between the end users and the aggregation point will also play an important role when determining backhaul requirements for a set of subscriptions.

Data caps

Another way network operators control backhaul and transit costs is by limiting the amount of traffic subscribers can download (or upload) in a given month. Operators claim that these caps help provide a higher quality of service and allocate scarce network backhaul efficiently. High bandwidth users pay more for their use than casual broadband users under such a system.

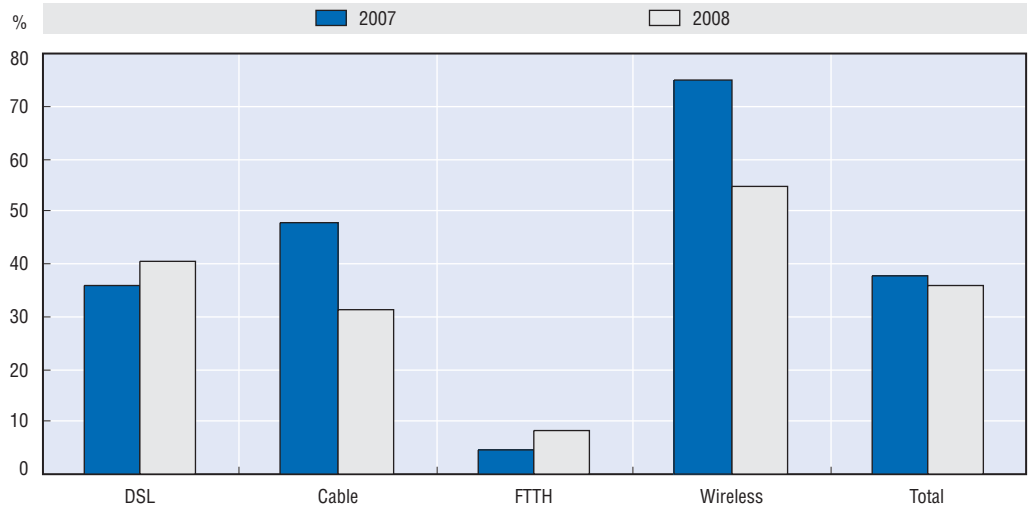
Of the 631 offers surveyed by the OECD in 2008, 36% had an explicit data limit or bit cap each month (Figure 4.17). The percentage of offers with caps actually fell from 38% in 2007. The percentage of DSL lines with caps increased to 41% while the percentage of cable lines with caps fell to 31%. Capped FTTH lines increased to 8% of total offers but fibre still has the lowest percentage of capped offers (Figure 4.19).

Operators changed the way they presented and sold data caps to subscribers over the previous two years. Portugal Telecom removed international bit caps for subscribers who use direct debit and receive an electronic bill. Unlimited international data previously was an additional EUR 7.50 per month. PT Luxembourg will waive bit caps for subscribers who take a triple-play package.

Other operators raised data caps over the five-month period from April to September 2008, allowing users more data traffic each month. Belgacom nearly doubled the bit cap on their plans across the board, although the caps are at a lower threshold than many other OECD countries. Some Belgacom offers introduce a cap and then turn to flat rate after EUR 10 of data traffic fees. Bell Canada has a similar tier system in place. Bell Canada's users encounter bit caps and then pay per additional gigabyte until they reach a maximum of CAD 30. After that point the connection becomes flat-rate.[10]

Figure 4.17. **The prevalence of data caps, 2007-08**

Percentage of surveyed offers with explicit monthly data caps



Note: Survey of 631 offers in 2008 and 556 in 2007 across a minimum of three operators in each OECD country.

StatLink http://dx.doi.org/10.1787/621158628071

Broadband subscribers in Australia can often choose between paying more per megabyte once they reach their cap or having their speeds dropped down to 64 kbit/s for the remainder of the month. The Australian operator Internode downgrades speeds to 64 kbit/s once users reach their cap but then may start applying additional charges if users consume an additional 3 GB of bandwidth at the slower speed. [11]

The cable operator Telstraclear in New Zealand does not include monthly data traffic in its plans at all. Users must buy packs of data to use each month depending on their needs.

Telenet's Belgian subscribers pay different rates for additional bandwidth depending on when they make the purchase. A block of additional traffic is less expensive if purchased before reaching the data cap than after[12] (Figure 4.18).

Finally, the fixed-line operator O2 in the Czech Republic removed data caps altogether from its DSL plans in early 2008. The operator still has data caps on mobile broadband connections.

Investment

Telecommunications investment reached USD 185 billion in 2007, an increase of 9% each year from 2005 (Table 4.17). The investment growth was the result of operators upgrading their mobile and broadband networks. Investment growth over the past four years is a sharp contrast to the investment declines observed between 2000 and 2003 following the bursting of the "dot.com bubble". Telecommunication investment as a percentage of gross fixed capital formation rose between 2005 and 2007, reaching 2.2% (Table 4.21).

Despite recent growth, investment in 2007 was still 24% lower than historical 2000 levels. The annual growth rate in telecommunication investment was 40% in both Greece and Luxembourg. Poland also had very strong growth at 38% each year. The United States led in total telecommunication investment with nearly USD 75 billion in 2007. Japan (USD 18 billion) and Italy (USD 10 billion) also had high total levels of investment.

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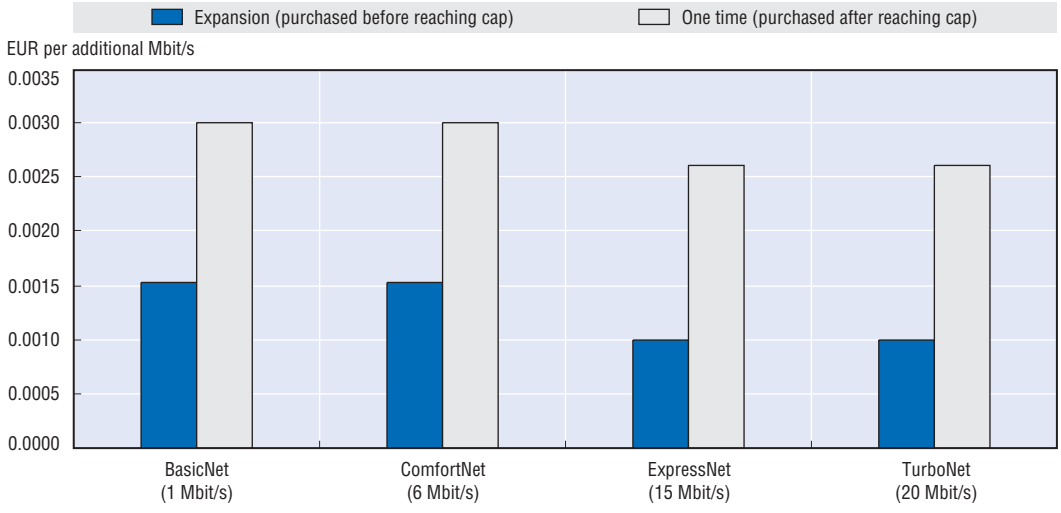
Figure 4.18. **Additional traffic price variations – before and after reaching the cap, September 2008**

Belgium: Telenet

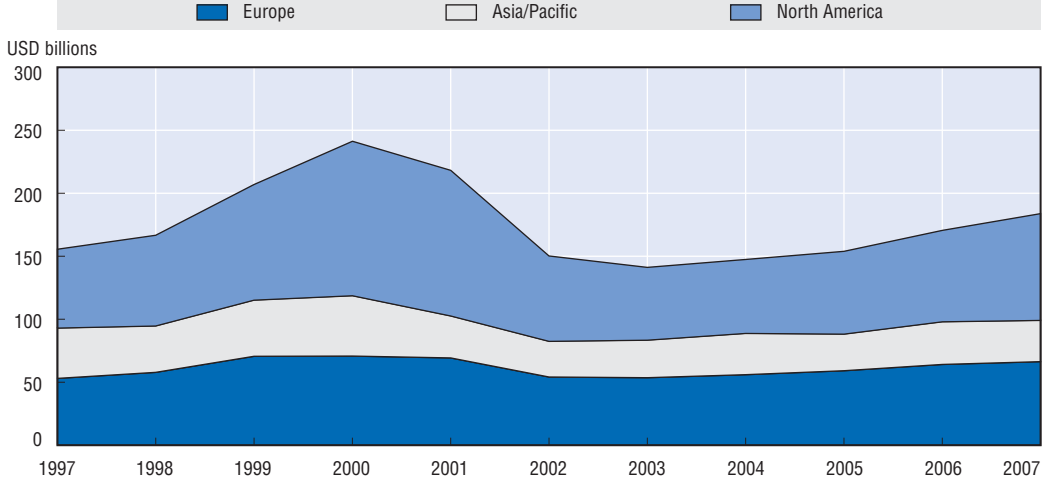


Source: Telenet, *http://telenet.be*.

StatLink http://dx.doi.org/10.1787/621213257654

Total telecommunication investment across the OECD was greatest in the North American region (46%), followed by Europe (36%) and then Asia-Pacific (18%) (Figure 4.19). On average, telecommunication investment represented 16% of telecommunication revenues in 2007.

Figure 4.19. **Public telecommunications investment by region, excluding spectrum fees, 1997-2007**



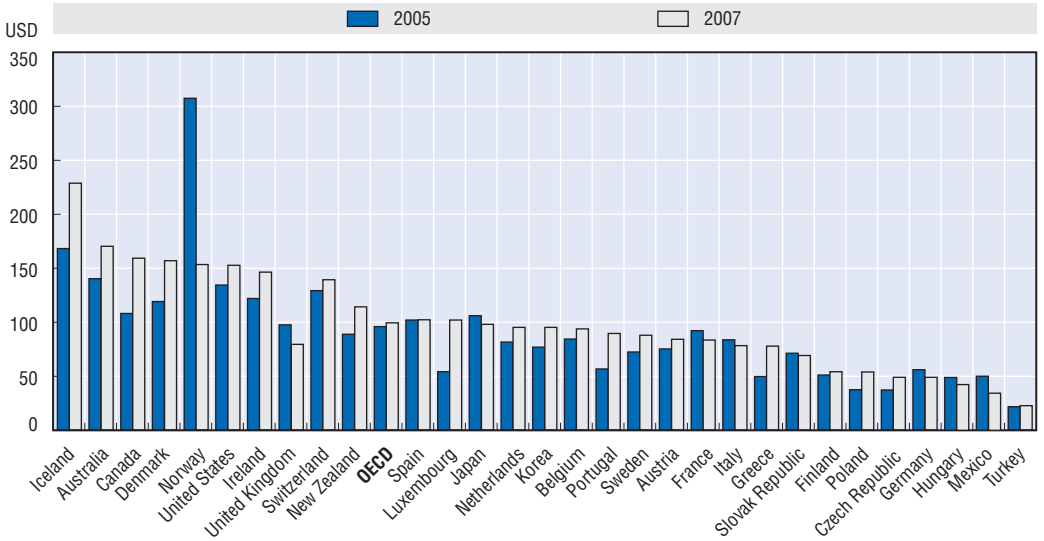
StatLink http://dx.doi.org/10.1787/621216507765

Six operators in the OECD invested more than USD 10 billion each during 2007. NTT had the highest total capital expenditure of USD 18 billion. ATT and Verizon both had capital expenditures of over USD 17 billion. NTT, ATT and Verizon all have large service markets so total investment should be high.

Another way to examine capital expenditure is as a percentage of total revenues (Table 4.20). This helps highlight firms with relatively high levels of revenue re-investment. The cable operator ONO in Spain had the highest level of investment relative to revenues in 2007 at 33%. Telstra (22%), Time Warner Cable (22%), Telenor (21%) and Comcast (20%) also had high levels of investment in relation to revenues.

Since the number of subscribers varies across countries it can also be illustrative to examine the levels of investment per communication access path (Table 4.22). Operators invested an average of USD 101 for each communication access path (analogue + ISDN + DSL + cable + fibre + mobile) in 2007. Swiss operators invested the most per access path in 2007 at USD 141 while Mexican, Czech and Turkish operators invested less than USD 35 per access path (Figure 4.20). Overall, investment per access path has increased over the past two years.

Figure 4.20. **Public telecommunications investment per access path**



StatLink http://dx.doi.org/10.1787/621246505125

Another way to examine investment is in per capita terms (Table 4.23). Investment averaged USD 156 each year for each inhabitant in the OECD between 2005 and 2007. Annual telecommunication investment per capita shows the highest investment in Iceland, Denmark and Australia. In Iceland investment per capita averaged USD 329 per year between 2005 and 2007 (Figure 4.21).

Mobile revenues accounted for 41% of all telecommunication revenues in the OECD in 2007 and data on mobile investment seems to suggest a similar breakdown for investment among fixed and mobile networks. Among countries reporting mobile telecommunication revenues in 2007 the simple, non-weighted average across countries shows that 40% of all telecommunication investment was destined for mobile networks (Table 4.18). Mobile represented more than half of telecommunication investment in five reporting countries (Austria, Korea, Portugal, the Slovak Republic and Turkey). In Portugal, mobile investment accounted for 62% of all investment while in Switzerland mobile only accounted for 21%.

OECD accession countries and China

The OECD is currently in a process of enlargement and engagement with many non-member economies. In December 2007, the OECD began accession talks with Chile,

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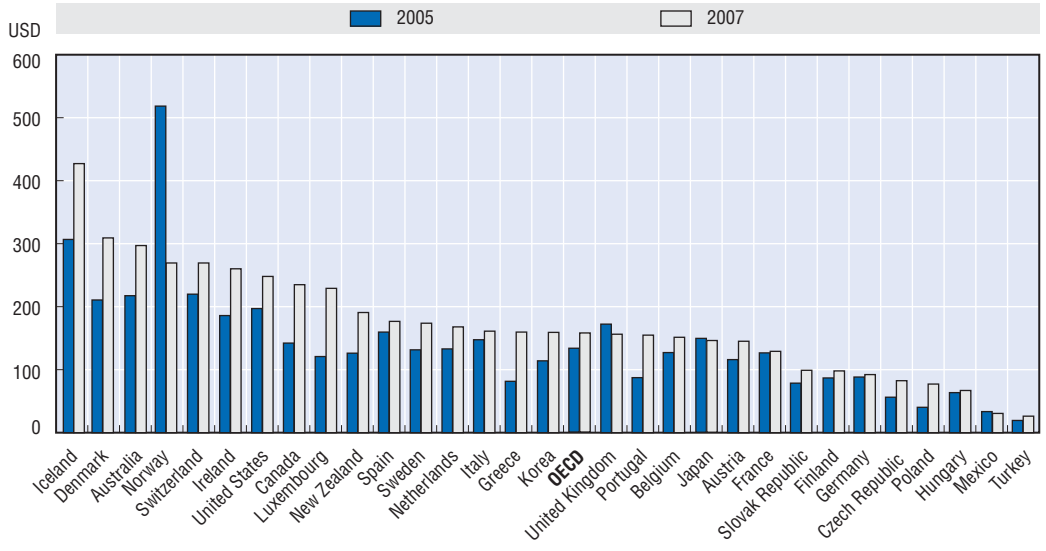
Figure 4.21. **Public telecommunications investment per capita**



StatLink http://dx.doi.org/10.1787/621304416413

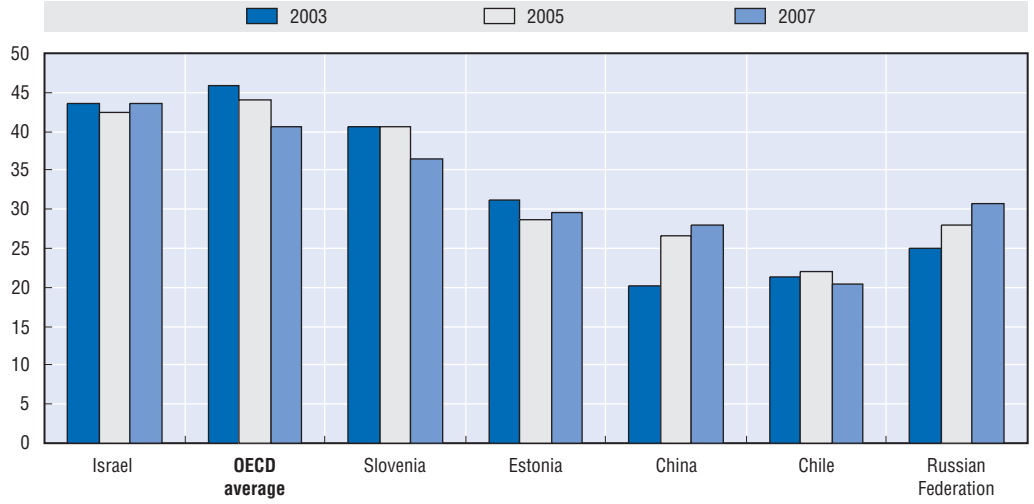
Estonia, Israel, the Russian Federation and Slovenia. Data collection for these five countries is still in progress and the time series published in this chapter are only for the period covering 2003 to 2007. This section will compare the telecommunication infrastructure development of these five accession countries as well as China with the OECD countries.

Three of the five accession countries have small, dynamic economies: Estonia (population of 1.3 million), Israel (7.2 million) and Slovenia (2 million). Governments in each of the three made developing their telecommunication infrastructure a key priority and they are above the OECD average in performance for many indicators. Chile has a larger population (16.6 million) and is less developed in terms of telecommunication infrastructure but is developing quickly, particularly in the fields of mobile telephony and broadband. The Russian Federation, with a population of 142.5 million, is more difficult to analyse due to a lack of official data. Nevertheless, its development in terms of mobile telephony over the last five years has been strong. China is developing its fixed and mobile infrastructure at roughly the same pace. Changes in fixed telephone access paths and total communication access paths are given in Figures 4.22 and 4.23.

Fixed telephone access lines

The number of fixed telephone access paths (analogue and ISDN) in the OECD decreased steadily over the previous five years. This trend is due to the increasing competition of mobile telephony and the substitution away from PSTN lines to VoIP for voice. Estonia and Slovenia follow the same trend as the OECD as a whole, losing a significant number of fixed lines since 2003 (Table 4.24). Fixed telephone access paths decreased 5.8% in Estonia and 9.6% in Slovenia. All accession countries except the Russian Federation recorded a decrease in fixed telephone access paths per 100 inhabitants, and the number of fixed telephone access paths in China also increased significantly over the same period. Among accession countries, Israel has the highest penetration of fixed telephone access paths (43.5 per 100 inhabitants) ahead of the OECD average (40.6), followed by Slovenia (36.0) and Estonia (29.7) (Figure 4.22).

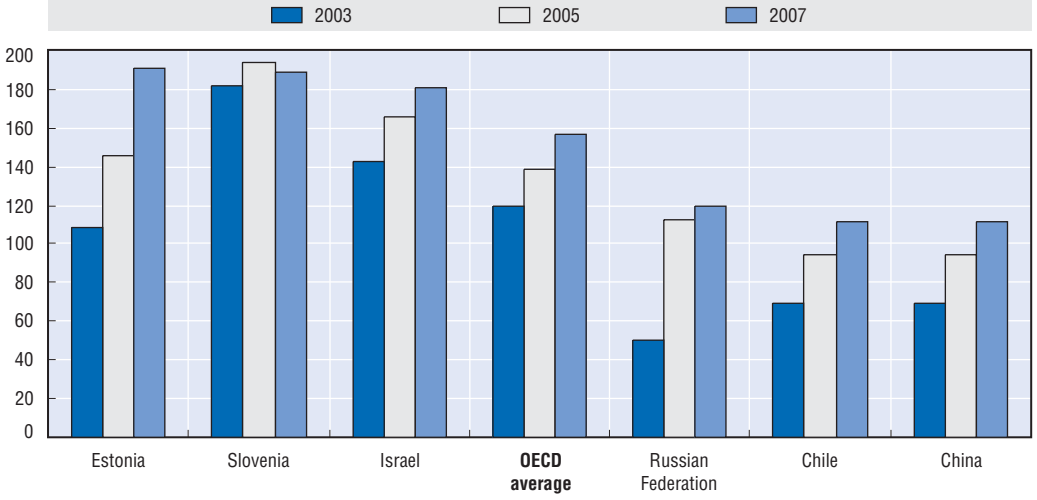
Figure 4.22. **Fixed telephone access paths per 100 inhabitants, 2003, 2005 and 2007**



Note: Data for the Russian Federation are for 2006 instead of 2007.
Source: For Russian Federation, International Telecommunication Union (ITU).

StatLink http://dx.doi.org/10.1787/621304713607

Figure 4.23. **Total communication access paths per 100 inhabitants, 2003, 2005 and 2007**



Source: For Russian Federation, International Telecommunication Union (ITU).

StatLink http://dx.doi.org/10.1787/621323200706

Mobile

The decrease in fixed-line subscriptions was largely countered by the growth in mobile subscriptions over the same period in the accession countries, just as in the OECD. There are more mobile subscribers than fixed lines in all accession countries and China (Table 4.24). The number of mobile subscribers has roughly doubled in Chile, Estonia and China since 2003 (Figure 4.24). Growth was even stronger in the Russian Federation, where mobile subscriptions have tripled since 2003. Estonia, Israel and the Russian Federation have very high mobile penetration rates with more than one mobile subscriber per inhabitant (Figure 4.26). Pre-paid accounts outnumber post-paid subscriptions in Chile,

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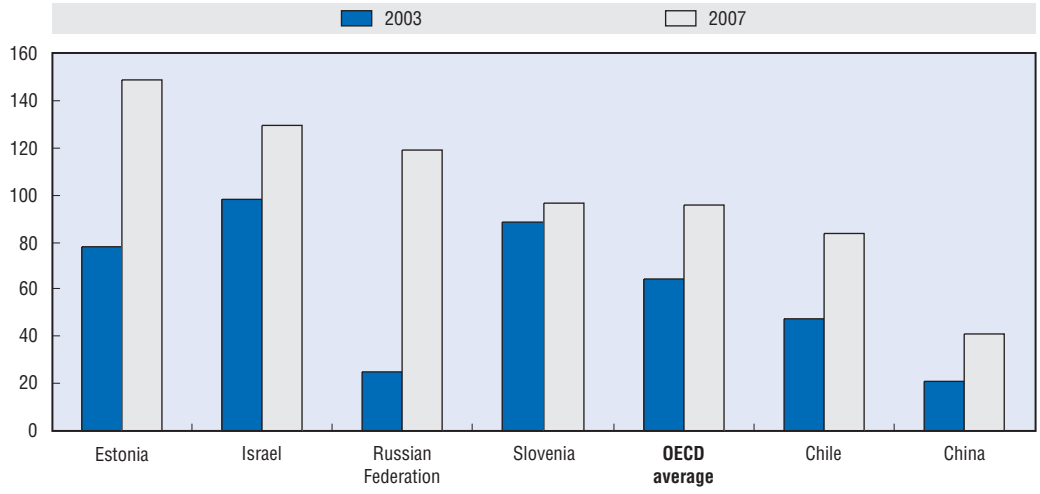
Figure 4.24. **Cellular mobile subscribers per 100 inhabitants, 2003 and 2007**

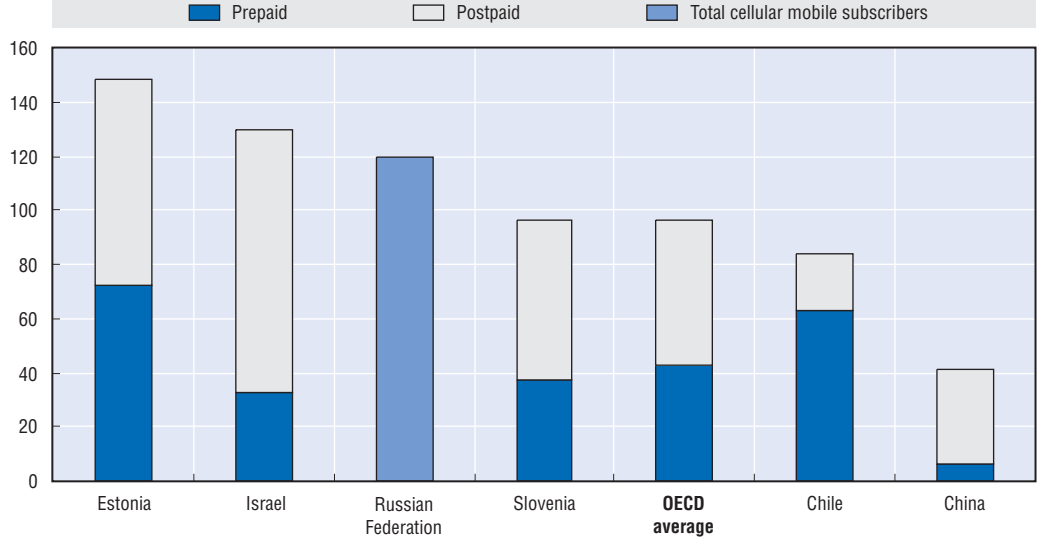


Source: For Russian Federation, International Telecommunication Union (ITU).

StatLink http://dx.doi.org/10.1787/621324870347

where 74.8% of mobile accounts are pre-paid. Estonia also has a higher percentage of pre-paid accounts (48.9%) than the OECD average (42.2%) (Figure 4.25). Pre-paid accounts account for a lower percentage of total subscriptions in Slovenia (38.8%) and Israel (25.0%).

Figure 4.25. **Cellular mobile subscribers per 100 inhabitants, by type of subscription, 2007**



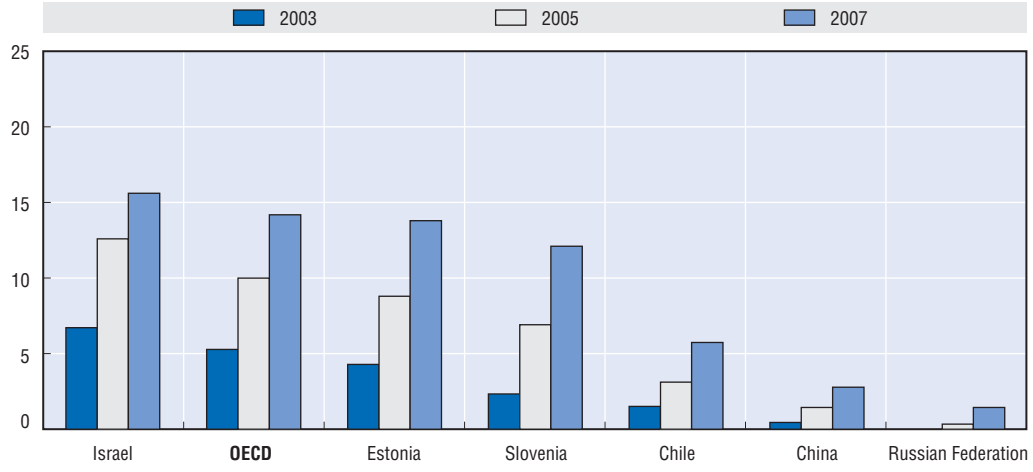
Note: The breakdown between post-paid and pre-paid is not available for the Russian Federation.
Source: For Russian Federation, International Telecommunication Union (ITU).

StatLink http://dx.doi.org/10.1787/621368823171

Broadband

Broadband is developing rapidly in the accession countries as well as in China. As broadband subscriptions increase, there has been a sharp decline in dial-up access. All accession countries recorded a significant drop in dial-up subscriptions: a drop of 92% in dial-up subscribers for Chile, 86% for Estonia, 72% for Israel and 67% for Slovenia. The

Figure 4.26. **Broadband subscribers per 100 inhabitants, 2003, 2005 and 2007**



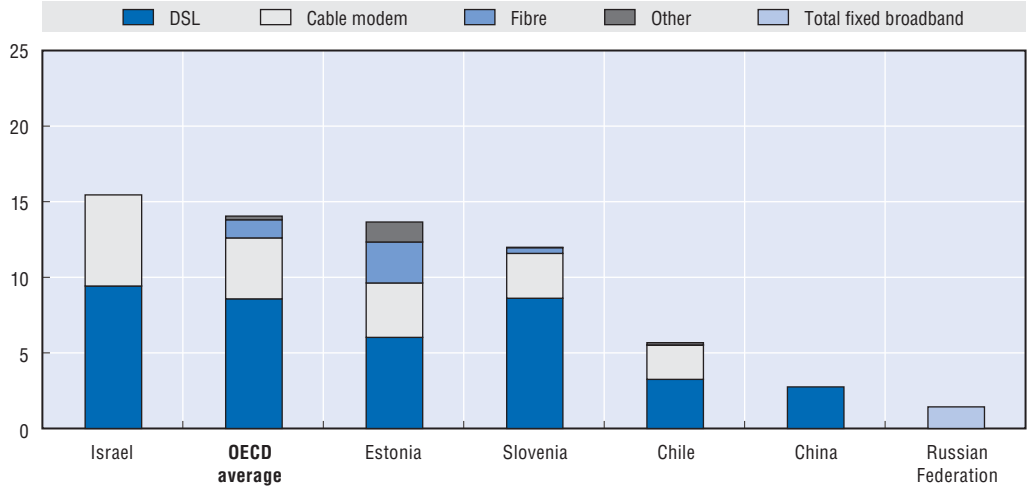
Note: Data for the Russian Federation are for 2006 instead of 2007.
Source: For Russian Federation : International Telecommunication Union (ITU).

StatLink http://dx.doi.org/10.1787/621374816184

growth of broadband subscriptions is overtaking dial-up (Figure 4.26). Broadband growth rates were high over the previous four years: 424% growth in Slovenia, 317% for Chile, 219% for Estonia, 149% for Israel. DSL subscriptions in China grew 536% over the same period. In terms of penetration, Israel has the highest broadband penetration rate among the countries with 22 broadband subscribers per 100 inhabitants. This is higher than the OECD average. Penetration rates are slightly lower for the other countries: Estonia (19.4), Slovenia (17.0), Chile (8.1), China (3.9) and the Russian Federation (2.0 in 2006).

DSL is the leading broadband technology in accession countries and accounts for more than 50% of subscriptions (Figure 4.27). The only exception is Estonia, where the market share of DSL at 44% is closer to cable (26%) and fibre (19.9%). Fibre's share in Estonia's broadband subscriptions is more than twice the OECD average share for fibre (8.6% of total connections).

Figure 4.27. **Broadband subscribers per 100 inhabitants by technology, 2007**



Note: Data for the Russian Federation are for 2006 instead of 2007.
Source: For Russian Federation: International Telecommunication Union (ITU).

StatLink http://dx.doi.org/10.1787/621382611127

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Notes

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12. Telenet's pricing can be found at: *http://telenet.be/261/0/1/en/residential/internet/compare-products.html*.

Table 4.1. Access trends in the OECD area

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR 2000-2007	CAGR 2005-2007
Lines/subscribers													
Standard analogue access lines	468 037 215	469 284 593	513 564 974	512 476 202	511 789 405	506 938 729	497 061 464	490 143 069	482 887 691	468 463 925	449 204 401	-1.86	-3.55
ISDN lines	10 071 488	13 645 430	20 912 589	27 966 353	30 960 802	32 596 733	33 071 198	31 631 623	31 176 792	31 286 793	30 459 796	1.23	-1.16
ISDN channels	32 154 248	42 191 620	61 194 480	79 587 686	83 475 798	87 267 366	88 797 290	86 373 714	85 152 196	86 816 572	85 580 495	1.04	0.25
Mobile subscribers	170 359 942	245 540 041	359 301 238	505 156 728	604 057 437	679 245 716	740 900 326	836 656 359	934 425 808	1 033 616 284	1 135 919 555	12.27	10.26
DSL lines			557 499	5 929 579	17 096 368	30 412 872	48 716 138	72 773 712	98 542 854	123 445 042	144 264 488	57.77	20.99
Cable modem subscribers	96 000	679 464	2 761 073	7 618 918	15 016 145	22 785 515	31 438 657	39 764 267	48 431 499	59 604 742	67 779 815	36.65	18.30
Fibre to the home/building subscribers			312 204	523 402	1 106 904	2 035 699	2 682 370	6 380 858	8 352 103	14 243 798	20 381 496	68.73	56.21
Telephone access													
Fixed telephone access paths (analogue + ISDN lines)	478 108 703	482 930 023	534 477 563	540 442 555	542 750 207	539 535 462	530 132 662	521 774 692	514 064 483	499 750 719	479 664 197	-1.69	-3.40
Total telephone access paths (analogue + ISDN lines + mobile)	648 468 645	728 470 064	893 778 801	1 045 599 283	1 146 807 644	1 218 781 178	1 271 032 988	1 358 431 051	1 448 490 291	1 533 367 003	1 615 583 752	6.41	5.61
Communication access													
Fixed communication access paths (analogue lines + ISDN lines + DSL + cable modem + fibre)	478 204 703	483 609 487	538 108 339	554 514 454	575 969 624	594 769 548	612 969 827	640 693 529	669 390 939	697 044 301	712 089 996	3.64	3.14
Total communication access paths (analogue lines + ISDN lines + DSL + cable modem + fibre + mobile)	648 564 645	729 149 528	897 409 577	1 059 671 182	1 180 027 061	1 274 015 264	1 353 870 153	1 477 349 888	1 603 816 747	1 730 660 585	1 848 009 551	8.27	7.34
Broadband													
DSL lines as percentage of fixed communication access paths			0.1	1.1	3.0	5.1	7.9	11.4	14.7	17.7	20.3	52.23	17.31
Cable subscribers as percentage of fixed communication access paths	0.02	0.1	0.5	1.4	2.6	3.8	5.1	6.2	7.2	8.6	9.5	31.85	14.70
Fibre subscribers as percentage of fixed communication access paths			0.1	0.1	0.2	0.3	0.4	1.0	1.2	2.0	2.9	62.81	51.46

StatLink http://dx.doi.org/10.1787/624551461088

Table 4.2. **Total communication access paths in the OECD area**

In thousands

	1993	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR 2005-2007	CAGR 2000-2007	CAGR 1996-2007
Australia	9 590	13 430	14 289	15 261	16 474	18 600	21 783	23 825	25 910	28 457	31 445	33 474	35 855	6.78	9.83	9.34
Austria	3 924	4 297	4 732	5 755	7 806	9 629	10 141	10 376	10 869	11 936	12 560	13 538	14 213	6.38	5.72	11.49
Belgium	4 701	5 258	6 012	6 490	7 819	10 267	12 462	13 283	14 013	14 899	15 659	16 109	16 962	4.08	7.44	11.23
Canada	18 902	21 471	22 938	24 891	26 657	29 702	33 202	35 077	37 110	39 457	42 068	45 131	47 609	6.38	6.97	7.51
Czech Republic	2 409	3 018	3 795	4 700	5 752	8 254	10 628	12 016	13 125	14 210	15 481	15 713	17 170	5.32	11.03	17.12
Denmark	3 563	4 571	4 608	5 134	5 815	6 640	7 372	8 031	8 529	9 142	9 485	10 196	10 629	5.86	6.95	7.97
Finland	3 270	4 346	5 011	5 801	6 288	6 815	7 326	7 746	8 056	8 264	8 842	9 171	9 507	3.69	4.87	7.38
France	33 170	34 431	37 883	42 273	50 922	59 468	66 866	69 265	74 035	79 578	85 526	90 848	97 376	6.70	7.30	9.91
Germany	41 199	46 746	48 863	54 350	63 561	88 107	97 736	102 071	108 788	120 318	128 928	138 836	153 951	9.27	8.30	11.44
Greece	5 191	5 861	6 370	7 595	9 534	11 693	13 778	15 085	15 999	16 720	18 152	19 777	22 674	11.76	9.92	13.09
Hungary	2 282	3 154	3 859	4 530	5 240	6 673	8 448	10 260	11 401	12 290	12 961	14 403	15 699	10.06	13.00	15.71
Iceland	166	201	221	265	333	378	404	443	475	493	533	558	574	3.80	6.13	10.03
Ireland	1 370	1 680	2 011	2 531	3 261	3 658	4 436	4 831	5 170	5 642	6 243	7 001	7 475	9.43	10.75	14.53
Italy	26 065	31 436	37 023	45 434	55 065	66 924	76 379	78 978	85 168	92 696	102 411	111 567	121 115	8.75	8.84	13.05
Japan	63 453	89 539	101 103	109 934	119 128	129 388	139 203	150 690	163 662	174 985	177 714	183 302	187 321	2.67	5.43	6.94
Korea	19 397	23 131	27 762	34 778	45 988	53 781	61 750	67 216	66 519	70 318	70 672	76 139	80 114	6.47	5.86	11.96
Luxembourg	234	295	327	358	426	551	686	730	801	935	1 031	1 059	1 067	1.74	9.90	12.41
Mexico	9 187	9 848	10 995	13 276	18 659	26 459	35 646	41 140	46 855	57 560	68 940	80 012	92 591	15.89	19.59	22.60
Netherlands	8 237	9 168	10 818	11 114	15 152	19 435	20 097	20 788	22 691	26 433	26 345	27 938	28 616	4.22	5.68	10.90
New Zealand	1 846	2 195	2 463	3 018	3 301	3 946	4 220	4 407	4 555	5 066	5 761	6 147	6 851	9.05	8.20	10.90
Norway	2 801	3 746	4 152	4 547	5 114	5 656	5 996	6 286	6 649	7 362	7 693	7 928	8 161	3.00	5.38	7.34
Poland	5 744	6 749	8 322	10 413	13 437	17 693	22 172	25 884	29 524	35 665	40 981	49 969	54 115	14.91	17.32	20.83
Portugal	3 687	4 407	5 374	6 969	8 564	10 459	11 811	13 145	14 121	14 969	16 108	17 016	18 132	6.10	8.18	13.72
Slovak Republic	1 122	1 275	1 592	2 005	2 319	2 992	3 704	4 337	4 985	5 581	5 872	6 342	7 633	14.01	14.32	17.67
Spain	15 353	18 507	20 415	23 519	32 055	41 745	47 557	52 389	57 199	60 005	67 169	72 184	76 719	6.87	9.08	13.80
Sweden	6 863	8 557	9 244	10 201	11 272	12 498	13 595	14 587	15 640	15 922	16 272	17 031	17 907	4.90	5.27	6.94
Switzerland	4 677	4 834	5 328	5 923	7 210	8 808	9 537	10 239	10 989	11 553	12 471	13 212	14 349	7.26	7.22	10.40
Turkey	14 268	15 092	17 354	20 466	25 856	33 470	37 344	42 373	46 936	54 337	64 154	74 274	84 581	14.82	14.16	16.96
United Kingdom	30 745	36 505	38 291	44 443	55 588	67 267	77 053	82 146	86 976	96 713	105 374	112 585	118 717	6.14	8.45	11.32
United States[1]	171 687	171 991	187 414	203 285	268 917	299 526	320 637	349 421	362 656	393 652	429 474	463 155	484 741	6.24	7.12	9.88
OECD	515 102	585 740	648 565	729 259	897 787	1 060 901	1 182 273	1 277 361	1 359 697	1 487 136	1 606 790	1 734 612	1 852 422	7.37	8.29	11.03

1. US data do not include access lines (voice equivalents) for competitive telephone carriers or for certain small traditional telephone carriers.

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

StatLink http://dx.doi.org/10.1787/624582708617

Table 4.3. Fixed telephone access paths in the OECD area

In thousands

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007 per 100 inhabitants	CAGR 2005-2007	CAGR 1996-2007
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	46.9	-1.8	0.3
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	33.0	-4.5	-2.7
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	37.8	-1.6	-1.6
Canada	18 051	18 722	19 384	19 187	19 527	19 810	19 274	19 055	18 804	18 355	18 355	18 355	56.2	0.0	0.2
Czech Republic	2 817	3 273	3 735	3 806	3 898	3 669	3 389	3 279	3 059	2 869	2 548	2 548	24.8	-5.8	-0.9
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	43.1	-8.3	-2.9
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	34.8	-10.1	-4.0
France	31 991	32 128	31 050	30 253	29 597	29 248	28 980	28 673	28 502	27 969	26 477	26 477	41.6	-2.7	-1.7
Germany	40 964	40 687	40 437	40 110	39 666	39 696	39 650	39 380	39 081	38 995	38 248	37 223	45.2	-2.3	-0.9
Greece	5 330	5 432	5 539	5 640	5 760	5 813	5 769	5 656	5 613	5 525	5 398	5 363	48.0	-1.5	0.1
Hungary	2 681	3 153	3 494	3 639	3 592	3 454	3 301	3 255	3 197	3 001	3 419	3 206	31.9	3.4	1.6
Iceland	154	155	159	161	161	158	158	152	150	151	147	149	47.7	-0.7	-0.3
Ireland	1 390	1 500	1 585	1 661	1 637	1 660	1 701	1 708	1 690	1 716	1 742	1 745	41.0	0.8	2.1
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	35.7	-6.1	-1.5
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	40.1	-6.1	-1.8
Korea	19 950	20 866	20 795	22 118	22 426	22 822	23 382	20 435	20 191	20 141	21 930	21 906	45.2	4.3	0.9
Luxembourg	250	260	228	217	248	251	251	246	245	244	245	254	53.0	2.0	0.2
Mexico	8 826	9 254	9 927	10 927	12 332	13 774	14 975	16 330	18 073	19 512	19 883	19 778	18.9	0.7	7.6
Netherlands	8 152	9 129	7 767	8 211	8 174	7 985	7 852	7 677	7 434	5 942	5 777	4 550	27.8	-12.5	-5.2
New Zealand	1 719	1 753	1 763	1 759	1 749	1 765	1 801	1 847	1 843	1 847	1 847	1 844	44.5	-0.1	0.6
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	32.3	-11.1	-4.4
Poland	6 532	7 510	8 485	9 533	10 946	11 400	11 860	11 818	11 726	10 897	10 487	9 424	24.7	-7.0	3.4
Portugal	3 744	3 867	3 894	3 892	3 766	3 733	3 682	3 616	3 569	3 494	3 356	3 162	29.8	-4.9	-1.5
Slovak Republic	1 246	1 392	1 540	1 655	1 698	1 556	1 403	1 295	1 250	1 197	1 167	1 151	21.3	-2.0	-0.7
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	45.3	2.2	2.5
Sweden	6 065	6 075	6 089	6 093	6 056	5 953	5 849	5 742	5 607	5 416	5 142	4 886	53.4	-5.0	-1.9
Switzerland	4 171	4 284	4 224	4 153	4 108	4 101	4 077	4 016	3 941	3 831	3 760	3 703	49.3	-1.7	-1.1
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	25.0	-2.1	2.2
United Kingdom	29 688	29 828	31 442	31 646	31 823	32 070	31 213	30 960	30 646	30 287	29 798	29 569	48.6	-1.2	0.0
United States	127 948	132 027	133 484	180 683	183 671	184 709	182 261	175 848	170 502	167 898	160 270	151 175	50.0	-5.1	1.5
OECD	465 647	478 109	482 930	534 478	540 443	542 750	539 535	530 133	521 775	514 064	499 751	479 664	40.6	-3.4	0.3

Note: Fixed telephone access paths: analogue + ISDN lines.

StatLink http://dx.doi.org/10.1787/624611122538

Table 4.4. Standard analogue telecommunication access lines in the OECD area

In thousands

	1993	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	AGR 2006-2007	CAGR 2000-2007	CAGR 1996-2007	Per 100 inhabitants 2007
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	-1.81	-0.42	0.57	46.88
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	-4.74	-3.58	-3.94	28.27
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	-1.46	-1.55	-2.38	34.12
Canada	17 567	18 051	18 660	19 294	19 082	19 409	19 689	19 161	18 951	18 708	18 276	*18 276*	*18 276*	0.00	-0.86	0.11	55.98
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	*2 388*	0.00	-6.67	-1.49	23.26
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	-9.75	-4.13	-3.80	38.55
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	-9.38	-6.80	-4.36	32.90
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	*26 477*	0.00	-1.58	-1.60	41.65
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	24 040	-5.50	-4.09	-4.30	29.22
Greece	5 163	5 329	5 431	5 536	5 611	5 659	5 608	5 413	5 200	5 080	4 939	*4 794*	*4 777*	-0.35	-2.39	-0.99	42.76
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	3 010	-6.41	-2.10	1.08	29.93
Iceland	149	154	152	151	148	144	140	140	135	134	134	132	135	2.22	-0.96	-1.19	43.23
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	0.18	0.39	1.48	38.41
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	-6.42	-2.27	-2.33	32.40
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	-7.04	-2.18	-2.85	35.05
Korea	18 925	19 942	20 845	20 756	21 944	22 326	22 764	23 277	20 331	20 126	20 006	21 903	21 879	-0.11	-0.29	0.85	45.15
Luxembourg	229	248	255	219	189	206	191	191	171	166	165	166	171	3.01	-2.65	-3.32	35.60
Mexico	8 801	8 826	9 254	9 927	10 927	12 317	13 747	14 956	16 315	18 059	19 500	19 872	19 766	-0.53	6.99	7.60	18.87
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	3 378	-24.24	-9.73	-7.65	20.63
New Zealand	1 660	1 719	1 753	1 763	1 759	1 749	1 765	1 801	1 847	1 843	1 847	1 847	1 844	-0.16	0.76	0.64	44.52
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	-7.65	-6.21	-7.19	22.82
Poland	5 728	6 532	7 510	8 479	9 483	10 814	11 225	11 534	11 323	11 174	10 352	9 951	8 938	-10.18	-2.68	2.89	23.45
Portugal	3 586	3 724	3 819	3 803	3 752	3 571	3 482	3 404	3 334	3 291	3 220	3 090	2 905	-5.99	-2.91	-2.23	27.38
Slovak Republic	1 118	1 246	1 392	1 539	1 651	1 686	1 525	1 350	1 234	1 184	1 140	1 120	1 106	-1.29	-5.85	-1.08	20.51
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	2.47	1.67	2.02	42.78
Sweden	6 013	6 032	6 010	5 965	5 890	5 786	5 667	5 584	5 497	5 403	5 237	4 987	4 745	-4.85	-2.79	-2.16	51.87
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	2 881	-0.54	-2.26	-3.04	38.37
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	-3.35	-0.15	2.23	24.94
United Kingdom	28 479	29 668	29 569	31 051	31 045	30 940	31 060	30 135	29 893	29 671	29 391	28 947	28 747	-0.69	-1.04	-0.29	47.29
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	-5.68	-2.72	1.57	49.67
OECD	485 469	459 689	468 037	469 285	513 565	512 476	511 789	506 939	497 061	490 143	482 888	468 464	449 204	-4.11	-1.86	-0.21	37.99

Note: Values in italics are estimates.

StatLink http://dx.doi.org/10.1787/624613735561

Table 4.5. ISDN subscriber lines in the OECD area

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR 2005-2007	Per 100 inhabitants 2007
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	-6.04	4.71
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	-2.02	3.68
Canada	..	61 854	90 538	105 452	117 581	120 510	112 854	103 795	95 938	79 092	79 092	79 092	0.00	0.24
Czech Republic	..	196	2 753	11 394	26 194	84 385	145 611	184 987	191 628	174 238	160 565	160 565	-4.00	1.56
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	-11.95	4.56
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	-13.97	1.91
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	13 183 000	2.06	16.03
Greece	981	926	3 706	29 020	100 918	204 856	355 796	455 308	532 861	586 067	604 447	586 116	0.00	5.25
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	-2.95	1.95
Iceland	782	3 620	7 724	12 686	16 869	17 928	17 928	16 745	16 853	16 427	15 239	13 969	-7.78	4.49
Ireland	..	..	48 850	76 223	47 414	70 180	100 770	97 341	100 107	111 231	111 378	110 731	-0.23	2.60
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	-7.17	3.32
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	-7.18	5.05
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	-55.14	0.06
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	2.17	17.36
Mexico	..	..	..	..	14 879	26 879	19 527	15 338	13 915	12 492	11 069	11 938	-2.24	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	-9.29	7.15
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	-15.38	9.46
Poland	238	400	6 439	50 324	132 165	174 755	326 360	495 316	551 458	544 562	535 529	485 948	-5.53	1.27
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	-3.08	2.43
Slovak Republic	..	..	771	4 353	11 911	31 076	53 052	60 296	66 798	56 680	47 315	45 082	-10.82	0.84
Spain	96 941	230 500	182 222	364 421	646 110	..	..	..	..	..	1 129 494	1 129 494	..	2.52
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	-11.15	1.54
Switzerland	125 810	208 000	341 155	530 889	726 613	860 806	913 480	927 135	928 888	907 453	863 138	822 356	-4.80	10.95
Turkey	..	..	..	..	7 191	8 692	13 551	15 989	14 005	14 298	14 535	15 265	3.33	0.02
United Kingdom	20 000	258 600	391 300	601 300	883 202	1 010 098	1 078 070	1 066 869	974 736	895 957	850 672	821 518	-4.24	1.35
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	0.00	0.37
OECD	5 957 927	10 071 488	13 645 430	20 912 589	27 966 353	30 960 802	32 596 733	33 067 027	31 620 511	31 187 195	31 283 903	30 456 599	-1.18	2.58

StatLink http://dx.doi.org/10.1787/624631574587

Table 4.6. **Cable voice telephony subscribers**

	2000	2001	2002	2003	2004	2005	2006	2007	Per 100 inhabitants (2007)
Australia	..	..	..	..	..	..	..	..	..
Austria	..	..	163 254	170 171	171 258	173 412	211 593	230 000	2.77
Belgium	111 134	181 310	187 399	234 864	285 923	417 282	509 500	597 556	5.63
Canada	..	..	..	..	..	..	1 590 000	2 313 000	7.08
Czech Republic	..	..	..	..	..	..	..	..	..
Denmark	..	..	..	..	..	..	..	..	..
Finland	..	..	..	..	..	..	..	..	..
France	..	..	..	..	..	..	..	..	..
Germany	350	1 200	9 000	20 000	48 000	111 000	310 000	790 000	0.96
Greece	0	..	..	..	..	..	..	..	..
Hungary	..	..	..	..	..	62 000	114 090	..	..
Iceland	..	..	..	..	..	..	..	..	..
Ireland	..	..	..	..	..	..	..	44 662	1.05
Italy	..	..	..	..	496 000	714 000	1 068 000	1 332 000	2.25
Japan	..	..	..	573 817	852 556	989 003	1 131 546	1 056 278	0.83
Korea	..	..	..	..	..	..	..	..	..
Luxembourg	..	..	..	..	..	..	2 000	3 900	0.81
Mexico	..	..	..	..	..	..	..	..	..
Netherlands	159 600	184 300	197 000	190 706	261 100	451 455	840 000	1 193 000	7.28
New Zealand	..	..	..	..	..	60 000	65 000	75 000	1.81
Norway	..	..	..	..	..	20 933	..	..	..
Poland	..	..	..	..	..	..	..	..	..
Portugal	1 521	58 232	155 982	166 850	186 189	211 675	230 732	244 973	2.31
Slovak Republic	..	..	..	..	..	..	..	..	..
Spain			666 297	1 449 020	1 786 311	2 023 380	2 272 835	2 366 111	5.27
Sweden	..	..	..	..	2 000	77 000	180 000	295 000	3.22
Switzerland	..	..	..	..	106 860	208 394	284 481	366 292	4.88
Turkey	..	..	..	..	..	..	..	..	..
United Kingdom	4 584 846	4 851 926	4 680 395	4 650 084	4 727 936	4 471 708	4 374 812	4 524 387	7.44
United States	1 125 000	2 246 000	3 071 000	3 301 000	3 706 000	5 100 000	6 751 000	8 385 000	2.78
OECD	5 982 451	7 522 968	9 130 327	10 756 512	12 630 133	15 091 242	19 935 589	23 817 159	2.01

StatLink http://dx.doi.org/10.1787/624655026651

Table 4.7. Total broadband subscribers in the OECD area

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	June 2008	CAGR 2005-07	CAGR 2000-07
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	4 981 656	31.70	81.66
Austria	0	0	50 900	137 400	292 600	451 500	618 500	867 318	1 181 692	1 383 798	1 622 023	1 704 769	17.16	42.28
Belgium	0	0	22 841	145 823	448 349	895 671	1 213 304	1 618 944	1 902 739	2 355 603	2 715 793	2 789 579	19.47	51.86
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	9 203 070	15.78	30.30
Czech Republic	0	0	1 500	10 000	12 100	16 900	48 498	255 200	661 000	1 136 758	1 501 420	1 626 000	50.71	104.61
Denmark	0	0	11 800	67 399	237 673	443 297	706 281	1 024 160	1 350 415	1 728 337	1 945 842	2 022 413	20.04	61.67
Finland	0	0	7 500	30 000	68 000	283 500	494 300	779 929	1 174 200	1 429 200	1 617 100	1 616 200	17.35	76.76
France	0	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	16 700 000	28.17	87.70
Germany	0	0	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	21 618 300	35.06	91.74
Greece	0	0	0	72	72	1 932	10 476	51 463	156 560	509 081	1 084 115	1 245 974	163.15	295.20
Hungary	0	0	486	2 304	26 079	65 704	202 002	360 741	639 505	965 384	1 395 612	1 583 102	47.73	149.73
Iceland	0	0	0	2 035	10 478	24 285	41 406	53 264	78 017	87 738	97 937	98 361	12.04	73.92
Ireland	0	0	0	300	400	10 600	33 050	134 848	274 100	519 029	767 736	832 590	67.36	206.81
Italy	0	0	615	114 900	415 000	976 019	2 401 939	4 701 252	6 896 696	8 393 000	10 131 542	10 727 651	21.20	89.63
Japan	0	0	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	29 341 909	1.38	72.42
Korea	0	0	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	15 059 029	3.20	20.17
Luxembourg	0	0	0	0	1 230	6 861	15 571	44 145	67 357	99 280	129 260	133 736	38.53	..
Mexico	0	0	0	8 622	111 070	247 016	428 378	1 037 455	2 301 054	2 978 359	4 548 838	5 406 156	40.60	144.85
Netherlands	0	0	151 000	260 000	612 200	1 136 200	1 913 200	3 085 561	4 114 573	5 065 000	5 617 902	5 806 595	16.85	55.12
New Zealand	0	0	0	10 334	28 079	64 100	103 776	191 695	374 000	490 067	757 132	853 020	42.28	84.68
Norway	0	0	4 700	17 829	84 192	190 544	373 261	697 875	1 045 589	1 250 899	1 436 255	1 554 993	17.20	87.20
Poland	0	0	0	0	21 696	114 000	297 291	818 575	920 752	2 736 923	3 297 700	3 651 458	89.25	..
Portugal	0	0	297	25 154	99 316	260 583	502 023	828 623	1 165 440	1 423 687	1 513 314	1 568 247	13.95	79.55
Slovak Republic	0	0	0	0	420	420	18 677	51 669	133 900	274 108	413 244	480 375	75.68	..
Spain	0	0	36 848	58 415	474 282	1 209 969	2 207 008	3 441 630	4 994 274	6 658 907	7 898 436	8 678 517	25.76	101.57
Sweden	0	0	10 800	191 300	562 100	871 400	1 186 000	1 590 561	2 182 000	2 397 700	2 756 014	2 933 014	12.39	46.39
Switzerland	0	0	70	60 891	141 688	414 742	781 579	1 316 910	1 788 829	2 064 118	2 438 128	2 471 592	16.75	69.41
Turkey	0	0	0	4 459	10 715	25 531	195 726	506 452	1 530 000	2 773 685	4 395 800	5 012 999	69.50	167.72
United Kingdom	0	0	0	57 693	350 000	1 371 319	3 200 900	6 196 000	9 826 300	12 995 140	15 606 100	16 710 169	26.02	122.56
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	70 345 756	74 712 174	20.46	41.32
OECD	96 000	679 464	3 470 446	14 029 549	34 146 361	57 183 536	85 886 855	122 759 182	164 670 083	200 256 108	236 379 624	251 123 648	19.81	49.70

StatLink http://dx.doi.org/10.1787/624704052147

Table 4.8. Total broadband subscribers by access technology

	2006				2007				June 2008			
	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	3 936 000	886 830		158 826
Austria	832 107	521 626	3 662	26 403	985 163	583 257	4 042	49 561	1 071 176	585 678	4 569	43 346
Belgium	1 469 668	878 360	14	7 561	1 620 577	1 071 107	56	24 053	1 663 073	1 101 418	616	24 472
Canada	3 714 335	4 180 751	1 072	32 923	4 096 932	4 747 898	1 072	130 000	4 171 453	4 900 545	1 072	130 000
Czech Republic	493 402	230 306	35 000	378 050	613 220	309 000	55 000	524 200	644 000	350 000	62 000	570 000
Denmark	1 062 040	506 734	138 588	20 975	1 206 282	541 708	151 700	46 152	1 249 585	535 287	175 960	61 581
Finland	1 234 000	181 100		14 100	1 348 000	209 600		59 500	1 374 700	212 900		28 600
France	12 019 313	690 000		9 000	14 804 715	718 017	27 268		15 875 000	795 005	29 995	
Germany	14 400 000	490 000		92 600	18 500 000	985 000		46 000	20 226 000	1 300 000		92 300
Greece	484 321		760	24 000	1 083 521		594		1 245 974			
Hungary	614 894	335 490		15 000	751 860	574 707	1 327	67 718	789 612	657 668	1 000	134 822
Iceland	85 280		668	1 790	94 630		1 218	2 089	94 816		1 571	1 974
Ireland	379 124	55 925	1 780	82 200	549 594	82 477	4 165	131 500	611 594	91 462	5 811	123 723
Italy	8 156 000		229 000	8 000	9 754 680		277 000	99 862	10 338 972		293 588	95 091
Japan	14 013 248	3 609 625	8 803 898	11 580	12 710 678	3 873 547	12 152 715	12 585	12 289 972	3 956 096	13 082 699	13 142
Korea	5 458 861	5 152 986	3 399 659	1 415	4 603 425	5 091 066	5 015 126	381	4 079 725	5 077 264	5 901 516	524
Luxembourg	90 100	8 710	250	220	116 900	11 500	300	560	117 079	15 953	310	394
Mexico	1 960 557	987 802		30 000	3 148 349	1 236 238		164 251	3 742 245	1 476 687		187 224
Netherlands	3 028 000	1 972 000	65 000		3 300 000	2 210 000	70 000	37 902	3 470 000	2 233 000	70 483	33 112
New Zealand	435 000	27 000		28 067	674 000	48 087		35 045	763 000	50 418		39 602
Norway	975 150	177 800	70 303	27 646	1 085 000	236 675	94 580	20 000	1 124 993	275 000	120 500	34 500
Poland	1 882 045	813 683	1 195	40 000	2 352 100	904 142	1 458	40 000	2 565 000	1 040 000	1 458	45 000
Portugal	881 512	537 552		4 623	892 859	605 799		14 656	914 547	632 220	1 274	20 206
Slovak Republic	182 391	36 701	46 338	8 678	277 838	52 666	66 649	16 091	322 512	53 452	87 269	17 142
Spain	5 262 617	1 350 101		46 189	6 230 952	1 633 489	23 057	10 938	6 836 478	1 735 146	26 070	80 823
Sweden	1 531 000	454 000	407 000	5 700	1 715 000	536 000	500 000	5 014	1 803 400	581 400	543 200	5 014
Switzerland	1 391 521	598 663	3 934	70 000	1 684 266	710 000	21 462	22 400	1 699 000	730 000	21 462	21 130
Turkey	2 723 547	27 804		22 334	4 346 054	35 651		14 095	4 957 251	48 725		7 023
United Kingdom	9 928 140	3 058 500		8 500	12 157 200	3 413 900		35 000	13 111 769	3 563 400		35 000
United States	25 761 869	32 097 223	1 035 677	1 748 100	29 745 693	36 497 284	1 912 707	2 190 072	30 167 862	39 582 978	2 550 276	2 411 058
OECD	123 445 042	59 604 742	14 243 798	2 962 526	144 264 488	67 779 815	20 381 496	3 953 825	151 256 788	72 468 532	22 982 699	4 415 629

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Table 4.9. Total broadband subscribers per 100 inhabitants in the OECD area

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	June 2008	Rank 2005	Rank 2007
Australia	0.01	0.03	0.15	0.38	0.84	1.84	3.50	7.65	13.57	18.33	23.20	23.93	17	16
Austria	0.0	0.0	0.64	1.72	3.64	5.59	7.62	10.61	14.35	16.71	19.51	20.50	16	18
Belgium	0.0	0.0	0.22	1.42	4.36	8.67	11.70	15.54	18.17	22.34	25.57	26.26	11	12
Canada	0.07	0.53	1.84	4.59	8.87	12.13	15.04	17.60	20.72	24.29	27.49	28.19	10	9
Czech Republic	0.0	0.0	0.01	0.10	0.12	0.17	0.48	2.50	6.46	11.07	14.62	15.84	24	23
Denmark	0.0	0.0	0.22	1.26	4.44	8.25	13.10	18.96	24.92	31.79	35.64	37.04	4	1
Finland	0.0	0.0	0.15	0.58	1.31	5.45	9.48	14.92	22.39	27.14	30.58	30.56	8	5
France	0.0	0.02	0.08	0.31	1.01	2.75	5.89	10.46	15.07	20.13	24.46	26.27	14	13
Germany	0.0	0.0	0.01	0.25	2.35	3.95	5.59	8.37	12.98	18.19	23.74	26.28	18	14
Greece	0.0	0.0	0.0	0.0	0.00	0.02	0.10	0.47	1.41	4.57	9.70	11.15	30	26
Hungary	0.0	0.0	0.0	0.02	0.26	0.65	1.99	3.57	6.34	9.59	13.88	15.74	25	25
Iceland	0.0	0.0	0.0	0.72	3.68	8.45	14.31	18.20	26.37	28.83	31.45	31.59	2	4
Ireland	0.0	0.0	0.0	0.01	0.01	0.27	0.83	3.32	6.61	12.20	18.05	19.58	23	20
Italy	0.0	0.0	0.0	0.20	0.73	1.71	4.17	8.08	11.77	14.24	17.08	18.08	19	22
Japan	0.0	0.0	0.12	0.50	2.25	6.36	11.58	17.22	21.89	20.69	22.50	22.97	9	17
Korea	0.0	0.0	0.58	8.65	19.70	24.32	26.16	27.03	28.69	29.01	30.36	31.08	1	7
Luxembourg	0.0	0.0	0.0	0.0	0.28	1.54	3.45	9.64	14.48	21.01	26.91	27.84	15	10
Mexico	0.0	0.0	0.0	0.01	0.11	0.25	0.42	1.01	2.22	2.84	4.34	5.16	28	30
Netherlands	0.0	0.0	0.96	1.63	3.82	7.04	11.79	18.96	25.22	31.00	34.30	35.46	3	2
New Zealand	0.0	0.0	0.0	0.27	0.72	1.63	2.59	4.72	9.12	11.83	18.28	20.59	22	19
Norway	0.0	0.0	0.11	0.40	1.87	4.20	8.18	15.20	22.62	26.84	30.52	33.04	7	6
Poland	0.0	0.0	0.0	0.0	0.06	0.30	0.78	2.14	2.41	7.18	8.65	9.58	27	27
Portugal	0.0	0.0	0.0	0.25	0.96	2.51	4.81	7.89	11.05	13.45	14.27	14.78	21	24
Slovak Republic	0.0	0.0	0.0	0.0	0.01	0.01	0.35	0.96	2.49	5.08	7.67	8.91	26	28
Spain	0.0	0.0	0.09	0.15	1.16	2.93	5.25	8.06	11.51	15.11	17.60	19.34	20	21
Sweden	0.0	0.0	0.12	2.16	6.32	9.76	13.24	17.68	24.16	26.40	30.13	32.06	5	8
Switzerland	0.0	0.0	0.0	0.85	1.97	5.72	10.69	17.88	24.12	27.67	32.47	32.92	6	3
Turkey	0.0	0.0	0.0	0.01	0.02	0.04	0.28	0.71	2.12	3.80	6.02	6.87	29	29
United Kingdom	0.0	0.0	0.0	0.10	0.59	2.31	5.37	10.36	16.32	21.45	25.68	27.49	13	11
United States	0.03	0.18	0.75	2.21	4.37	6.69	9.58	12.77	16.36	20.27	23.29	24.73	12	15
OECD	0.01	0.06	0.31	1.24	3.00	4.99	7.44	10.56	14.08	17.01	19.99	21.24		

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Table 4.10. 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	Rank
Australia	47.1	51.0	72.9	76.8	81.1	86.5	96.5	111.6	120.6	129.6	140.7	153.2	160.8	172.2	14
Austria	41.8	47.2	54.0	59.4	72.2	97.7	120.2	126.1	128.4	133.9	146.0	152.6	163.5	170.9	16
Belgium	39.3	46.5	51.8	59.1	63.6	76.5	100.2	121.2	128.6	135.1	143.0	149.5	152.8	159.7	22
Canada	55.2	60.0	72.5	76.7	82.5	87.7	96.8	107.0	111.8	117.2	123.3	130.2	138.2	145.8	26
Czech Republic	15.7	23.2	29.3	36.8	45.7	55.9	80.3	104.0	117.8	128.7	139.2	151.3	153.0	167.2	18
Denmark	56.6	62.0	86.9	87.2	96.8	109.3	124.4	137.6	149.4	158.2	169.2	175.0	187.5	194.7	6
Finland	53.5	55.5	84.8	97.5	112.6	121.7	131.7	141.2	148.9	154.5	158.1	168.6	174.1	179.8	10
France	49.6	57.3	57.7	63.3	70.4	84.4	97.9	109.3	112.4	119.3	127.4	136.1	143.8	153.2	24
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	187.1	8
Greece	39.1	48.5	54.7	59.1	70.1	87.6	107.1	125.8	137.3	145.1	151.2	163.5	177.4	203.0	3
Hungary	9.6	21.5	30.6	37.5	44.1	51.2	65.3	82.9	101.0	112.5	121.6	128.5	143.0	156.1	23
Iceland	51.4	55.6	74.6	81.6	96.8	120.3	134.6	141.8	154.2	164.1	168.6	180.1	183.3	184.3	9
Ireland	28.1	36.5	46.3	54.9	68.2	86.9	96.3	114.9	123.1	129.5	139.0	150.5	164.6	175.8	11
Italy	39.4	43.7	55.3	65.1	79.8	96.7	117.5	134.1	138.2	147.8	159.3	174.7	189.3	204.2	2
Japan	44.2	49.7	71.2	80.2	87.0	94.1	102.0	109.5	118.2	128.1	137.0	139.1	143.5	146.6	25
Korea	35.7	42.0	50.8	60.4	75.1	98.7	114.4	130.4	141.1	139.0	146.4	146.8	157.6	165.3	20
Luxembourg	47.8	56.4	70.9	77.8	83.9	98.5	125.7	155.3	163.5	177.3	204.1	221.7	224.1	222.3	1
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	76.4	88.4	30
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	171.0	174.7	12
New Zealand	43.8	44.8	58.8	65.1	79.1	86.0	102.2	108.6	111.8	113.6	124.7	140.5	148.4	165.4	19
Norway	50.3	56.8	85.5	94.3	102.6	114.6	125.9	132.9	138.5	145.6	160.4	166.5	170.1	173.4	13
Poland	8.6	14.8	17.6	21.7	27.2	35.1	46.2	58.0	67.7	77.3	93.4	107.4	131.0	142.0	27
Portugal	24.1	36.1	43.8	53.3	68.8	84.2	102.3	114.7	126.8	135.2	142.5	152.7	160.8	170.9	17
Slovak Republic	..	20.9	23.7	29.6	37.2	43.0	55.4	68.8	80.6	92.7	103.7	109.0	117.6	141.6	28
Spain	32.4	38.6	46.9	51.6	59.2	80.3	103.7	116.8	126.8	136.2	140.6	154.8	163.8	171.0	15
Sweden	68.3	68.6	96.8	104.5	115.2	127.3	140.9	152.8	163.4	174.6	177.0	180.2	187.5	195.7	4
Switzerland	58.7	65.6	68.4	75.2	83.5	101.2	122.9	132.4	141.1	150.2	156.9	168.2	177.1	191.1	7
Turkey	12.3	23.0	24.1	27.8	32.3	40.2	49.6	54.4	60.9	66.4	75.7	89.0	101.8	115.9	29
United Kingdom	44.1	50.3	62.8	65.7	76.0	94.7	114.2	130.3	138.5	146.0	161.6	175.0	185.8	195.3	5
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	21
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	

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

StatLink http://dx.doi.org/10.1787/624807625672

Table 4.11. Cellular mobile subscribers in the OECD area

	1993	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	AGR 2006-07	CAGR 2000-07	CAGR 1993-2007
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	7.6	15.0	27.8
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	6.5	7.1	31.1
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	9 659 819	10 230 505	5.9	8.9	43.1
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	8.2	12.8	21.5
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	11 882 202	13 074 666	10.0	17.0	65.7
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	8.3	9.4	22.8
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	7.2	7.2	20.3
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	55 349 000	7.1	9.3	40.6
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	13.4	10.5	33.1
Greece	28 000	531 488	938 038	2 056 084	3 894 312	5 932 403	7 963 742	9 314 000	10 330 000	11 057 602	12 448 473	13 893 669	16 226 675	16.8	15.5	57.5
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	10.7	20.0	44.6
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	327 639	1.5	6.2	23.3
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	6.0	13.7	37.6
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	11.7	11.4	36.0
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	5.5	7.0	32.3
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	8.2	7.2	38.1
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	-4.2	12.3	41.9
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	57 016 373	68 241 096	19.7	25.3	44.7
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	8.2	7.7	37.4
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	11.6	9.9	25.0
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	5 007 746	5 191 566	3.7	6.9	20.8
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	12.6	29.6	75.5
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	11 447 313	12 226 439	13 450 931	10.0	10.6	41.8
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	24.0	24.7	71.7
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	6.0	10.6	45.4
Sweden	850 000	2 492 000	3 169 000	4 108 000	5 126 000	6 191 000	7 034 000	7 812 000	8 669 000	8 659 000	8 983 000	9 492 000	10 265 000	8.1	7.5	19.5
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	10.4	8.5	28.0
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	17.7	22.4	60.2
United Kingdom	2 216 000	6 817 000	8 463 000	13 001 000	23 942 000	35 384 000	44 633 000	49 546 944	52 795 573	59 687 915	65 471 665	69 764 926	73 542 243	5.4	11.0	28.4
United States	14 712 000	44 043 000	55 312 293	69 209 321	86 047 000	109 478 000	123 375 000	147 767 000	158 722 000	184 700 000	213 000 000	241 800 000	263 000 000	8.8	13.3	22.9
OECD	29 003 773	120 093 223	170 359 942	245 540 041	359 301 238	505 156 728	604 057 437	679 245 716	740 900 326	836 656 359	934 425 808	1 033 616 284	1 135 919 555	9.9	12.3	30.0
World	34 161 906	145 114 641	215 149 135	318 595 411	492 082 896	739 969 274	963 789 154	1 161 288 157	1 421 742 333	1 769 565 762	2 225 891 984	2 763 506 940	3 316 952 173	23.9	38.7	..
OECD % share of world total	85	83	79	77	73	68	63	58	52	47	42	37	34			

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Table 4.12. 3G cellular mobile subscribers in the OECD area

	2001	2002	2003	2004	2005	2006	2007	AGR 2006-07
Australia	..	..	20 000	238 070	532 000	1 560 000	4 560 000	192.3
Austria	..	..	..	180 240	901 812	1 671 000	2 464 715	47.5
Belgium	..	..	..	..	..	..	..	..
Canada	..	..	..	..	..	..	..	..
Czech Republic	..	..	..	..	65 000	119 405	182 495	52.8
Denmark	..	..	3 425	124 674	..	326 927	666 178	103.8
Finland	..	..	..	13 000	45 000	..	1 040 000	..
France	..	..	..	..	..	..	..	..
Germany	..	..	..	..		..	8 700 000	..
Greece	..	..	..	18 800	229 537	419 553	1 126 039	168.4
Hungary	..	..	..	..	..	..	..	..
Iceland	..	..	..	..	..	..	6 621	..
Ireland	..	..	..	..	..	..	994 144	..
Italy	..	..	400 000	2 813 000	10 477 700	17 091 000	24 548 000	43.6
Japan	89 400	7 161 100	16 692 000	30 352 700	48 329 400	69 909 200	88 097 400	26.0
Korea	..	16 537 747	24 826 749	32 538 532	36 089 425	*40 220 115*	*43 497 541*	8.1
Luxembourg	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..
Netherlands	..	..	..	..	..	..	..	..
New Zealand	..	..	88 000	470 000	993 000	*993 000*	*993 000*	0.0
Norway	..	..	..	..	..	..	..	..
Poland	..	..	..	..	5 534	*5 534*	*5 534*	0.0
Portugal	..	..	..	..	..	..	3 074 319	..
Slovak Republic	..	..	..	..	..	174 999	473 110	170.4
Spain	..	..	..	..	..	3 421 849	9 600 000	180.6
Sweden	..	..	18 000	322 000	..	1 214 000	2 258 000	86.0
Switzerland	..	..			114 806	360 690	1 447 095	301.2
Turkey	..	..	..	..	..	..	..	..
United Kingdom	..	..	230 000	2 567 000	4 611 000	7 820 072	12 514 000	60.0
United States	..	13 900	30 700	49 200	257 431	484 277	586 141	21.0
OECD	89 400	23 712 747	42 308 874	69 687 216	102 651 645	145 791 621	206 834 332	41.9

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Table 4.13. Cellular mobile penetration, subscribers per 100 inhabitants

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR 2005-07	CAGR 1996-2007
Australia	21.7	24.6	28.4	33.3	41.6	56.8	64.1	71.5	81.4	89.7	94.9	102.1	6.7	15.1
Austria	7.5	14.6	28.8	53.8	76.4	81.3	83.3	87.4	97.8	101.7	111.7	118.5	8.0	28.5
Belgium	4.7	9.6	17.2	31.2	54.9	74.8	78.4	83.0	87.7	91.7	91.6	96.3	2.5	31.6
Canada	11.6	14.0	17.7	22.7	28.4	34.3	38.2	42.0	46.9	52.7	57.4	62.1	8.6	16.5
Czech Republic	1.9	5.1	9.4	18.9	42.3	67.9	84.4	95.2	105.6	115.1	115.7	127.3	5.2	46.3
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	7.2	14.9
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	5.8	13.4
France	4.1	9.6	18.7	34.2	48.9	60.5	62.6	67.2	71.3	76.6	81.7	87.1	6.6	32.0
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	10.9	29.2
Greece	5.0	8.7	19.0	35.8	54.3	72.7	84.8	93.7	100.0	112.1	124.6	145.2	13.8	35.9
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	9.0	33.5
Iceland	17.2	24.3	38.7	62.3	76.5	82.6	90.7	96.7	99.1	102.8	106.1	105.2	1.2	17.9
Ireland	8.0	14.0	25.5	42.7	53.2	71.8	79.5	85.7	93.2	101.6	110.3	116.9	7.3	27.6
Italy	11.3	20.7	35.7	52.8	74.3	89.7	92.9	98.4	108.6	122.6	136.4	151.4	11.1	26.6
Japan	21.4	30.3	37.4	44.9	52.7	58.8	63.6	67.8	71.6	75.5	79.6	84.0	5.5	13.2
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	6.2	26.1
Luxembourg	10.8	16.0	30.5	48.2	69.2	97.9	106.0	119.4	141.0	154.7	151.1	142.4	-4.0	26.4
Mexico	1.1	1.9	3.5	8.0	14.3	21.9	25.7	29.5	37.4	45.4	54.4	65.1	19.8	44.9
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	6.2	29.5
New Zealand	12.8	18.8	32.9	40.2	56.7	62.3	64.4	64.8	74.5	86.1	91.8	102.5	9.1	20.9
Norway	28.8	38.1	46.7	59.7	72.2	79.6	83.5	89.0	98.6	102.9	107.4	110.3	3.6	13.0
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	19.2	61.3
Portugal	6.6	14.9	30.4	45.9	65.2	77.5	88.8	95.8	100.7	108.5	115.5	126.8	8.1	30.8
Slovak Republic	0.5	3.7	8.6	12.3	24.0	39.9	54.3	68.4	79.4	84.3	90.8	112.6	15.6	62.7
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	4.7	27.3
Sweden	28.2	35.8	46.4	57.9	69.8	79.1	87.5	96.8	96.3	99.5	104.5	112.2	6.2	13.4
Switzerland	9.4	14.7	23.9	42.9	64.7	73.2	79.1	84.6	85.2	92.2	99.7	109.3	8.9	25.0
Turkey	1.3	2.6	5.5	12.1	22.3	26.8	33.5	39.4	48.3	60.5	72.2	84.9	18.5	46.4
United Kingdom	11.7	14.5	22.2	40.8	60.1	75.5	83.5	88.7	99.8	108.7	115.1	121.0	5.5	23.6
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	10.1	16.4
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	9.7	21.8

StatLink http://dx.doi.org/10.1787/624876620873

Table 4.14. 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
Australia	..	..	..	..		..	409	6	1 350	17	3 300	30	4 120	33	5 400	38	7 080	43	8 504	46	9 700	49	10 150	48
Austria	..	..	..	..	..	..	2 044	48	3 185	52	3 331	51	3 259	48	3 338	47	3 529	44	3 774	45	3 880	42	3 695	37
Belgium	..	..	..	..	..	..	1 275	40	3 377	60	4 901	64	5 331	66	5 716	66	6 036	66	6 042	63	5 755	60	5 639	55
Canada	..	..	..	..	341	6	1 132	16	1 879	22	2 736	26	2 937	24	3 146	24	3 330	22	3 820	22	4 203	22	4 463	22
Czech Republic	..	..	..	..	..	..	..	..	..	..	3 016	43	6 732	78	7 268	75	7 733	72	7 834	67	7 020	59	6 766	52
Denmark	..	..	..	..	..	..	980	37	1 238	37	1 474	37	1 354	30	1 118	23	1 013	20	998	18	1 023	18	990	16
Finland	..	..	..	..	..	..	30	1	75	2	84	2	90	2	94	2	350	7	369	7	454	8	550	9
France	..	..	..	..	..	..	7 279	35	13 806	47	18 022	49	17 108	44	16 462	39	16 409	37	16 698	35	17 185	33	17 776	32
Germany	..	..	..	..	2 087	15	5 533	24	26 318	55	31 374	56	31 338	53	33 307	51	31 374	42	40 200	51	39 947	47	53 433	55
Greece	..	..	..	..	716	35	..	..	3 469	58	5 029	63	6 066	65	6 750	65	7 286	66	8 339	67	9 601	69	11 471	71
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
Iceland	..	..	..	..	6	5	40	23	63	29	88	37	88	34	113	40	125	43	133	44	144	45	137	42
Ireland	..	..	..	..	..	..	640	40	1 266	63	1 967	71	2 210	71	2 510	73	2 845	75	3 202	76	3 540	75	3 708	75
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	91	65 732	92	72 696	90	79 742	89
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
Korea	..	..	..	..	..	..	..	..	..	..	..	..	607	2	591	2	527	1	662	2	538	1	872	2
Luxembourg	..	..	..	..	..	..	47	22	120	39	179	41	179	38	318	59	381	59	419	58	372	52	310	45
Mexico	423	41	982	56	2 282	68	6 327	82	12 450	88	19 974	92	23 922	92	28 069	93	35 943	93	43 861	93	52 711	92	63 043	92
Netherlands	..	..	..	..	1 573	47	3 938	58	7 370	67	7 500	65	7 400	63	8 100	62	10 064	63	12 028	74	9 382	55	9 596	52
New Zealand	..	..	..	..	577	46	879	57	1 487	68	1 661	69	1 737	68	1 798	69	2 115	70	2 461	70	2 595	68	2 878	68
Norway	..	..	..	..	474	23	1 113	42	1 385	43	1 514	42	1 654	44	1 666	41	1 754	39	1 736	37	1 614	32	1 424	27
Poland	..	..	..	..	463	24	942	24	2 606	39	5 120	48	7 375	53	9 467	54	13 498	58	18 813	65	24 319	66	26 684	64
Portugal	..	..	..	..	2 429	79	3 706	79	5 305	80	6 329	79	7 293	79	7 929	79	8 424	80	9 291	81	9 771	80	10 320	77
Slovak Republic	..	..	..	..	..	..	127	19	483	37	1 536	72	1 961	67	2 284	62	2 445	57	2 393	53	2 382	49	3 097	51
Spain	..	..	..	..	2 609	37	9 240	62	15 737	66	19 271	65	22 087	66	21 627	58	20 067	52	20 714	49	25 390	56	26 312	54
Sweden	..	..	235	7	1 016	25	1 983	39	2 773	45	3 536	50	4 309	55	5 003	58	4 629	53	4 638	52	4 693	49	4 642	45
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
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
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	45 392	65	47 170	64
United States	..	..	..	..	..	..	4 302	5	6 570	6	11 565	9	11 565	8	11 565	7	15 000	8	23 430	11	36 270	15	44 710	17
OECD	1 037	1	6 953	4	33 095	13	93 497	26	188 499	37	247 575	41	279 332	41	303 147	41	337 489	40	391 757	42	445 309	43	502 369	44

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Table 4.15. 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	
Australia	August 2000	50.0	72.0	75.0	75.0	81.0	81.0	88.0	91.0	Population
Austria	November 1999	72.0	77.0	80.0	80.0	87.0	90.0	95.0	95.0	Lines
Belgium	October 1999	75.0	93.0	98.0	98.0	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	Population
Czech Republic	March 2003	0.0	0.0	0.0	44.0	84.0	90.0	..	..	Population (customers)
Denmark	July 1999	65.0	90.0	95.0	95.0	96.0	98.0	98.0	99.0	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	Households
Greece	June 2003	0.0	0.0	0.0	0.0	6.0	9.0	..	94.3	
Hungary	September 2000	..	0.0	0.0	58.0	70.0	85.0	87.0	89.0	Population
Iceland	April 2000	33.0	51.0	78.0	90.0	92.0	92.0	..	..	Population
Ireland	May 2002	0.0	0.0	25.0	50.0	74.0	90.0	..	37.0	Lines
Italy	December 1999	45.0	67.5	70.0	80.0	85.0	90.0	89.0	94.0	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	..	..	Lines
Luxembourg	2001	0.0	65.0	90.0	90.0	100.0	100.0	96.0	98.0	Population
Mexico	September 2001	0.0	0.0	..	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	Lines
New Zealand	June 1999	60.0	69.0	83.0	84.8	92.0	93.0	92.0	93.0	Population (customers)
Norway	December 2000	20.0	50.0	58.0	67.0	77.0	91.0	..	..	Lines
Poland (TPSA)	2001	0.0	3.5	56.0	69.0	77.0	85.0	..	..	Lines
Portugal	December 2000	..	..	..	..	..	98.8	..	..	Lines
Slovak Republic	2003	0.0	0.0	0.0	14.5	50.0	60.0	..	76.0	
Spain	1999	62.2	81.3	89.3	92.0	92.0	92.0	..	..	Lines
Sweden	October 2000	..	70.0	75.0	78.0	90.0	96.0	..	97.8	Lines
Switzerland	October 2000	0.0	85.0	95.0	98.0	98.0	98.0	98.0	98.0	Lines
Turkey	February 2001	0.0	0.0	2.5	5.0	10.0	10.0	..	..	Lines
United Kingdom	July 2000	50.0	60.0	64.0	85.0	95.0	99.8	99.6	99.6	Lines
United States	1997	36.0	50.0	68.0	75.0	77.0	78.0	79.0	82.0	Lines
OECD (weighted average)		42.0	55.8	66.9	75.9	78.5	82.7	..	..	
OECD (simple average)		27.3	51.0	61.9	72.0	81.1	85.7	..	..	

StatLink http://dx.doi.org/10.1787/625078205362

Table 4.16. Availability of cable modem service in the OECD area

	Actual coverage by year end (%)								
	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	..	..	..	..	..	..	..	..	..
Austria	..	..	..	..	..	50.0	52.0	55.0	60.0
Belgium	..	..	..	..	64.0	..	..	80.0	..
Canada	..	..	79.4	84.4	87.7	90.1	91.5	93.4	..
Czech Republic	..	..	..	..	..	..	..	..	..
Denmark	..	..	14.0	30.0	50.0	60.0	..	..	..
Finland	..	..	..	..	..	..	..	..	..
France	..	..	..	..	..	..	..	..	..
Germany	..	..	1.9	2.6	3.3	7.7	15.0	38.0	53.0
Greece	..	..	..	..	..	..	..	..	..
Hungary	..	..	..	..	..	..	49.0	74.0	..
Iceland	..	..	..	..	..	..	..	..	..
Ireland	..	..	..	..	..	..	..	..	..
Italy	..	..	..	..	..	..	..	..	..
Japan	..	..	..	..	..	..	..	..	..
Korea	..	..	..	..	..	..	..	..	..
Luxembourg	..	..	..	..	..	..	62.0	65.0	70.0
Mexico	..	..	..	..	..	..	..	..	..
Netherlands	..	..	..	..	..	85.0	..	..	..
New Zealand	..	..	..	..	14.0	14.0	14.0	14.0	14.0
Norway	..	..	..	..	..	..	..	..	..
Poland (TPSA)	..	..	..	..	..	2.5	..	..	..
Portugal	..	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	..	..	..	..	22.0
Spain	..	..	..	..	..	52.3	..	..	..
Sweden	..	..	..	..	..	..	..	..	..
Switzerland	..	..	46.7	61.6	73.2	75.5	..	..	..
Turkey	..	..	..	..	..	..	..	..	..
United Kingdom	..	..	..	..	..	..	50.0	49.0	49.0
United States	..	..	71.0	82.0	88.0	91.0	93.0	96.0	96.0

StatLink http://dx.doi.org/10.1787/625080445231

Table 4.17. **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**
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	*5 809*	*6 153*
Austria	965	1 308	1 283	996	1 662	2 002	2 619	1 620	905	411	436	949	937	1 203
Belgium	614	779	927	719	670	746	952	1 427	1 203	1 181	1 238	1 328	1 313	1 599
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
Czech Republic	..	226	818	1 421	1 164	854	471	599	455	1 267	512	576	627	*843*
Denmark	490	431	612	890	1 077	986	1 116	1 324	970	851	955	1 137	1 237	1 681
Finland	670	510	632	835	595	572	629	657	475	493	511	453	475	515
France	4 548	6 081	6 175	6 423	6 153	6 286	7 194	8 198	5 376	6 109	6 784	7 928	8 769	8 166
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	*7 555*
Greece	291	808	751	843	1 552	1 398	1 346	1 534	1 291	1 263	1 358	901	1 006	1 774
Hungary	216	456	754	764	662	812	820	750	713	625	653	638	635	669
Iceland	12	23	30	29	52	56	69	37	24	44	80	90	78	132
Ireland	174	202	260	462	515	460	704	442	575	575	*638*	*767*	*900*	*1 101*
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
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
Korea	2 587	3 167	4 615	3 049	4 495	7 038	7 766	5 990	6 396	5 205	5 283	5 463	6 895	7 671
Luxembourg	39	72	96	79	30	55	15	30	49	44	73	56	88	110
Mexico	1 409	2 214	1 862	1 971	3 164	4 028	5 226	5 751	3 130	2 584	3 615	3 474	3 747	3 205
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*
New Zealand	362	367	340	389	298	352	379	377	320	376	418	515	596	787
Norway	500	483	361	541	477	541	578	597	707	524	*643*	*2 385*	*957*	*1 261*
Poland	140	489	896	1 006	1 365	1 862	2 434	1 965	2 326	1 363	1 492	1 539	2 466	2 929
Portugal	562	973	938	1 078	1 216	1 248	1 179	1 274	967	645	838	916	953	1 634
Slovak Republic	..	..	287	384	343	1 050	1 359	1 405	641	345	425	420	442	530
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
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
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	2 012
Turkey	548	787	500	553	4 225	3 777	3 541	2 949	2 159	2 204	368	1 389	1 154	1 907
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*
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	74 515
OECD	88 514	108 296	129 227	156 789	168 006	208 472	243 130	219 901	151 443	142 263	148 580	155 046	171 781	185 261

Note: Data in italics indicate unofficial estimates derived from historic ratios of incumbent investment to total investment. Exchange rate fluctuations between years among national currencies and the US dollar will affect growth rates. For example, French telecommunication investment grew 15.6% in USD terms but only 14.1% in EUR terms between 2004 and 2005.

StatLink http://dx.doi.org/10.1787/625111707460

Table 4.18. 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	Percent of total investment 2007
Australia												
Austria		1 211	1 069	1 958	833	502	205	212	483	534	726	60.4
Belgium					571	368	302	410	402	513	474	29.6
Canada	1 371	988	811	1 346	1 223	1 232	929	846	910	1 492	1 605	21.0
Czech Republic	337	101	317	731	625	355	238	250	368	515		
Denmark	124											
Finland	1 352											
France												
Germany	2 247	2 000	2 918	3 250	2 766	2 264	2 809	3 210	3 125	3 375		
Greece	170 000			620	533	489	522	730	530	595	666	37.5
Hungary	163			376	422	419	210	265	251			
Iceland	3	6	10				10	10	19	8	64	48.0
Ireland	162											
Italy	1 170	1 745	2 274	3 034	3 318	4 840	4 135	4 605	4 129	3 956	4 375	46.0
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	28 635	26 402	24	3 269	3 910	51.0
Luxembourg							101	41	46	35	27	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	1 180	40.3
Portugal	329	674	739	552	484	460	372	501	522	545	1 008	61.7
Slovak Republic				383		255	160	148	166	210	307	57.9
Spain	478			2 642	1 756		1 612	2 277	2 753	2 824	3 061	38.8
Sweden	302	174	192	162	224	591	640	530	392	293	477	30.2
Switzerland	171	248	745	616	509	586	627	695	515	389	417	20.7
Turkey		3 619	3 162	2 835	2 589	1 961			1 038	766	1 112	58.3
United Kingdom	1 866											
United States		8 228	14 422	25 482	24 028	20 490	20 989	23 998	27 337	27 969	21 142	28.4

StatLink http://dx.doi.org/10.1787/625124367755

Table 4.19. 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	Average 2005-07
Europe	39 603	50 662	45 678	53 413	58 127	71 026	71 157	69 788	54 537	53 875	56 379	59 522	64 485	66 810	63 606
(%)	45	47	35	34	35	34	29	32	36	38	38	38	38	36	37
North America	28 289	31 631	42 424	63 115	72 599	92 365	123 470	116 496	68 284	58 219	59 151	66 177	72 959	85 353	74 830
(%)	32	29	33	40	43	44	51	53	45	41	40	43	42	46	44
Asia/Pacific	20 622	26 003	41 125	40 261	37 279	45 081	48 503	33 618	28 622	30 169	33 049	29 347	34 337	33 098	32 261
(%)	23	24	32	26	22	22	20	15	19	21	22	19	20	18	19
OECD	88 514	108 296	129 227	156 789	168 006	208 472	243 130	219 901	151 443	142 263	148 580	155 046	171 781	185 261	170 696

Notes: Calculations include unofficial estimates derived for Table 4.17.

StatLink http://dx.doi.org/10.1787/625125350313

Table 4.20. 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
Australia	50.8	24.1	33.4	27.3	29.8	27.0	25.3	26.2	21.6	17.3	21.5	17.0	16.7	20.3	17.7
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
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	10.8	10.8
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
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	14.9
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
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
France	30.6	32.7	26.9	19.9	22.4	19.6	17.6	20.0	21.3	12.8	11.8	11.4	12.1	13.4	11.1
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	8.6
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	9.4	9.7	15.3
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
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
Ireland	21.7	20.2	24.0	24.2	21.7	26.9	23.9	31.3	17.8	18.0	14.4	12.6	15.1	16.8	17.7
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
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	13.8
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	14.4	15.4	15.8
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	16.2
Mexico	112.5	55.9	24.0	30.3	22.5	32.8	35.7	36.4	35.8	18.5	15.1	19.3	15.9	14.6	11.2
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	12.5
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	14.3	16.6
Norway	25.5	21.9	14.4	18.4	15.0	19.3	20.8	22.0	21.2	21.1	13.1	14.4	50.0	19.8	23.7
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	13.4	19.2	20.3
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	10.3	16.4
Slovak Republic	..	..	197.3	130.9	85.1	71.3	236.3	169.0	149.3	62.7	25.7	26.2	22.6	22.6	20.9
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
Sweden	34.5	23.2	23.0	19.3	20.3	15.7	21.9	37.1	35.9	27.5	23.3	23.2	17.8	20.9	21.4
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	12.7	39.7	14.3
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
United Kingdom	28.6	15.3	19.2	28.2	27.9	25.1	31.6	31.3	30.4	20.7	19.2	17.5	15.7	13.8	12.2
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	16.8	18.9
OECD	31.6	29.7	29.4	26.2	25.2	25.4	27.9	29.8	26.2	17.8	15.2	14.7	14.6	15.7	15.6

Note: Calculations include unofficial estimates derived for national investment and revenues for some countries.

StatLink http://dx.doi.org/10.1787/625127272705

Table 4.21. Public telecommunication investment as a percentage of gross fixed capital formation (GFCF)

	Average 1988-90	Average 1991-93	Average 1994-96	Average 1997-99	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average 2005-07
Australia	3.06	3.18	3.60	3.89	3.91	3.75	4.01	4.36	3.81	2.51	3.00	2.44	2.23	2.74	2.62	2.53
Austria	2.95	3.05	2.47	3.11	2.02	3.26	4.05	5.73	3.67	2.02	0.73	0.69	1.42	1.34	1.46	1.41
Belgium	1.69	1.78	1.80	1.39	1.45	1.30	1.43	1.98	3.02	2.48	2.04	1.77	1.73	1.57	1.61	1.64
Canada	2.89	3.08	2.63	3.28	3.30	3.55	2.99	3.57	3.67	2.90	1.92	1.97	1.89	2.13	2.35	2.12
Czech Republic	1.57	2.74	5.23	6.75	8.31	6.68	5.25	2.97	3.46	2.20	5.20	1.81	1.86	1.79	1.99	1.88
Denmark	2.06	1.71	1.96	2.85	2.66	3.03	2.86	3.45	4.17	2.85	2.08	2.02	2.24	2.07	2.37	2.23
Finland	1.97	2.32	3.25	2.80	3.68	2.41	2.31	2.68	2.70	1.95	1.66	1.49	1.22	1.18	1.03	1.14
France	1.92	2.29	2.22	2.41	2.58	2.34	2.30	2.79	3.15	1.96	1.81	1.72	1.84	1.87	1.47	1.72
Germany	2.97	3.51	2.45	2.06	2.63	1.74	1.82	2.24	2.72	1.81	1.42	1.47	1.48	1.54	1.22	1.41
Greece	1.79	3.99	3.48	4.70	3.42	5.89	4.81	4.89	5.47	3.87	2.70	2.43	1.55	1.46	2.20	1.74
Hungary	..	5.94	8.22	6.83	7.50	5.94	7.05	7.45	6.12	4.66	3.36	2.85	2.46	2.61	2.30	2.46
Iceland	0.98	1.94	2.59	2.50	1.95	2.61	2.93	3.49	2.18	1.50	2.00	2.57	1.95	1.40	2.41	1.92
Ireland	2.45	2.43	2.27	2.55	2.86	2.72	2.07	3.16	1.89	2.17	1.64	1.43	1.42	1.51	1.60	1.51
Italy	9.35	3.82	2.48	2.69	2.46	2.55	3.05	2.94	3.18	3.50	2.90	2.48	2.33	2.17	2.15	2.22
Japan	1.65	1.72	2.39	2.90	2.78	2.91	3.01	3.11	2.37	2.11	2.12	2.22	1.79	2.05	1.82	1.89
Korea	3.54	2.66	2.68	3.75	1.66	4.29	5.32	4.88	4.21	4.02	2.86	2.63	2.36	2.67	2.75	2.59
Luxembourg	1.89	2.33	2.64	1.26	1.97	0.72	1.11	0.36	0.66	0.96	0.70	1.03	0.74	1.12	1.10	0.99
Mexico	3.54	3.24	2.99	3.06	2.30	3.28	3.61	3.84	4.22	2.29	1.95	2.42	2.05	1.91	1.63	1.86
Netherlands	1.97	2.30	1.88	7.19	3.88	6.60	11.08	3.78	3.16	1.79	1.75	2.68	1.78	1.99	1.77	1.85
New Zealand	4.12	5.05	2.67	2.78	2.74	2.69	2.91	3.53	3.45	2.46	2.05	1.80	1.94	2.41	2.81	2.38
Norway	1.92	1.98	1.21	1.46	1.56	1.26	1.55	1.86	1.93	2.06	1.34	1.38	4.20	1.50	1.56	2.42
Poland	3.39	3.43	3.77	3.56	2.86	3.28	4.55	5.99	4.98	6.27	3.45	3.27	2.78	3.67	3.20	3.22
Portugal	3.56	4.65	3.97	3.83	3.80	3.87	3.83	3.88	4.17	3.03	1.81	2.08	2.21	2.26	3.35	2.61
Slovak Republic	..	..	5.48	8.99	5.30	4.28	17.39	25.83	23.35	9.58	4.19	4.19	3.30	3.04	3.03	3.13
Spain	4.23	3.34	2.64	3.38	2.12	3.68	4.34	6.26	4.63	2.90	2.13	2.00	2.07	1.89	1.77	1.91
Sweden	2.27	2.76	3.28	2.91	3.59	2.82	2.31	3.78	4.36	3.41	2.87	2.69	1.86	1.94	1.84	1.88
Switzerland	2.98	3.23	2.89	2.79	2.86	2.11	3.40	3.97	2.95	2.79	2.37	2.19	2.07	6.22	2.15	3.48
Turkey	1.99	1.94	1.27	5.24	0.87	6.84	8.01	6.56	9.47	5.56	4.27	0.46	1.36	0.98	1.35	1.23
United Kingdom	2.59	2.19	2.67	4.25	4.40	3.46	4.91	5.58	5.69	3.78	3.57	3.12	2.68	2.23	1.89	2.26
United States	2.41	2.54	2.89	4.10	3.71	3.91	4.67	5.83	5.47	3.26	2.68	2.40	2.44	2.49	2.95	2.63
OECD	2.51	2.54	2.61	3.42	3.08	3.32	3.87	4.41	4.16	2.87	2.41	2.23	2.14	2.21	2.20	2.18

Note: Calculations include unofficial estimates derived for Table 4.17.

StatLink http://dx.doi.org/10.1787/625145166312

Table 4.22. 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	Average 2005-07	Monthly average 2005-07
Australia	294.8	248.8	328.4	253.0	280.5	226.9	251.6	206.6	153.0	111.2	160.8	146.1	141.2	173.5	171.6	162.1	13.5
Austria	310.4	377.6	343.3	251.9	210.5	288.8	256.5	272.0	159.8	87.2	37.8	36.5	75.5	69.2	84.6	76.5	6.4
Belgium	164.3	183.1	196.8	106.1	119.7	103.2	95.3	92.7	114.5	90.6	84.3	83.1	84.8	81.5	94.3	86.9	7.2
Canada	238.6	206.1	159.4	167.9	182.3	175.0	146.5	166.4	154.8	118.4	88.2	100.8	108.7	135.1	160.3	134.7	11.2
Czech Republic	25.2	123.4	333.2	256.9	374.4	247.7	148.5	57.1	56.4	37.9	96.5	36.0	37.2	39.9	49.1	42.1	3.5
Denmark	171.9	143.4	189.4	190.8	193.1	209.8	169.5	168.0	179.6	120.8	99.8	104.5	119.9	121.3	158.1	133.1	11.1
Finland	260.2	186.1	221.1	120.1	166.6	102.6	91.0	92.3	89.7	61.3	61.2	61.9	51.3	51.8	54.2	52.4	4.4
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	83.9	91.0	7.6
Germany	312.2	438.3	298.6	173.7	243.5	147.2	130.5	103.1	105.1	65.6	56.8	58.5	56.2	58.5	49.1	54.6	4.6
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	78.2	59.6	5.0
Hungary	233.8	349.5	337.7	166.3	198.0	146.1	154.9	123.0	88.8	69.5	54.8	53.1	49.3	44.1	42.6	45.3	3.8
Iceland	96.6	166.5	198.5	164.0	129.1	195.7	167.3	183.5	92.2	54.7	92.4	162.0	169.5	140.3	230.6	180.1	15.0
Ireland	191.4	182.2	197.8	191.3	229.6	203.3	141.0	192.4	99.6	119.1	111.3	113.1	122.8	128.5	147.3	132.9	11.1
Italy	346.8	366.0	202.7	137.2	150.1	131.2	130.5	97.5	94.4	113.1	104.1	94.4	84.1	75.7	78.6	79.4	6.6
Japan	294.8	350.9	530.4	290.1	324.6	264.0	281.6	282.2	171.8	127.8	124.8	132.5	106.5	114.8	98.7	106.7	8.9
Korea	194.5	202.8	244.8	130.7	109.8	129.3	153.0	144.4	97.0	95.2	78.3	75.1	77.3	90.6	95.7	87.9	7.3
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	82.6	102.7	79.8	6.7
Mexico	289.7	325.6	213.8	211.1	179.2	238.3	215.9	197.5	161.3	76.1	55.2	62.8	50.4	46.8	34.6	43.9	3.7
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	94.7	95.8	90.8	7.6
New Zealand	254.5	242.8	205.2	121.1	157.8	98.8	106.8	96.1	89.3	72.5	82.4	82.5	89.3	97.0	114.8	100.4	8.4
Norway	241.1	213.1	145.1	113.6	130.2	104.9	105.7	102.1	99.6	112.5	78.8	87.3	310.0	120.7	154.5	195.1	16.3
Poland	44.8	123.1	155.6	130.2	120.9	131.1	138.5	137.6	88.6	89.9	46.2	41.8	37.5	49.4	54.1	47.0	3.9
Portugal	267.6	325.2	257.7	173.6	200.5	174.5	145.7	112.7	107.9	73.5	45.7	56.0	56.9	56.0	90.1	67.7	5.6
Slovak Republic	..	71.8	256.0	288.3	241.2	170.8	452.8	454.4	379.4	147.9	69.3	76.1	71.6	69.7	69.5	70.3	5.9
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	102.6	98.5	102.8	101.3	8.4
Sweden	188.7	196.3	197.6	118.5	151.8	113.6	89.9	131.0	126.1	97.5	92.8	99.1	72.7	81.1	88.4	80.7	6.7
Switzerland	421.7	425.0	389.3	268.2	307.3	215.3	282.1	254.9	172.2	161.5	143.8	143.8	130.2	392.8	140.2	221.1	18.4
Turkey	92.9	79.1	35.8	128.1	31.9	206.4	146.1	105.8	79.0	50.9	47.0	6.8	21.7	15.5	22.5	19.9	1.7
United Kingdom	195.4	141.7	166.5	231.0	260.4	202.2	230.3	209.9	183.8	124.0	125.7	118.7	98.0	84.9	79.7	87.5	7.3
United States	178.8	182.2	238.3	312.7	303.9	320.1	314.0	378.3	329.4	174.6	144.4	131.0	135.4	136.3	153.7	141.8	11.8
OECD	227.8	246.2	261.7	234.8	241.7	230.4	232.2	229.2	186.0	118.6	104.6	99.9	96.5	99.0	100.0	98.5	8.2

Note: Calculations include unofficial estimates derived for Table 4.17. Total communication access paths = analogue lines + ISDN lines + DSL + cable modem + fibre + mobile subscribers.

StatLink http://dx.doi.org/10.1787/625151653722

Table 4.23. 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	Average 2005-07	Monthly average 2007
Australia	135.97	121.83	168.73	205.76	215.45	184.09	217.74	199.38	170.69	134.11	208.43	205.51	216.31	279.03	295.58	263.64	24.63
Austria	126.24	165.56	159.44	194.63	125.02	208.38	250.48	326.91	201.44	111.91	50.66	53.28	115.23	113.14	144.64	124.34	12.05
Belgium	61.80	77.57	91.39	69.75	70.66	65.65	72.93	92.93	138.75	116.47	113.87	118.83	126.80	124.56	150.54	133.97	12.54
Canada	127.61	118.17	95.76	137.56	139.80	144.47	128.41	161.07	165.63	132.41	103.31	124.34	141.52	186.81	233.78	187.37	19.48
Czech Republic	3.79	21.86	79.21	111.35	137.90	113.08	83.08	45.89	58.62	44.63	124.16	50.15	56.25	61.07	82.12	66.48	6.84
Denmark	95.44	83.36	116.96	185.57	168.34	203.15	185.22	209.01	247.16	180.40	157.85	176.80	209.88	227.43	307.79	248.36	25.65
Finland	134.87	101.14	123.83	129.56	162.44	115.49	110.76	121.48	126.73	91.24	94.51	97.80	86.44	90.22	97.48	91.38	8.12
France	80.61	106.25	106.76	104.67	107.36	102.48	104.16	118.41	134.00	87.26	98.47	108.64	126.20	138.76	128.45	131.13	10.70
Germany	148.79	196.16	155.73	114.53	144.99	97.53	101.09	110.51	124.70	81.21	74.89	85.30	87.92	98.65	91.84	92.80	7.65
Greece	28.95	78.42	71.89	116.64	78.20	143.21	128.51	123.27	140.08	117.46	114.57	122.77	81.17	90.26	158.79	110.07	13.23
Hungary	20.75	44.21	73.70	72.66	74.24	64.47	79.29	80.34	73.66	70.16	61.66	64.61	63.29	63.09	66.52	64.30	5.54
Iceland	47.13	89.15	112.46	165.32	105.32	189.41	201.23	246.97	130.72	84.42	151.61	273.24	305.33	257.16	425.04	329.18	35.42
Ireland	49.47	57.01	72.16	129.12	126.12	138.68	122.55	185.18	114.53	146.57	144.14	157.22	184.82	211.53	258.90	218.42	21.58
Italy	128.67	152.72	89.28	109.55	97.65	104.71	126.28	114.60	126.51	156.34	153.84	150.34	146.90	143.26	160.41	150.19	13.37
Japan	125.07	163.49	263.89	251.61	260.32	229.61	264.91	287.88	188.10	151.10	159.90	181.52	148.15	164.67	144.71	152.51	12.06
Korea	60.93	72.40	102.35	104.81	66.34	97.11	150.98	165.21	126.50	134.30	108.76	109.97	113.49	142.77	158.31	138.19	13.19
Luxembourg	103.11	182.69	234.21	128.46	187.09	71.28	127.01	34.63	68.56	109.94	97.03	158.45	120.16	185.15	228.17	177.82	19.01
Mexico	17.00	26.07	20.63	31.97	20.99	33.22	41.72	53.19	57.76	31.06	25.37	35.14	33.46	35.77	30.60	33.28	2.55
Netherlands	77.01	103.58	97.75	414.83	209.79	375.72	658.99	199.37	166.51	96.87	112.27	187.81	132.49	161.85	167.35	153.90	13.95
New Zealand	108.63	104.52	92.99	90.92	102.76	78.13	91.86	98.21	96.95	81.08	93.65	102.84	125.47	143.92	189.95	153.11	15.83
Norway	118.26	112.68	82.87	117.16	122.72	107.59	121.17	128.59	132.31	155.82	114.76	139.97	516.06	205.33	267.97	329.79	22.33
Poland	3.68	12.75	23.21	36.86	26.27	35.65	48.64	63.62	51.38	60.84	35.70	39.07	40.32	64.67	76.85	60.61	6.40
Portugal	56.71	98.85	95.17	116.49	106.79	120.04	122.64	115.29	123.81	93.23	61.82	79.77	86.82	90.06	154.00	110.29	12.83
Slovak Republic	..	7.73	53.62	109.83	71.33	63.54	194.61	251.68	261.24	119.22	64.20	78.91	78.05	82.03	98.39	86.15	8.20
Spain	116.46	109.34	82.09	119.94	67.05	128.14	164.62	232.11	179.59	126.88	121.50	136.34	158.84	161.27	175.70	165.27	14.64
Sweden	127.06	134.34	135.72	134.69	158.68	130.96	114.42	184.49	192.66	159.43	162.08	175.35	130.93	152.17	172.99	152.03	14.42
Switzerland	239.14	259.96	249.97	232.15	231.22	179.73	285.52	313.34	228.02	227.88	215.99	225.60	218.98	695.75	267.93	394.22	22.33
Turkey	9.97	13.48	8.12	44.71	8.85	66.57	58.70	52.48	42.98	31.00	31.17	5.12	19.28	15.81	26.13	20.41	2.18
United Kingdom	84.21	64.45	83.38	180.93	170.99	153.69	218.11	239.81	239.53	171.69	183.58	191.83	171.52	157.72	155.75	161.66	12.98
United States	94.57	102.05	143.50	248.87	208.69	235.66	302.27	401.16	370.07	211.65	179.96	175.58	196.14	210.94	246.67	217.92	20.56
OECD	86.76	102.21	119.21	159.78	141.98	151.11	186.24	215.18	193.20	132.09	123.19	127.79	132.54	145.89	156.67	145.03	13.06

Note: Calculations include unofficial estimates derived for Table 4.17.

StatLink http://dx.doi.org/10.1787/625156763584

Table 4.24. Communications data for accession countries and China

	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
	Fixed telephone access paths, in thousands					Fixed telephone access paths per 100 inhabitants				
Chile	3 252	3 318	3 436	3 326	3 379	21.4	21.5	22.0	20.2	20.3
Estonia	423	404	387	376	398	31.2	29.9	28.7	28.0	29.7
Israel	2 913	2 896	2 936	3 005	3 125	43.5	42.5	42.4	42.6	43.5
Russian Federation	36 100	38 500	40 100	43 900	..	25.0	26.8	27.9	30.8	..
Slovenia	812	811	813	792	735	40.7	40.6	40.7	39.5	36.4
OECD	530 128	521 764	514 075	499 748	479 661	45.9	44.9	43.9	42.4	40.6
China	262 747	311 756	350 445	373 812	370 448	20.2	23.8	26.6	28.2	27.9
	Total communication access paths, in thousands					Total communication access paths per 100 inhabitants				
Chile	10 520	12 580	14 689	16 793	18 641	69.1	81.6	94.2	102.0	112.1
Estonia	1 475	1 659	1 966	2 214	2 564	108.8	122.8	145.9	164.6	191.0
Israel	9 531	10 118	11 490	12 438	13 021	142.5	148.6	165.8	176.3	181.3
Russian Federation	72 235	112 347	161 689	194 574	170 000	49.9	78.1	112.7	136.5	119.3
Slovenia	3 640	3 943	3 881	3 928	3 807	182.4	197.4	194.0	195.6	188.6
OECD	1 384 117	1 502 443	1 627 203	1 748 462	1 853 400	119.9	129.2	139.1	148.5	156.7
China	271 205	646 581	770 391	872 014	969 750	69.1	81.6	94.2	102.0	112.1
	Cellular mobile subscribers, in thousands					Cellular mobile subscribers per 100 inhabitants				
Chile	7 268	9 261	10 570	12 451	13 955	47.7	60.1	67.8	75.6	83.9
Estonia	1 052	1 256	1 445	1 659	1 982	77.6	92.9	107.3	123.4	147.6
Israel	6 618	7 222	7 757	8 404	8 983	98.9	106.1	111.9	119.1	125.1
Russian Federation	36 135	73 722	120 000	150 674	170 000	25.0	51.2	83.6	105.7	119.3
Slovenia	1 762	1 849	1 759	1 820	1 928	88.3	92.6	87.9	90.6	95.5
OECD	740 900	836 656	934 426	1 033 616	1 135 920	64.2	72.0	79.9	87.8	96.1
China	269 953	334 824	393 406	461 082	547 286	20.8	25.6	29.9	34.8	41.2
	Total broadband subscribers, in thousands					Total broadband subscribers per 100 inhabitants				
Chile	322	450	683	1 016	1 343	2.1	2.9	4.4	6.2	8.1
Estonia	82	125	167	229	261	6.0	9.2	12.4	17.1	19.4
Israel	633	980	1 230	1 420	1 579	9.5	14.4	17.7	20.1	22.0
Russian Federation	343	675	1 589	2 900	..	0.2	0.5	1.1	2.0	..
Slovenia	66	114	195	279	344	3.3	5.7	9.7	13.9	17.1
OECD	85 887	122 759	164 670	200 256	236 380	7.4	10.6	14.1	17.0	20.0
China	8 184	17 203	26 540	37 120	52 016	0.6	1.3	2.0	2.8	3.9
	Internet dial-up subscribers, in thousands					Total broadband subscribers, in thousands, 2007				
						DSL	Cable modem	Fibre	Other	Total
Chile	484	326	198	86	38	769	538	0.5	36	1 343
Estonia	47	33	18	12	6	115	69	52	25	261
Israel	623	508	448	193	176	963	616	..	..	1 579
Russian Federation	..	..	..	..	..	2 900	..	..	..	2 900
Slovenia	223	229	201	123	73	247	85	11	0.7	344
OECD	163 085	129 237	104 553	40 551	29 364	144 264	67 780	20 381	3 954	236 380
China	..	..	..	..	..	52 016	..	..	..	52 016

StatLink http://dx.doi.org/10.1787/625164686444

ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Chapter 5

Internet Infrastructure

The growth in broadband subscriptions has helped fuel the expansion of the Internet and also been one source of its growing pains. This growth in the number of networks – and devices attached to those networks – has led to a shortage of unique Internet addresses used to identify individual devices connected to the Internet. As a result, there is a need for all network operators to upgrade to a new Internet addressing scheme, Internet protocol version 6 (IPv6). Based on allocation trends, experts estimate that the addresses in the current scheme (IPv4) will run out in 2011 or early 2012 (January 2009 projections).

Introduction

Over the past decade, there has been tremendous growth in the scale and scope of the Internet. All available indicators show that in the two years since the previous edition of the *Communications Outlook*, the Internet has continued to experience unabated growth in terms of numbers of Internet hosts, web servers and secure servers at the edge of the network. This growth has also occurred in areas such as the Internet's core naming and addressing systems including domain names, IP addresses and autonomous system numbers as well as with regard to routing infrastructure services. Attending this growth has been a rise in security-related incidents.

This chapter discusses developments in the basic underlying structure of the Internet. The Internet is distributed by nature, with numerous entities co-operating to form a network of networks. This creates challenges for measurement. On the other hand, for some indicators, data are available from online surveys undertaken through the network. In addition, databases to track entities that have been assigned IP address blocks or autonomous system numbers provide country data on Internet infrastructure, as do country code top-level domain names and databases on domain name registrations.

One source of data is the Internet Systems Consortium's (ISC) long-running Internet Domain Survey which provides data on Internet hosts. According to the ISC, the Internet has grown from 30 million hosts in 1998 to 540 million hosts in January 2008. Other sources show that Web servers have grown in number from 2 million in 1998 to 33 million by mid-2008. These servers help enable more than 175 million websites to form the World Wide Web. Secure servers, used for a multiplicity of purposes such as electronic commerce, have grown in number from 20 000 in 1998 to 660 000 by June 2008. Domain name registrations increased from 25 million in 2000 to 168 million by 2008.

Internet growth is also evident in the use of IP addresses. IPv4 addresses are nearing full allocation, with 13% of addresses remaining at year-end 2008. The deployment of IPv6 is still in the early stages but gathering momentum, with the number of IPv6 prefixes allocated doubling from about 1 300 in 2005 to over 2 800 at year-end 2008. The number of individual networks on the Internet (or "autonomous systems") has increased from fewer than 3 000 in 1997 to over 26 000 ten years later, as Internet connectivity became increasingly important for enterprises. One measure of security incidents is the number of bot-infected computers and this number decreased by 17% between 2007 and mid-2008. In practice, several indicators are closely correlated and point to the same countries as having the most advanced Internet infrastructure. These typically are the United States, Germany, the Nordic countries and the Netherlands, as well as Japan and Korea.

Internet hosts

One of the leading indicators used to measure growth in the Internet are surveys of Internet hosts, such as the survey undertaken by Internet Systems Consortium (ISC). An Internet host is a computer or device connected to the Internet and uniquely identified

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with an IP address. Internet hosts can be servers that provide services to other machines (*e.g.* Web servers, e-mail servers, FTP servers and so on), and/or clients that use services. Internet hosts include web servers, mail servers, work stations or ports of Internet service providers (ISPs). ISC's survey attempts to discover every visible host on the Internet by counting the number of IP address records that have been assigned a domain name. It should be noted that domain names assigned can be at any level, *i.e.* they are not limited to registered domain names.

Data on Internet hosts can help provide information on network growth and accessibility, and how densely hosts populate the address space. However, host data do not indicate the total number of users accessing the Internet. Surveys may also underestimate the size of the Internet because many hosts are unreachable by the survey, as they are behind firewalls and in private address space behind network-address translators. ISC's methodology also excludes Internet hosts when there is no information in ARPA zones, excluding many hosts that are not special purpose hosts. In addition, with the development of virtual hosting where a single machine might act like several systems and have multiple domain names and IP addresses, a host is no longer necessarily an individual device. Overall, host counts tend to be on the low side and should be seen as an indicator of the minimum size of the Internet, which is visible to the rest of the Internet. 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).

The number of Internet hosts worldwide reached 540 million in January 2008 (Table 5.1). This was up from less than 30 million in 1998. The host count grew by 33% compound annual growth rate (CAGR) during this period. Over half of all hosts (287 million) had a generic top-level domain (gTLDs), of which a great majority (190 million or 43%) under the .net domain, which is commonly used for nework operations such as hosting.

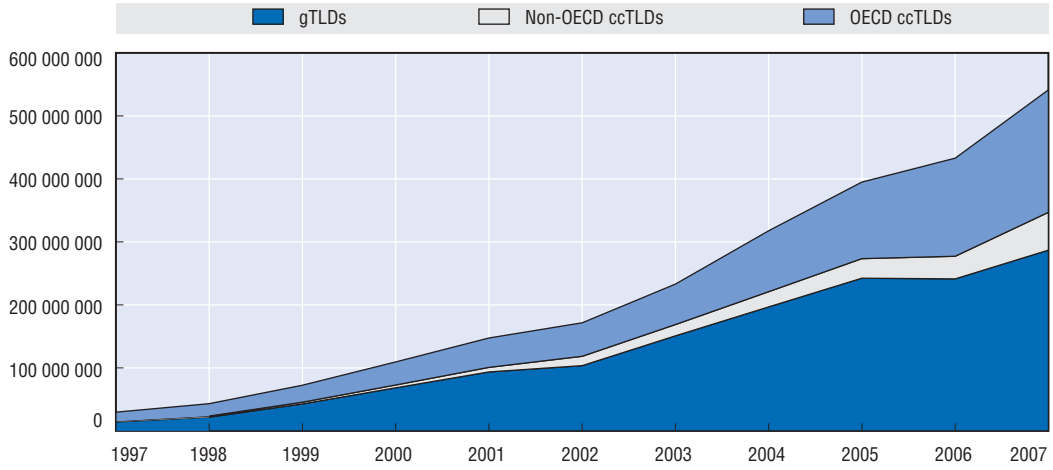
In January 2008, 36% of hosts (195 million hosts) were connected under OECD-related country code top-level domains (ccTLDs). The largest OECD country code domain (ccTLD) in terms of hosts was .jp (Japan) with over 36 million hosts. While under 2 million hosts were under the .us domain, over 15 million more were under various other US domains (.edu, .mil, .gov). For historical reasons, most hosts in the United States are under gTLDs such as .com and .net. Other large ccTLDs are: .de (Germany) with 20 million hosts; .it (Italy) with 16 million; .fr (France) with 14 million; .au (Australia) with 11 million, and .nl (the Netherlands) with 10 million.

The countries with the largest number of Internet hosts per capita are Iceland, Finland, the Netherlands, Denmark and Norway. Ireland, Mexico and Turkey experienced high growth rates of 75% or more between 2006 and 2008, growing from comparatively lower penetration levels. The overall worldwide growth rate slowed significantly between 2006 and 2007 to reach 10% on average, due chiefly to zero growth in hosts under gTLDs that year. Growth in this indicator picked up again between 2007 and 2008.

Web servers

Web servers are computers that host or "serve" content (*e.g.* web servers host websites): the number of web servers provides one 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

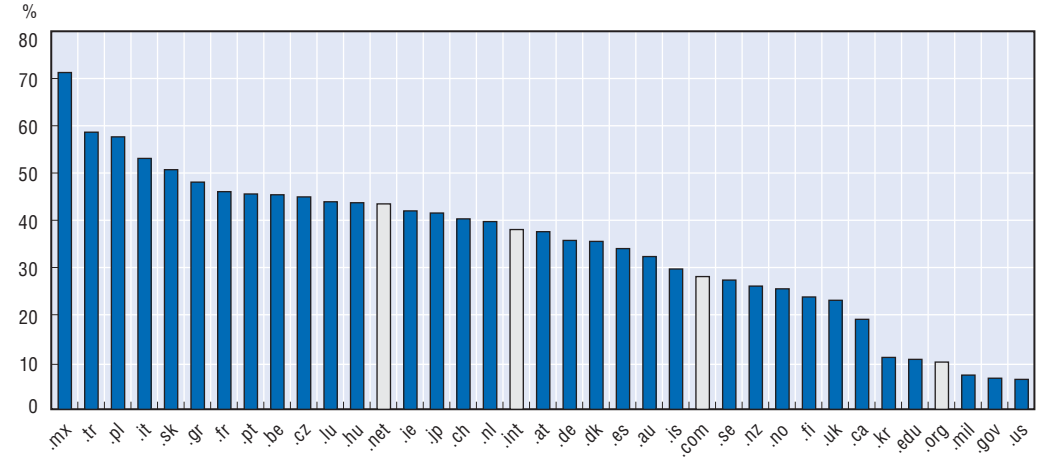
Figure 5.1. **Internet hosts by type of domain, 1998-2008**



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

StatLink http://dx.doi.org/10.1787/621385326367

Figure 5.2. **Average annual growth in Internet hosts by domain, 1998-2008**



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

StatLink http://dx.doi.org/10.1787/621402474058

web servers by having a web crawler visit websites that have a hyperlink to them from at least one other site. This methodology excludes about 90% of web pages, in particular a number of personal web sites or blogs that are not linked to by any well-known sites. In addition, web sites that do not allow web crawlers or web robots are not considered by the survey. Therefore the survey may underestimate the number of web servers.

Growth of web servers, from 20 million in 2006 to 33 million by mid-2008, has continued alongside continued expansion of the World Wide Web, which totalled some 175 million websites by mid-2008, up from 80 million in 2006. Of the 33 million web servers reported by E-Soft's survey, more than 60% (19 million) were in the major gTLD domains and 40% were under ccTLDs. Reflecting the commercial growth within the Internet, .com alone accounted for almost 14 million web servers (about 45% of the worldwide total). Among OECD-related ccTLDs, the largest were .de (Germany) with 2.3 million web servers

(7% of the total), .nl (Netherlands) with 1.1 million web servers (3%) and .uk (United Kingdom) with almost 1 million (3%) (Table 5.2). These data are consistent with other data showing that Germany and the United Kingdom are the locations for largest hosting of sites outside the United States.

The worldwide total number of web servers increased by 40% per annum between mid-2000 and mid-2008, with gTLDs .com and .org increasing by 40% per annum and .net by 45% per annum. The fastest growing OECD country-related ccTLDs were .au (Australia), which experienced a 34% per annum growth in the number of web servers recorded, .hu (Hungary) at 63% per annum, .pl (Poland) at 55% per annum, and .be (Belgium) at 52% per annum.

Secure servers

Secure sockets layer (SSL) sites are used by e-commerce sites, online banking and financial services, and other online service providers. They provide security by allowing an encrypted connection between server and browser, so that sensitive information such as credit card numbers can be transmitted in a more secure way on the Internet. Netcraft's survey of SSL sites found more than 660 000 secure servers in the OECD area in July 2008, representing 96% of the global total (Table 5.3). This survey provides one indicator of the development of online trading and services in different countries. The survey counts each distinct, valid SSL certificate, which typically represents a single company approved by a certificate authority.

Over the ten years up to July 2008, the number of secure servers in the world grew at an average rate of 42% per annum. Online trading and services remain most prevalent in the United States, where over half of the world's secure servers are still located. However, the share of the United States has decreased significantly, from 72% in 1998 to 52% in 2008, as actors in other countries have been increasing their use of secure servers. Japan, the United Kingdom and Germany follow the United States in terms of absolute numbers of secure servers.

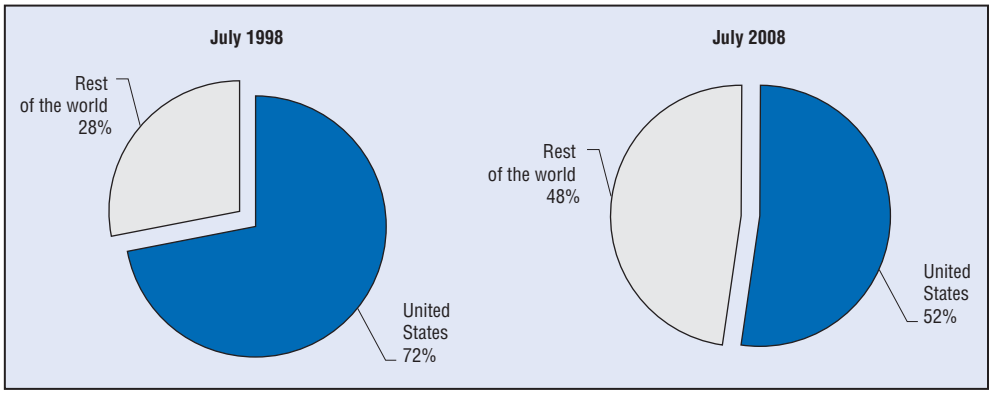
On a per capita basis, Iceland leads in the use of secure servers. Following Iceland are the United States, the Netherlands, Denmark and Switzerland. High Internet access penetration rates and adoption of electronic payment systems have fuelled the market for Internet services in these countries.

The number of secure servers in OECD countries increased by 42% a year on average between July 1998 and July 2008. Growth was particularly high from mid-2003 to mid-2004 (over 60%). Korea, the Czech Republic, Hungary, the Netherlands and Poland all experienced growth rates of 43% or more in 2008, with Hungary and Poland starting from a very low level (seven secure servers per 100 000 inhabitants). Adoption levels vary widely: ten OECD countries had more than 80 secure servers per 100 000 inhabitants in July 2008 and seven had fewer than ten (Figure 5.3).

The domain name system

The domain name system (DNS) translates user-friendly domain names (*e.g.* www.oecd.org) into numeric Internet (IP) addresses (*e.g.* 203.160.185.48) and is used by every computer on the Internet to find other computers. The DNS handles billions of requests daily and is essential to the Internet's smooth functioning. Top-level domains (TLDs) are divided into two classes. Generic top-level domains (gTLDs) include for example ".com" or ".org", while country code top-level domains (ccTLDs) are used and reserved for

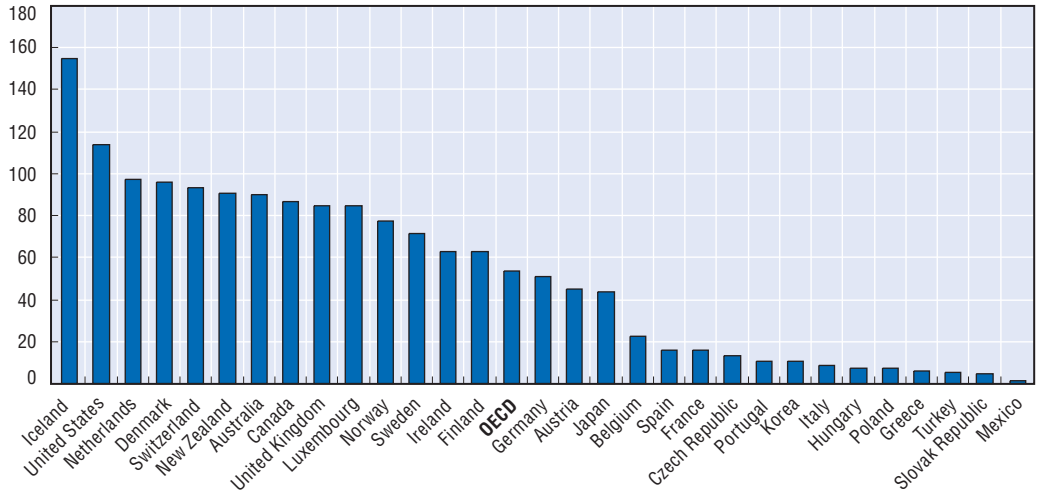
Figure 5.3. **Secure servers in the United States and in the rest of the world, 1998 and 2008**



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

StatLink http://dx.doi.org/10.1787/621424818258

Figure 5.4. **Secure servers per 100 000 inhabitants**



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

StatLink http://dx.doi.org/10.1787/621441605152

countries or dependent territories expressed in two-letter country codes (*e.g.* ".au" for Australia or ".fr" for France).

Domain name registrations are an indicator of interest in adopting a web presence and ultimately an indicator of the development of the Internet. Growth of domain name registrations remained high in 2008 with 168 million domain names registered by mid-year, up 22% since mid-2007. However, the very high growth of 2005-07 slowed in 2008. A plateau may have been reached, which could signal the beginning of market saturation. The introduction of new TLD extensions in the near future is likely to create new opportunities but will also raise a number of new issues to be considered by the Internet community. It should be noted that this section only relates to registered domain names. Depending on how a particular TLD is organised, these are either the second-level domain names (*e.g.* domain names registered under .com) or the third-level domain names (*e.g.* domain names registered under .co.uk).

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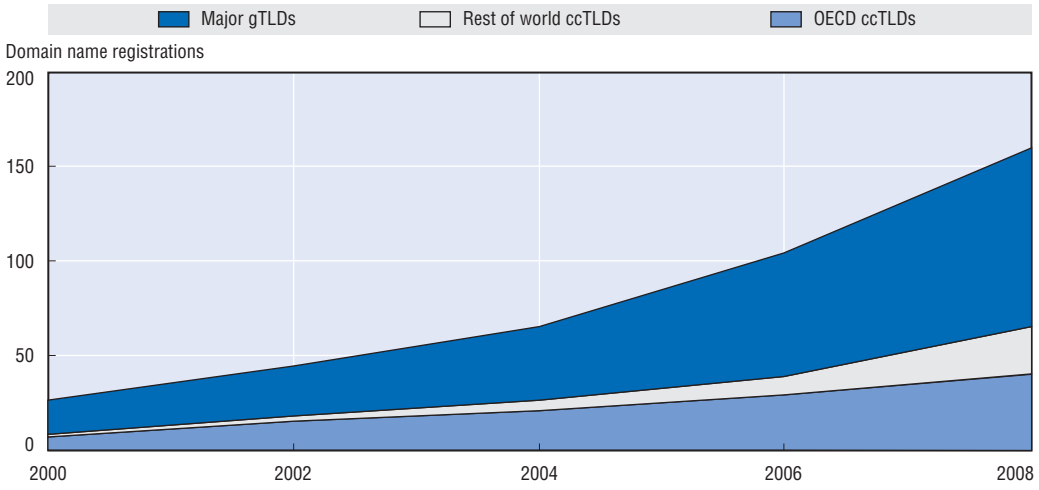
Figure 5.5. **Domain name registrations per type of top-level domain, 2008**



StatLink http://dx.doi.org/10.1787/621451788682

Registrations by domain

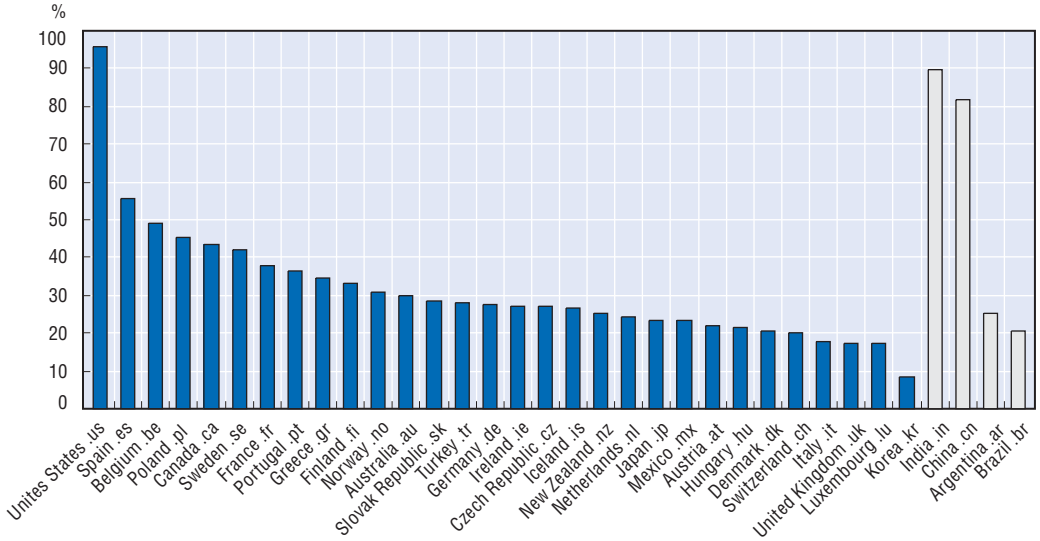
From mid-2000 to mid-2008, the number of registered domain names increased by 17% on average per annum, with stronger growth in ccTLD registrations than gTLD registrations (Table 5.5). Over the past eight years, registrations under the major gTLDs more than tripled, from 28 million in 2000 to over 100 million by mid-2008, while registrations under ccTLDs grew five-fold, from 12 million in 2000 to 65 million by mid-2008. OECD country-related ccTLDs accounted for around 24% of all worldwide domain name registrations in mid-2008.

The ccTLD market is concentrated, with registrations under the top three ccTLDs representing nearly half of the global ccTLD market in 2008. As of July 2008, China's ccTLD (.cn) surpassed Germany's (.de) as the largest, with 12.3 million domains. Germany's ccTLD is the second largest, with over 12 million names registered in .de and .uk is third, with nearly 7 million registrations. Over the 2006-08 period, China's .cn experienced average annual growth rates of 200%, compared with 10% for .de and 16 % for .uk. Against the backdrop of slower growth for many ccTLDs in the second quarter of 2008, the most dynamic ccTLDs over the 2000-2008 period were the United States, Spain, Belgium, Poland, and India, in addition to China (Figure 5.6).

Wide variations in take-up of registered country code domain names are largely a result of the goals of the registries and of historical policies applied to registration. Registries may place requirements on registrations, such as a need for local presence or having a trademark, and prices vary for obtaining a domain name. For example, the large adoption of names under .de in Germany is due to several factors. These include non-restrictive policies by the registry from close to its inception, a strong level of Internet use in Germany, and comparatively low prices. The adoption and recognition of .de is evident by its 70% share of the total domain name market in Germany (Figure 5.8).

With 185 registrations per 1 000 inhabitants, the Dutch ccTLD (.nl) was the country code with the highest ratio of registrations per capita mid-2008 (Figure 5.7). Individuals – who represented 33% of names registered – are the most dynamic market segment in the Netherlands. Some 66% of registrants use .nl in their personal e-mail addresses. The .nl ccTLD had a 71% market share in the Netherlands, compared to 18% for .com and 9% for .eu

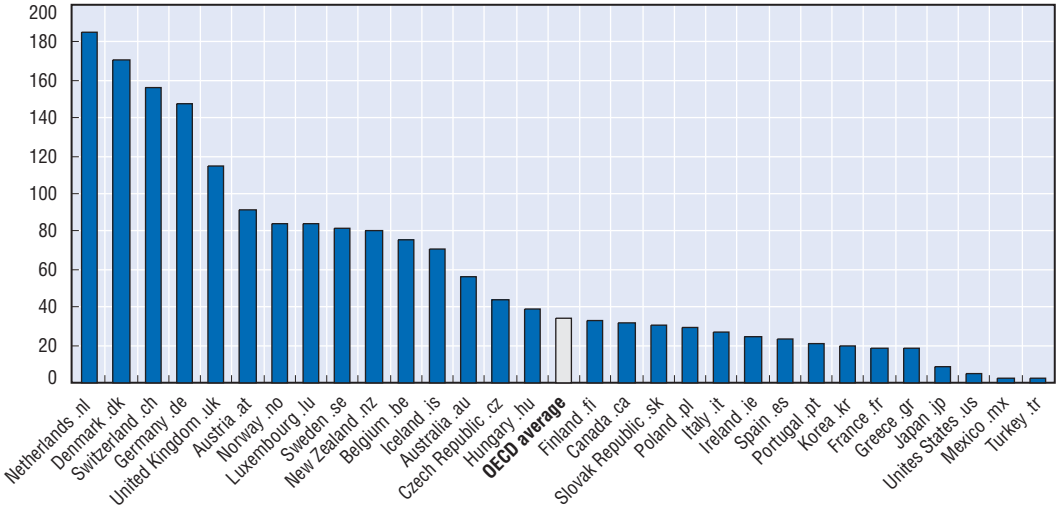
Figure 5.6. **Average annual growth in domain name registrations by domain, 2000-08**



Note: As at mid-year or nearest available data point. For Argentina (.ar) and India (.in), growth is calculated over a shorter period due to data limitations.

StatLink http://dx.doi.org/10.1787/621476672664

Figure 5.7. **OECD country-related ccTLD registrations per 1 000 inhabitants, July 2008**

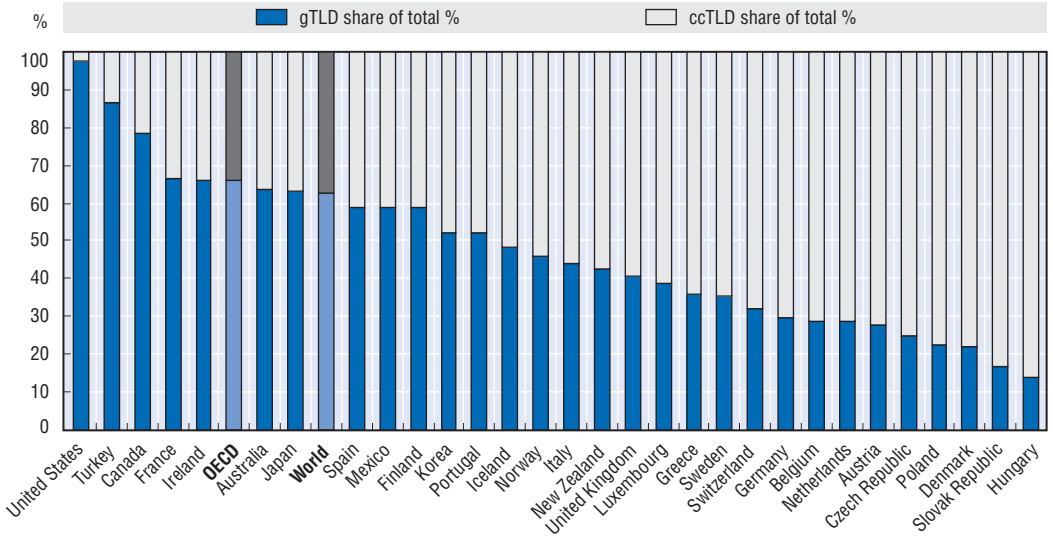


Note: At mid-year or nearest available data point.

StatLink http://dx.doi.org/10.1787/621480553021

(Figure 5.10). Other ccTLDs with high numbers of registrations on a per capita basis were .dk (Denmark), .ch (Switzerland), .de (Germany), and (.uk) United Kingdom, which also had over 100 domain names registered per 1 000 inhabitants (Figure 5.7). The relative number of registrations of domain names in Japan, at 21 per 1 000 inhabitants, was lower than could be expected in view of the high level of Japanese Internet use. One reason could be that internationalised domain names (IDNs), *i.e.* the use of non-Latin characters in domain names, is not yet widely deployed. Keyword look-ups that do not use the DNS are extensively used in Japan.

Figure 5.8. **Shares of gTLDs in OECD country-related domain name registrations, August 2008**



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

StatLink http://dx.doi.org/10.1787/621481315407

Registrations by country

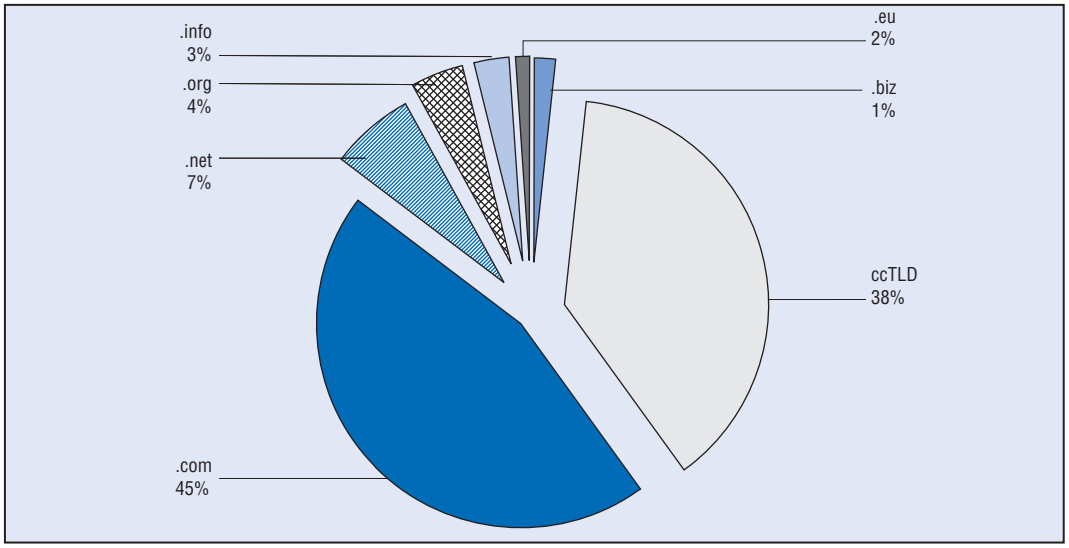
Some data are available on the geographic distribution of domain names. For gTLDs, ZookNIC tracks registrations of gTLDs according to the location of the registrant. As to registrations of ccTLDs, research shows that nearly all users adopting ccTLDs are based in the related country (for example, over 98% of .fr registrants are located in France). Therefore, an assumption can generally be made that ccTLD registrants are based in the country concerned. Table 5.5 shows the number of domain name registrations under related ccTLDs and major gTLDs by registrant location for OECD countries.

On average, 39% of registrations are under country-related ccTLDs and 61% under gTLDs, including 45% under .com, 7% under .net, 4% under .org, 3% under .info and 1% under .biz. However, these shares vary considerably from country to country (Figure 5.8). A further 2% is registered under .eu (Europe) (Figure 5.9). On a per capita basis, .eu domain names are most popular in Luxembourg, Germany, and the Netherlands, followed by Spain (Figure 5.10). In absolute terms, .eu was highest in Germany, the United Kingdom and the Netherlands.

For historical reasons, the ccTLD .us accounts for a small share of US-related registrations. Other countries in which gTLDs represent a high proportion of registrations include Turkey and Canada, where gTLD registrations accounted for more than 70% of all registrations. Conversely, ccTLD registrations accounted for more than 80% of all domain name registrations in several Eastern European countries: Hungary, the Slovak Republic, Poland, and the Czech Republic (Figure 5.8).

Combining ccTLDs and country-related registrations under major gTLDs (and .eu) reveals that, on a per capita basis, on average across OECD countries, 106 domain names were registered per 1 000 inhabitants by mid-2008, up from 81 in 2006. Registrations were significantly lower in Mexico, Japan, Korea, Portugal, Greece and Poland.

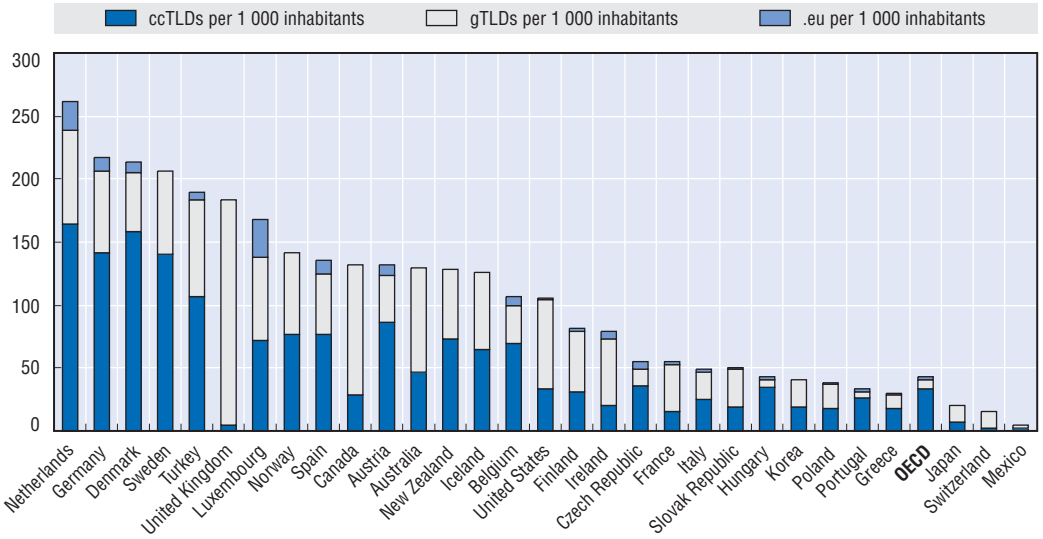
Figure 5.9. **Shares of domain name registrations under ccTLDs and major gTLDs, world, August 2008**



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

StatLink http://dx.doi.org/10.1787/621501488500

Figure 5.10. **Domain name registrations per 1 000 inhabitants, August 2008**



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

StatLink http://dx.doi.org/10.1787/621552043365

The domain name registration market

gTLD registries perform back-office functions and provide services to registrars. Registrars, in turn, provide services to users. Over the past ten years, since the creation of ICANN in 1998, the registrar market has become highly competitive, with the top 20 gTLD registrars accounting for 76% of the market in 2008 and the top four some 47%. "Go Daddy" is a leading player, accounting for a quarter of the market and no other registrar accounts for more than 10% (Figure 5.11). Go Daddy has increased its market share from 12% in 2004

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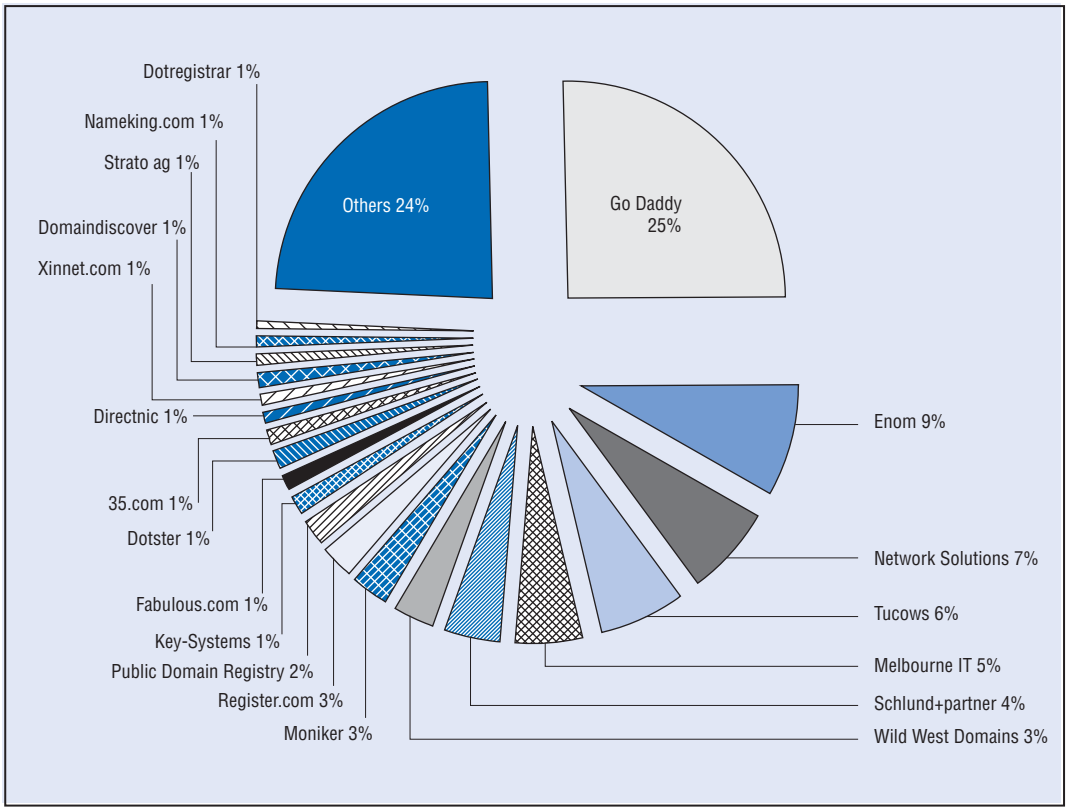
to 25% in 2008, while the market share of Network Solutions has fallen from 16.6% in 2004 to 6.6% in 2008.

Figure 5.11. **Domain name registrars' market share, 2008**



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

StatLink *http://dx.doi.org/10.1787/621568030820*

Box 5.1. **Creating new TLDs**

In June 2008, the Internet Corporation for Assigned Names and Numbers (ICANN), the corporation that co-ordinates Internet identifiers, approved a proposal to allow the creation of new top-level domains (TLDs). The new policy will allow any entity, with the technical and financial means, to propose a top-level domain (TLD). This could enable domains for cities such as ".nyc" for New York, or for certain activities such as ".shopping", and result in addresses such as "hotels.paris" or "pc.dell". Applicants will incur a fee of between USD 100 000 to USD 500 000 for each name. ICANN expects to begin taking applications for new TLDs during the second quarter of 2009. The policy is expected to bring new opportunities for users and growth for the domain name industry, but also, raises a number of complex new issues to be considered by the Internet community.

One major application area is expected to be the creation of TLDs that are focused on a particular company brand. For example, amazon could create a ".amazon" TLD, and use addresses such as "books.amazon", "trips.amazon" and so on. Businesses will need to decide if this approach has value to them. Some users may also need to consider defensive registrations depending on policy development in this area.

Box 5.1. **Creating new TLDs** *(cont.)*

Another likely application is registrations in newly-created category-focused gTLDs. Depending on policy development additional TLDs may increase the number of domain registrations that businesses might need to carry out. For instance, if someone creates ".espanol" to indicate sites written in Spanish, a business will have to decide whether its Spanish-language Internet presence ought to be accessible via that domain extension, and whether it needs to complete a defensive registration to prevent cybersquatting on its trademark. On the other hand, a company or organisation with its own TLD may be less inclined to register second level domain names. In addition, many of the new TLDs are likely to be used solely by their creator rather than open to registration of second level domains by the public.

It is likely that the established TLDs, particularly ".com", will continue to overwhelmingly dominate the domain name marketplace in terms of volume. Domains that have been introduced more recently such as ".mobi" or ".biz" are relatively little used compared to .com, .net and .org but have enabled some users to obtain the name of their choice.

Address space

The Internet Protocol (IP) specifies how communications take place between one device and another through an addressing system. Networks use the Internet Protocol to route messages based on the IP address of the destination. Currently there are two types of IP address in active use: IP version 4 (IPv4) and IP version 6 (IPv6). IPv4 was initially deployed on 1 January 1983 and is still the most commonly used version. The newer IPv6 was developed between 1993 and 1998 to accommodate additional growth. Deployment of the IPv6 protocol began in 1999.

Both IPv4 and IPv6 addresses are generally assigned or allocated hierarchically. The Internet Assigned Numbers Authority (IANA) function, performed by ICANN under contract to the US Department of Commerce, allocates blocks of IPv4 and IPv6 address space and autonomous system (AS) numbers to each regional Internet registry (RIR) to meet the needs of that region. RIRs, in turn, allocate IP addresses to local Internet registries (LIRs), or to national Internet registries (NIRs) in those countries that have them, based on demonstration of need. 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.* they advertise that they can deliver traffic to this set of prefixes.

By year-end 2008, 87% of all available IPv4 Internet addresses were assigned to users. Experts believe that, if current trends continue, IPv4 addresses available for new assignments will be fully depleted by 2011. There is growing awareness within the Internet community and among network operators of the need to increase the use of IPv6. The Internet technical community is discussing ways to encourage an orderly transition to an IPv6-based Internet connectivity model. There is also discussion on ways to manage IPv4 address space exhaustion, including initiatives to reclaim unused address space and of the implications of authorised or unauthorised transfers of addresses between assignees. While they are growing, volumes of IPv6 activity remain very low. There were over 1 300

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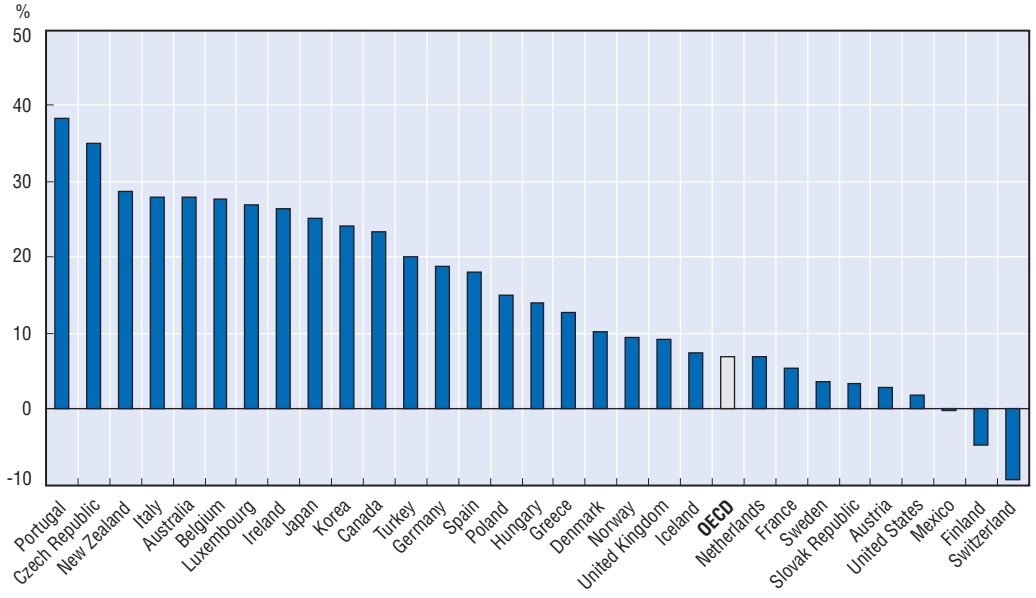
prefixes announced in the IPv6 routing table late 2008, compared to over 260 000 entries in the IPv4 routing table. In other words, the size of the IPv6 routing table is only about 0.5% of the size of the IPv4 routing table.

IPv4 address space

The IPv4 address space is a 32-bit address scheme (for example, 80.124.192.0), which creates an address space of theoretically 4 billion (2^{32}) possible unique addresses, often counted in terms of /8 prefix sizes. At year-end 2008, 37.5% of the IPv4 address space (1.61 billion addresses or 96 /8 prefixes) had been allocated by the RIRs (out of these, 49 /8 prefixes had already been assigned to end-users while the remainder were still in the RIRs' unassigned pools). Legacy assignments (*i.e.* address space allocated before the creation of the RIR system) represented another 35.5% (91 /8 prefixes), and 13.3% (34 /8s) were reserved for other uses or unavailable for technical reasons. This left 13% of IPv4 addresses (34 /8s) available for future allocations. Based on allocation trends, experts estimated that previously unallocated IPv4 address space would run out in 2011 or early 2012 (January 2009 projections).

At year-end 2008, OECD countries accounted for about 82% (2.2 billion out of 2.7 billion) of allocated IPv4 address space (Table 5.10). The United States had the largest allocation, with over 1.4 billion IPv4 addresses, reflecting the original development of the Internet in the United States, and the legacy assignments of early US-based networks (Table 5.6). The next largest shares of allocated IPv4 addresses were attributable to Japan (6%), the United Kingdom (6%), France and Korea (3% each), as well as Germany and Canada (2% each). Growth in allocations of routed IPv4 addresses reflects catch-up, with the Czech Republic, Portugal and New Zealand experiencing the fastest growth among the OECD countries (Figure 5.12). Year-on-year growth rates of allocated IPv6 addresses were very low or negative in some countries that were historically well resourced in IPv4 address space per inhabitant, such as Switzerland, the United States, the United Kingdom and the Nordic countries.

Figure 5.12. **Average yearly growth of allocated IPv4 addresses, by country, 1998-2008**

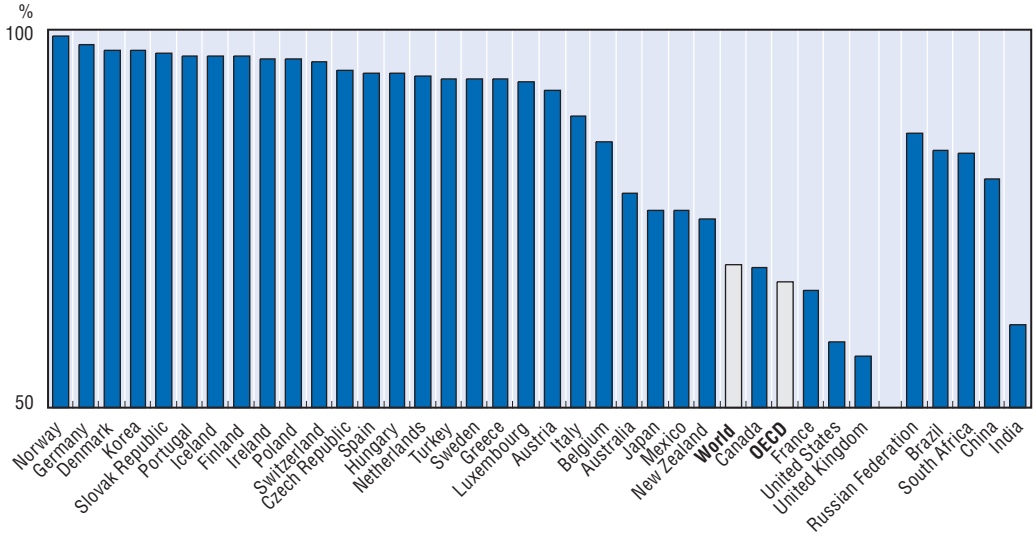


Source: OECD, based on data from the regional Internet registries.

StatLink http://dx.doi.org/10.1787/621640440241

Once an organisation has been allocated/assigned addresses, for these addresses to be "visible" on the Internet routes to the address blocks used must be published in the routing tables. Routed prefixes, which represent on average 69% of allocated prefixes (Table 5.7), therefore provide a better indication of how many addresses are being used and where. 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 therefore are not visible in public routing tables.

Figure 5.13. **Percentage of allocated IPv4 address space that is routed, year-end 2008**



Source: OECD, based on data from the regional Internet registries.

StatLink http://dx.doi.org/10.1787/621642866736

In late 2007, there were around 2.18 billion routed IPv4 addresses, up from just over 1 billion in 1997 (Table 5.7). OECD countries accounted for 83% of globally routed IPv4 addresses, down from 93% in 1997, and 20 out of 30 OECD countries accounted for over 90% of routed IPv4 address space. The United States led in routed IPv4 addresses, with over 1 billion out of the roughly 2.2 billion routed IPv4 addresses. The next largest shares of allocated IPv4 addresses were attributable to Japan (7%), Germany (5%), as well as the United Kingdom, Korea and France (3% each). The United States represented over 45% of routed IPv4 addresses in October 2008, consistent with the fact that the US represents over half of allocated IPv4 addresses. The United States was also the largest user of routed IPv4 addresses on a per capita basis, with 3.37 addresses per inhabitant (Figure 5.14). Other countries to record more than two routed IP addresses per person include Norway, Australia, Finland, Canada, the Netherlands and Iceland. There was an average of 1.53 IPv4 addresses per inhabitant across the OECD, with Turkey, the Slovak Republic, and Mexico the only OECD countries with less than one address per inhabitant. The proportion of routed IPv4 address space to allocated IPv4 address space was lowest in the United Kingdom, the United States, France and Canada, as well as India (Figure 5.13).

IPv6 address space

The IPv6 standard, established between 1993 and 1998, is a newer version of the Internet protocol. IPv6 addresses are 128-bit numbers and are conventionally expressed

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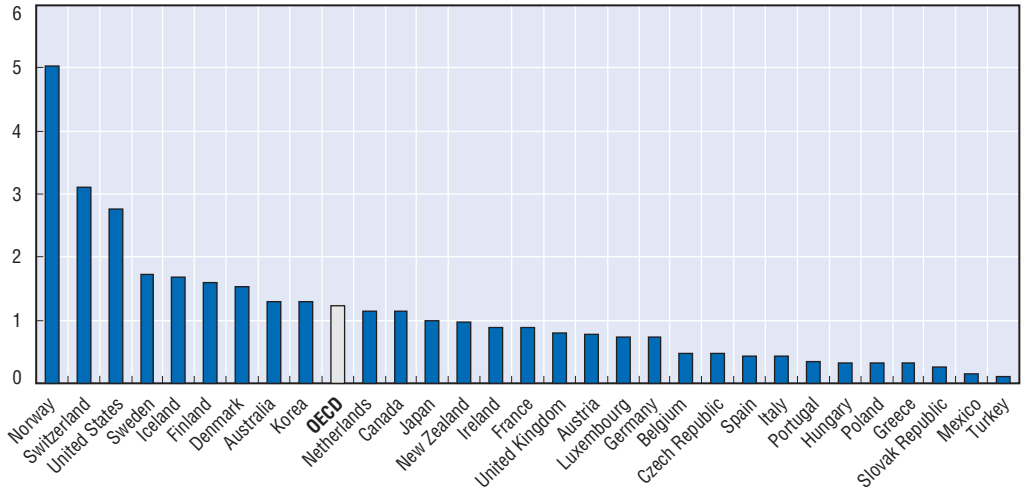
Figure 5.14. **Routed IPv4 addresses per inhabitant, year-end 2008**



Source: OECD, based on data from the regional Internet registries.

StatLink http://dx.doi.org/10.1787/621654582876

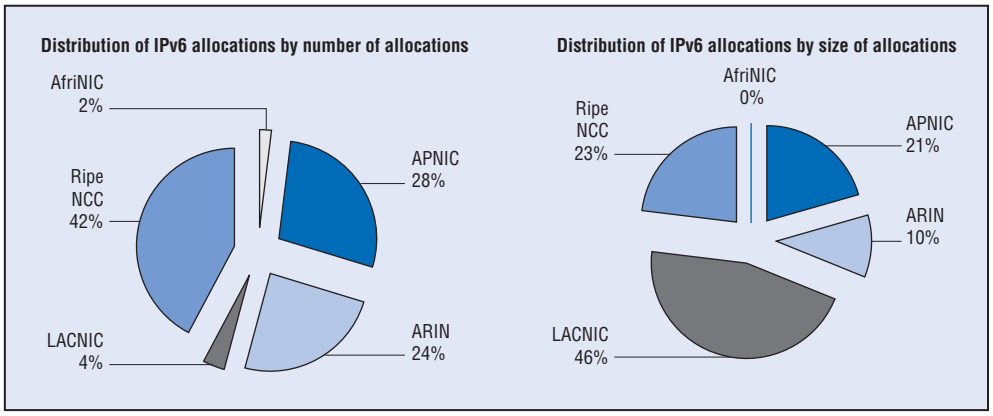
using hexadecimal strings (for example, 2001:db8:85a3::8a2e:370:7334). IPv6 provides virtually unlimited address space (2 to the 128th power, or 3.40282367 × 1038, IP addresses). Beyond additional address space, IPv6 adoption is being driven by public sector procurement mandates, by deployment of innovative products and services, by its better support for a mobile Internet, as well as by the decreased network complexity that it allows.

The latest versions of popular end-systems integrate IPv6, as do parts of the core of the Internet. However, progress in actual usage of IPv6 remains very slow to date and considerable challenges must be overcome to achieve a successful transition. Immediate costs are associated with deployment of IPv6, whereas many benefits are long term and depend on a critical mass of actors adopting the new protocol. A further major obstacle to IPv6 deployment is that it is not backwards-compatible with IPv4: IPv6-only devices cannot communicate directly with IPv4-only devices. Instead, both protocols must be deployed, or sophisticated "tunnelling" and translation systems set up. Experience to date with IPv6 suggests that its deployment requires planning and co-ordination over several years. Increased awareness of the issues is needed and finding skilled resources is challenging.

Entities can and are going through the RIR processes to obtain IPv6 allocations, as the first step in adopting IPv6. The number of allocated prefixes provides an indication as to the number of organisations interested in implementing the IPv6 protocol (Figure 5.15). At the end of 2008, the RIRs had made a cumulated total of 3 091 allocations (Table 5.8). OECD countries accounted for 76% of the IPv6 allocations. The United States was leading, accounting for 22% of allocated IPv6 prefixes. Next were Japan (8%), Germany (7%), the United Kingdom (5%), the Netherlands (3%) and France (2%).

Although the size of IPv6 allocations (Figure 5.15) is difficult to use at an aggregate level because extremely large allocations were made to some operators and large users, it can nonetheless help indicate the scale of planned deployments. Many large IPv6 prefix assignments were to telecommunication operators (Figure 5.16). For example, Deutsche Telekom and France Telecom were each allocated a /19 prefix in 2005. To illustrate the size of

Figure 5.15. **Distribution of IPv6 allocations by the RIRs, year-end 2008**



Source: OECD, based on data from the regional Internet registries.

StatLink http://dx.doi.org/10.1787/621658605640

Figure 5.16. **Selected large IPv6 allocations**

Prefix	Company	Date
2003::/19	Deutsche Telekom, Germany	13 January 2005
2a01:c000::/19	France Telecom, France	30 December 2005
2a01:2000::/20	Telecom Italia, Italy	16 May 2006
2001:2000::/20	TeliaSonera, European Union	10 May 2004
2400:2000::/20	Softbank BB IPv6 Network, Japan	12 July 2005
2400::/20	Korea Telecom, Korea	1 June 2005
2401:6000::/20	Australian Government Department of Defence, Australia	10 August 2007
2608::/22	United States Department of Defense (DoD), United States	6 May 2008
2402::/22	Korean Education Network, Korea	20 October 2006
2a00:2000::/22	British Telecom, United Kingdom	29 August 2007
2600:800::/27	MCI / Verizon Business, United States	8 January 2007
2a01:2e0::/28	PLUSGSM, Poland	19 March 2007
2404:180::/28	Samsung Networks, Korea	28 August 2006
2610:080::/29	RCN Corporation, United States	2 June 2006
2600::/29	Sprint, United States	21 December 2006

Source: OECD, extracted from RIR IP Whois databases.

StatLink http://dx.doi.org/10.1787/621682815333

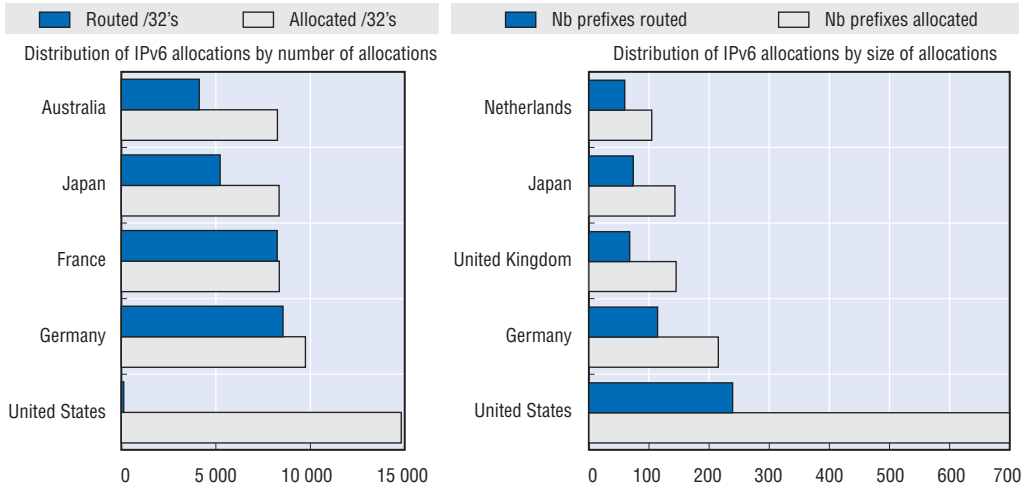
some of these prefixes, the allocation in 2006 of a /20 to Telecom Italia represented 268 435 456 (2^{28}) customers, under the assumption of each customer receiving a /48 and each customer having up to 2^{16} (65 536) local area networks. However, the policy basis under which these allocations were made – without incremental cost to requesters and without any obligation to demonstrate IPv6 deployed infrastructure – means that requesting and being granted allocations does not necessarily mean actively planning to deploy IPv6.

From a regional perspective, it appears that the European and Asian markets had started, or were close to starting, large-scale deployments of IPv6, as per the size of their allocations. North America, Latin America and the Caribbean, and Africa, appeared to have been comparatively more interested in evaluating IPv6, with large numbers of smaller allocations received (Figure 5.15).

Compared to allocated IPv6 address space, the amount of routed IPv6 address space provides a better indication of actual IPv6 use (Table 5.10). In terms of routed IPv6 prefixes

by size of allocations, Germany, France, Japan, Australia and the United States were comparative leaders at the end of 2008. The top positions partly reflected the very large /19 prefixes that Deutsche Telekom and France Telecom were routing, as well as the /20 allocations received by Softbank BB in Japan and by the Australian Government Department of Defence. Nevertheless, the United States, Germany and the United Kingdom were also leaders in terms of numbers of allocations, irrespective of size (Figure 5.17).

Figure 5.17. **Top five countries ranked by allocations, allocated and routed IPv6 addresses, year-end 2008**



Source: OECD, based on data from SIXXS (*www.sixxs.net*).

Source: OECD, based on data from the RIRs.

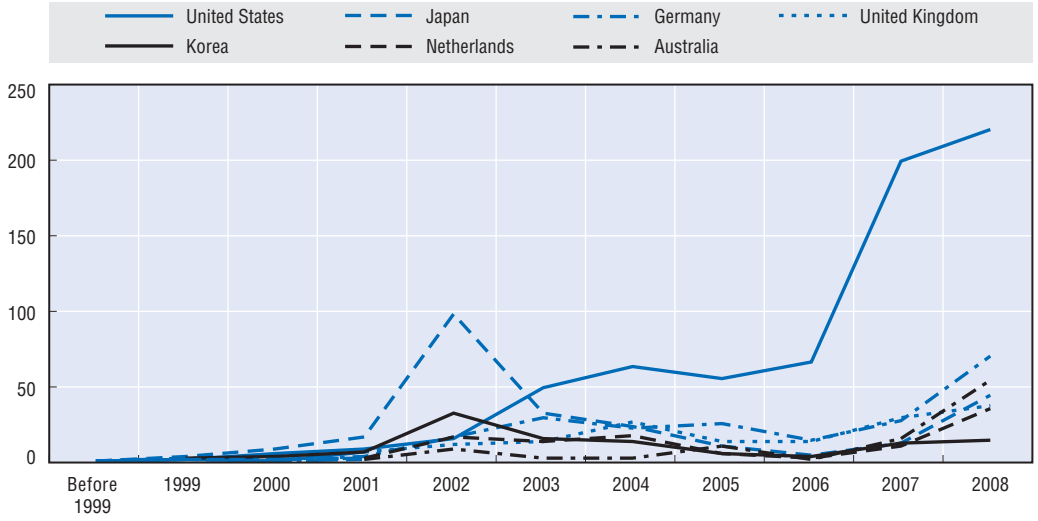
StatLink *http://dx.doi.org/10.1787/621714684452*

Caveats that warrant noting include that, as with IPv4, routed IPv6 address space is not necessarily used. In addition, observing routed IPv6 address space does not take into account the approach used by transition mechanisms whereby IPv6 is tunnelled across the IPv4 Internet and is not directly visible as distinct IPv6 routes in the routing system.

At the end of 2008, about 50% of all allocated IPv6 LIR prefixes were visible in the IPv6 routing table on average, although the proportion varied significantly from country to country (Figure 5.17). The largest numbers of routed IPv6 prefixes were attributable to the United States (224 routed prefixes), Germany (108), Japan (70), as well as the United Kingdom (65) and the Netherlands (53).

While Japan had an early lead in IPv6 deployment after its 2001 national strategy for the adoption of IPv6 (e-Japan), other countries seemed to be catching up (Figure 5.18). In particular, there was a surge in the number of IPv6 allocations in the United States in 2007. In 2007, 200 IPv6 prefixes were registered in the United States. This surge was likely linked to the mandate of the United States' Office of Management Budget (OMB) for all agencies' infrastructure (network backbones) to be using IPv6 and agency networks to be interfacing with this infrastructure by June 2008. Several other countries have also taken a lead in deploying IPv6 networks and the number of allocations in other countries also increased in 2008. For example, the Australian Government Information Management Office has a revised strategy for the transition to IPv6 which will see Australian government agencies being IPv6-capable by the end of 2012.

Figure 5.18. **Numbers of IPv6 allocations, top eight OECD countries, 1999-2008**



Source: OECD, based on data from the regional Internet registries.

StatLink http://dx.doi.org/10.1787/621714751764

Networks on the Internet

Autonomous systems

The Internet as a network of networks is composed of autonomous systems, groups of networks that operate under a single external routing policy. They can be ISPs, ranging from the largest "Tier 1" ISPs to small local ISPs, academic, military or government networks, or firms with a particular need for some independence of networking. For example AT&T, Google, NTT and France Telecom each are an AS. They obtain, aggregate and announce hierarchical, aggregated blocks of IP addresses for a network. Each AS has its own unique AS identifier number (for example, 8228) and groups the individual prefixes that are allocated to that network. 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 network 80.124.192.0/24 being 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 have two or more upstream transit connections are likely to need their own ASN, while networks with a single upstream connection should not need an ASN since the routing policies of the network are exactly the same as those of its upstream service provider.

Border Gateway Protocol (BGP) routing tables provide a snapshot of Internet topology from a particular place and time. In late 2007, there were 26 606 autonomous systems visible in the Internet routing table from AS6447 (www.routeviews.org), up from 2 899 in late 1997 or by 25% per annum (Table 5.8). Of the autonomous systems present in the routing table at that time, 74% were in OECD countries. By far the largest share of autonomous systems have their origin in the United States, which accounted for more than 43% of the worldwide total in late 2007 – although it should be noted that these networks may be offering service anywhere around the world. By comparison, in late 2007, the United Kingdom accounted for just 4% of the world's visible autonomous systems, Germany for 3.3%, Poland for 2.5% and Canada for 2.2%.

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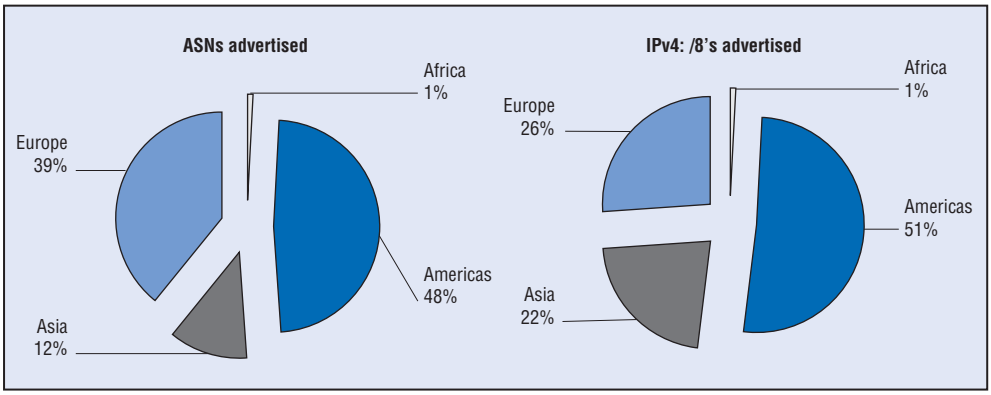
In terms of regional breakdown, 47% of autonomous systems advertised in BGP were related to the Americas, 38% to Europe, 12% to Asia, 2% to Oceania and 1% to Africa. At the same time, some 2.7 billion IPv4 addresses (/8s) had been allocated, of which 1.9 billion were being advertised. Of those being advertised, 50% were related to the Americas, 26% to Europe and 21% to Asia (Figure 5.19).

Figure 5.19. **Routed autonomous systems and IPv4 addresses, year-end 2008**



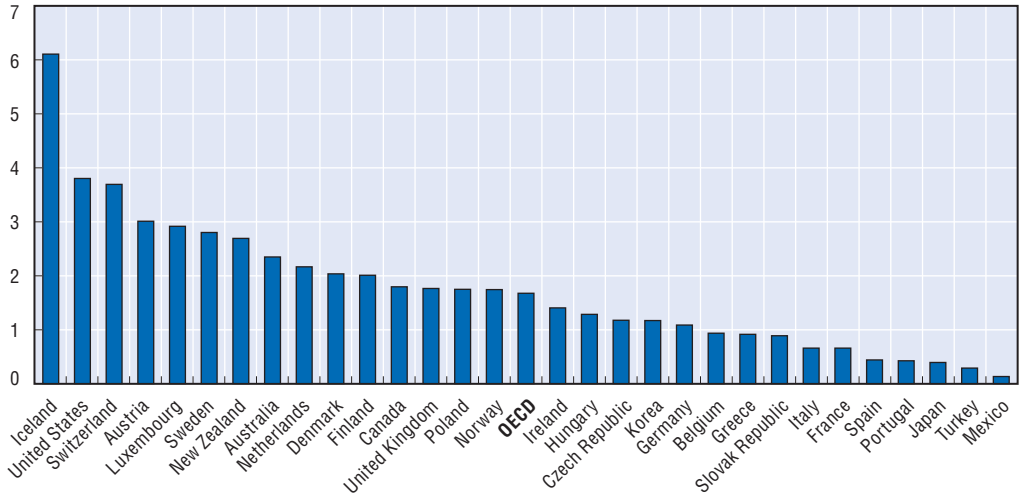
Source: OECD, based on routing table data from AS6447 (Route-Views.Oregon-ix.net).

StatLink http://dx.doi.org/10.1787/621730524053

As the Internet developed outside its country of origin, the United States' share of the total number of autonomous systems in use has been falling – down from 56% in November 1997 to 43% ten years later. Nevertheless, the number of autonomous systems in the United States increased rapidly over this period, from 1 627 to 11 472 or by 22% per annum. The decreasing share of autonomous systems attributed to the United States reflects growing use of the Internet in the rest of the world, with all other OECD countries increasing their share of the worldwide total from 25% in 1997 to 31% in 2007. Meanwhile, the rest of the world also experienced an increase in the number of autonomous systems during the same period, from 18% to 25%. Factors influencing the addition of advertised autonomous systems include the number of active Internet Service Providers (ISPs). Another important factor of growth of advertised AS is the increased business-criticality of assured Internet connectivity. To create redundant interconnection, end-site networks use the services of two or more upstream providers, *i.e.* they exchange traffic with two or more independent networks ("provider-independent" or "multi-homed" users). In such situations, the end site may want to express different routing policies to each upstream provider, and it does so by using its own ASN and expressing these routing policies using BGP to each of its upstreams. This widespread practice increases the number of networks that need their own AS number.

When weighted by population, Iceland (over six AS per 100 000 inhabitants), followed by the United States, Switzerland, Austria and Luxembourg had the highest number of autonomous systems per 100 000 inhabitants at the end of 2007, while ten countries had less than one AS per 100 000 inhabitants (Figure 5.20). Those countries with a high number of autonomous systems per capita all have well-developed Internet markets, but some countries with well-developed markets have a much lower ratio (*e.g.* Japan and France). This may reflect such factors as industrial structure, the number of ISPs and the level of competition between them.

Figure 5.20. **Autonomous systems per 100 000 inhabitants, November 2007**



Source: OECD, based on data provided by Tom Vest (Packet Clearing House) from raw data generated by the University of Oregon Route Views project.

StatLink http://dx.doi.org/10.1787/621743778458

Available data show the average number of routed IPv4 addresses per routed AS decreasing from the end of 1997 to the end of 2007 (Table 5.12). After a very steep decrease (50%) between the end of 1997 and the end of 1998, autonomous systems continued to use fewer IPv4 addresses every year between end-1998 and end-2002 (by about 12% a year). Worldwide, the average number of IPv4 addresses per routed AS fell from 354 308 in late 1997 to 81 845 in late 2007, while across the OECD the average number fell from 405 851 to 91 776 – or by nearly 14% per annum each. All OECD countries experienced a decline.

Declining numbers of IPv4 addresses per AS reflect several factors. First of all, more entities have been using ASNs and their own IPv4 address blocks. Secondly, solutions were devised in the early 1990s to cope with IPv4 Internet address space running out. In particular, the "classless" address architecture (classless inter-domain routing, CIDR) introduced in the 1990s created smaller sizes of address blocks to enable more efficient use of the remaining IPv4 space. In addition, network address translation (NAT) use has progressively become very widespread and allows a small number of public addresses to be "shared" across a much larger number of hosts using private, *i.e.* not globally unique, addresses.

Peering

Peering is the arrangement of Internet traffic exchange between networks (*e.g.* Internet service providers, ISPs). Large ISPs with their own backbone networks agree to carry traffic from other large ISPs in exchange for the carriage of their traffic on the other ISPs' backbones. They may also exchange traffic with smaller ISPs so that they can reach regional end points. Peers add value to a network by providing access to the users on its own network, plus the access allowed through the other networks with which it peers. Reasons to peer include reducing transit costs, reducing latencies, billing more traffic to customers, increasing operational stability, localising connectivity and providing roughly equal mutual benefit. FixedOrbit provides a regular snapshot of Internet peering, showing the centrality of various networks in terms of the number of peers with which they

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exchange traffic. These data provide a picture of the size and market shares of the larger ISPs, and how those shares change over time.

In August 2008, FixedOrbit reported a total of 78 862 peerings, down from 94 638 in September 2006 and the same as the level of peerings in 2004. The Internet backbone industry consolidation of 2007 was apparent in that the top 10 networks' share of peerings increased, from 13.4% of all peerings to 19%. Verizon, which acquired MCI Uunet in 2006, increased the size of its network in terms of peering relationships, with 2 288 peers, or 2.9% of total peerings, and controlled around 26 million IP addresses. The second largest peer, AT&T WorldNet Services, reported 2 157 peers or 2.7 % of total peerings (Table 5.10). The top 10 cohort was quite stable between 2006 and 2008 (Figure 5.21). SBC Internet services dropped out of the top 10 between 2006 and 2008, following its 2005 merger with AT&T Worldnet Services. Hurricane Electric came into the top 10 in August 2008 (with 838 peers). These large peer networks play a central role in Internet traffic exchange, but none accounted for more than 3% of peerings, suggesting that the market remains competitive and fragmented.

Security

Alongside the numerous benefits, growing reliance on the Internet also brings risks.

Akamai 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 (DoS) attacks, hacking attempts and DNS hijackings. Akamai's network is composed of more than 30 000 servers and covers over 120 countries. Attack traffic is measured across the Internet by capturing packets that are generally from automated scanning trojans and worms looking to infect new computers scanning randomly generated IP addresses. Akamai collects data on the number of connections that are attempted, the source IP address, the destination IP address and the source and destination ports in real time.

While attack traffic may originate in a given country, this does not indicate where the attack was launched. Rather, it indicates the location of the web hosting company or ISP to which the attacking IP addresses were allocated. On the other hand, some believe that the Internet service provider has some responsibility in respect to good network practices and therefore, this is an indicator of interest. In addition, these percentages are based on attack traffic observed by a special set of Akamai agents and are not necessarily the percentages that would be observed across the entire Internet.

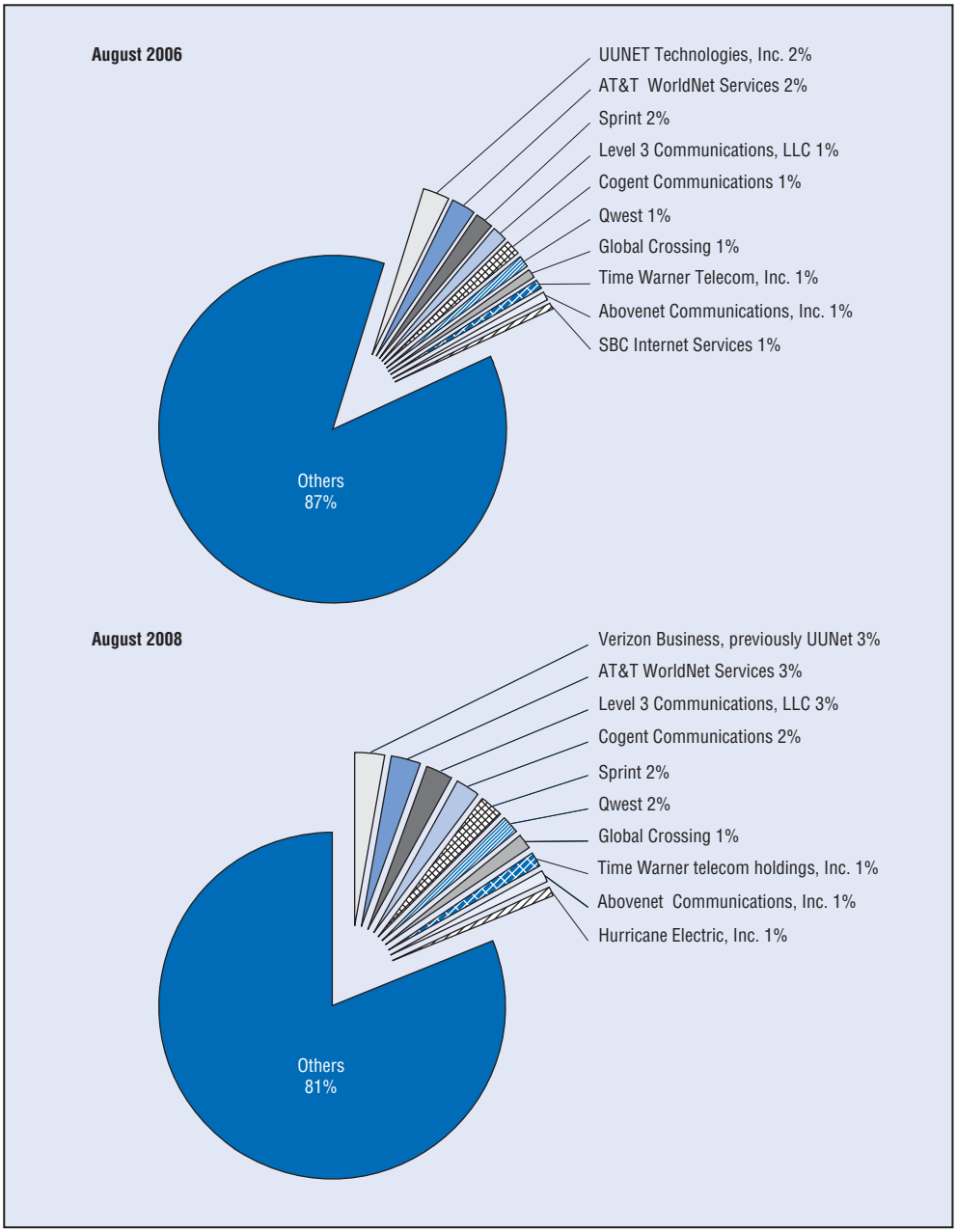
In 2008, China and the United States were consistently among the top countries of attack origin as measured by Akamai. They together accounted for half of attack traffic measured in the fourth quarter of 2008, with respectively 23% and 19% of attack traffic originating in each country. The difference between them and other countries was significant. Sweden was third with 11%. Other countries represented less than 4% each. The position of other countries varied significantly from one quarter to the next. For example, from 4% in the first quarter of 2008, Japan was the origin of 30% of traffic in the second quarter of 2008 down again to only 3% in the third quarter and 2% in the last quarter. The top 10 countries accounted on average for 66% of the measured attack traffic.

The Akamai report states:

> "While it is likely a contributing factor, there does not appear to be a clear and obvious link between the availability of high-speed connectivity and the likelihood that a country is a leading source of attack traffic."

Figure 5.21. **Top ten networks defined by number of peers, 2006-08**

Share of total peering, percentages



Source: OECD, compiled from FixedOrbit statistics (*www.fixedorbit.com*).

StatLink http://dx.doi.org/10.1787/621782834285

However, greater levels of Internet usage may account for higher levels of attack traffic. For example, six of the ten countries contributing the highest attack traffic (the United States, China, Japan, Germany, France, and Korea) were also among the countries advertising the highest numbers of IPv4 addresses in the global routing table (Table 5.7). The fact that attack traffic originates in certain countries may also have to do with those countries' hosting market, including the hosting of underground economy servers. For example, Symantec identified the United States as the top country for hosting underground economy servers in mid-2008.

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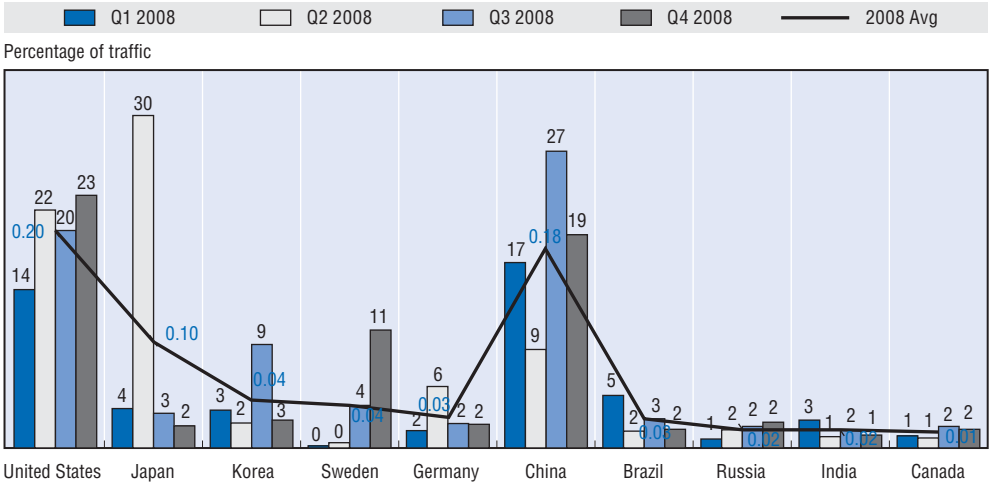
Figure 5.22. **Attack traffic, top 10 originating countries**



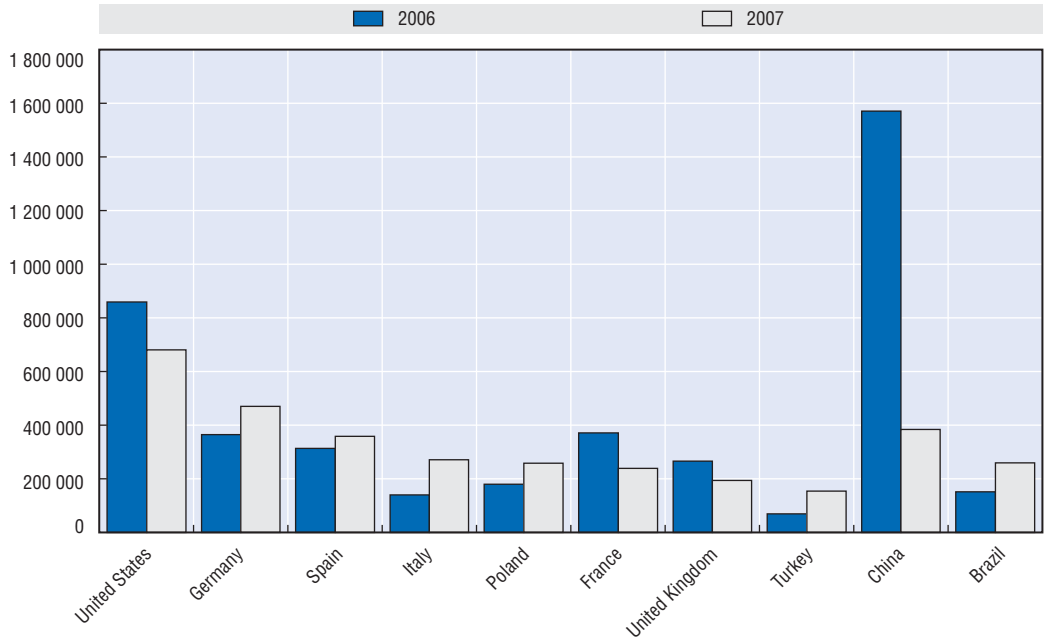
Source: Akamai (2009), "The State of the Internet", *www.akamai.com*.

StatLink http://dx.doi.org/10.1787/621818146553

Another security indicator, monitored by security firm Symantec, is the presence of "bot"-infected computers, *i.e.* PCs with software maliciously installed to provide attackers with unauthorised control. Bot-infected computers are used to create "botnets", networks of compromised machines that may be used to mount denial of service attacks against particular sites on the Internet or to retransmit spam, phishing and so forth. This indicator may be useful as a benchmark of security awareness and action by Internet users, since bot-infected computers are often computers that are unprotected. Symantec gathers data by monitoring 40 000 sensors located in networks in over 180 countries ("honey pots"). It records attacks from infected computers and matches them with other databases, such as those for malicious code and those enabling the identification of originating addresses. Significantly, the data are not specific to Symantec customers, unlike some of the company's other indicators, so there should not be a geographical bias. Because of the distributed nature of the "bots", the source of such attacks and identity of the attackers commandeering the botnets are largely untraceable.

At year-end 2007, Symantec identified around 3.2 million distinct bots worldwide, of which 66% were in OECD countries. The largest numbers of bot-infected computers were in the United States (14% of total bots measured), followed by Germany (9.5%) and China (7.8%). Between end-2007 and end-2008, the number of bots decreased significantly in non-OECD countries. China accounted for a large portion of the decrease in bot-infected computers, representing a decrease of nearly 1.2 million bots or 75% over the period (Figure 5.23).

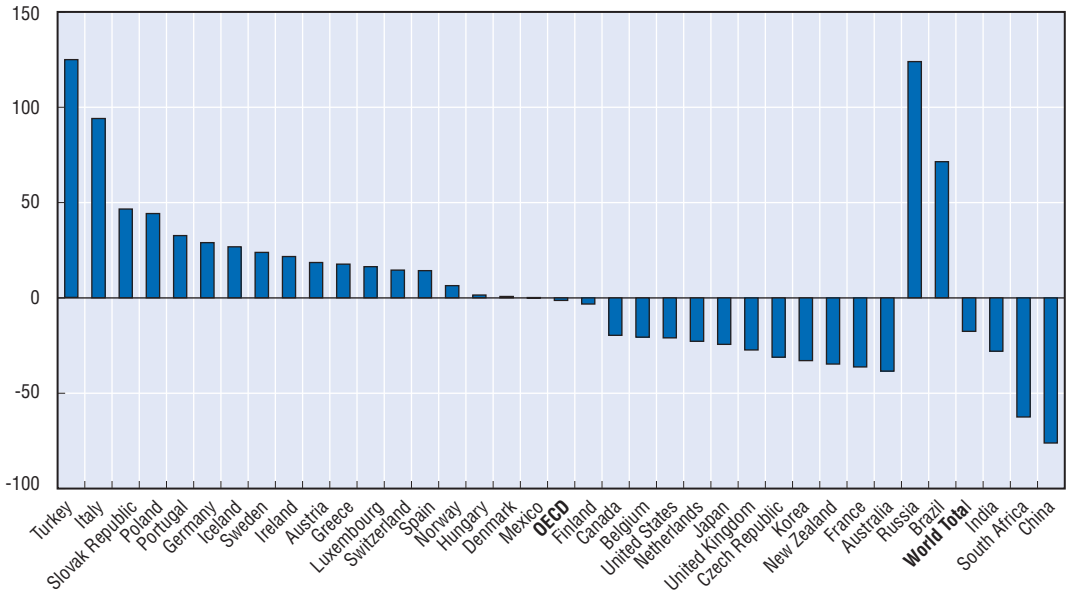
Figure 5.23. **Bot-infected machines, top 10 countries, December 2007**



Source: OECD, based on data provided by Symantec.

StatLink http://dx.doi.org/10.1787/621861378407

Figure 5.24. **Growth in bot-infected computers, 2006-07**



Source: OECD, based on data provided by Symantec.

StatLink http://dx.doi.org/10.1787/621881878266

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Table 5.1. Internet hosts by domain, 1998-2008

	Domain	Hosts, January 1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Annual growth 1998-2008 (%)
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	32.0
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	37.3
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	45.0
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	18.8
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	44.6
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	35.2
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	23.5
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	45.7
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	35.4
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	47.7
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	43.4
Iceland	.is	17 450	21 894	29 598	44 040	61 682	68 282	106 296	144 636	191 528	209 071	229 916	29.4
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	41.6
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	52.7
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	41.2
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	10.9
Luxembourg	.lu	4 273	21 894	9 670	11 744	16 735	17 260	28 214	61 785	84 257	89 938	158 681	43.5
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	73.1
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	39.4
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	25.9
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	25.3
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	57.2
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	45.2
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	50.3
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	33.7
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	27.1
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	39.9
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	58.1
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	22.8
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*	
	.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	6.2
	.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	10.5
	.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	7.2
	.gov	497 646	651 200	777 750	834 971	793 031	607 514	676 595	783 169	722 543	701 178	934 284	6.5
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*	*35.3*
	.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	27.8
	.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	43.1
	.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	9.9
	.int	672	898	8 727	9 435	11 048	11 594	13 625	13 120	15 756	16 808	16 484	37.7
	.biz	0	0	0	0	1 477	16 680	28 586	53 672	45 934	39 592	36 612	..
	.info	0	0	0	0	2 128	8 349	15 502	30 828	60 533	54 351	75 764	..
	.name	0	0	0	0	7	217	318	913	1 267	1 210	1 471	..
	.pro	0	0	0	0	2	2	5	15	36	46	61	..
	.areo	0	0	0	0	0	132	315	627	768	690	1 431	..
	.coop	0	0	0	0	9	148	417	1 191	2 953	4 705	6 354	..
	.museum	0	0	0	0	4	9	15	19	22	20	23	..
	.travel	0	0	0	0	0	0	0	15	15	39	80	..
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	33.7

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. NIDA (National Internet Development Agency of Korea) estimates there were 8 726 654 Korean hosts by end 2007.

Source: Internet Software Consortium, *www.isc.org.*

StatLink http://dx.doi.org/10.1787/625232085288

Table 5.2. Web servers by domain, July 2008

	Domain	Web servers, July					Annual growth (%)
		2000	2002	2004	2006	2008	
Australia	.au	26 119	66 605	121 004	163 737	268 387	33.8
Austria	.at	22 078	43 816	75 113	119 022	184 311	30.4
Belgium	.be	7 386	19 147	51 684	180 654	205 713	51.6
Canada	.ca	22 105	53 335	106 883	152 681	238 565	34.6
Czech Republic	.cz	12 626	35 600	69 120	116 240	261 879	46.1
Denmark	.dk	25 280	135 984	147 681	204 654	247 777	33.0
Finland	.fi	9 836	16 708	25 284	37 762	59 465	25.2
France	.fr	20 471	47 200	55 981	155 163	411 471	45.5
Germany	.de	179 542	493 016	1 063 877	1 593 296	2 311 389	37.6
Greece	.gr	3 337	9 779	18 488	28 993	56 822	42.5
Hungary	.hu	5 392	15 919	41 556	118 214	263 090	62.6
Iceland	.is	1 199	2 914	7 243	9 731	21 385	43.4
Ireland	.ie	2 905	7 291	11 545	17 592	30 110	34.0
Italy	.it	33 168	89 517	191 690	297 304	484 154	39.8
Japan	.jp	45 581	145 929	297 446	399 275	808 599	43.3
Korea	.kr	11 576	39 791	433 837	140 699	158 754	38.7
Luxembourg	.lu	1 409	2 467	3 747	5 321	8 559	25.3
Mexico	.mx	4 552	9 605	14 860	21 065	33 330	28.3
Netherlands	.nl	48 014	167 993	305 358	601 492	1 126 853	48.4
New Zealand	.nz	8 757	23 834	40 055	58 330	83 377	32.5
Norway	.no	10 531	26 646	48 471	69 061	104 585	33.2
Poland	.pl	22 265	133 501	373 468	524 888	741 599	55.0
Portugal	.pt	5 113	8 645	14 637	25 588	43 724	30.8
Slovak Republic	.sk	4 479	15 930	22 711	62 126	61 167	38.6
Spain	.es	9 146	13 526	19 342	36 269	96 600	34.3
Sweden	.se	23 265	33 870	50 773	82 574	158 249	27.1
Switzerland	.ch	36 082	77 166	190 134	182 553	273 771	28.8
Turkey	.tr	4 897	9 546	14 227	19 918	37 650	29.0
United Kingdom	.uk	131 415	277 031	437 404	634 677	955 977	28.2
United States							
	.us	17 299	29 876	98 633	115 445	155 239	31.6
	.edu	46 272	78 213	106 244	129 458	156 845	16.5
	.mil	2 587	3 210	3 270	3 040	..	2.7
	.gov	6 648	10 462	14 642	18 909	23 735	17.2
Total ccTLDs world						13 392 745	
Total gTLDs world						19 849 192	
	.com	992 618	4 689 003	7 239 594	8 884 634	14 782 393	40.2
	.net	106 613	534 214	1 078 762	1 293 624	2 138 109	45.5
	.org	124 150	451 254	791 389	1 081 603	1 628 373	38.0
World total	World	2 213 960	8 420 350	14 978 181	19 863 342	33 241 937	40.3

Source: Security Space, *www.securityspace.com.*

StatLink http://dx.doi.org/10.1787/625300652838

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Table 5.3. Secure servers in OECD countries, 1998-2008

	July 1998	July 1999	July 2000	July 2001	July 2002	July 2003	July 2004	August 2005	July 2006	July 2007	July 2008
Australia	632	1 305	2 828	3 704	4 693	4 830	8 079	9 604	11 562	15 436	19 264
Austria	98	241	447	881	949	1 073	1 590	1 807	2 201	3 022	3 762
Belgium	52	159	268	431	439	512	912	1 159	1 468	1 931	2 418
Canada	929	1 789	3 896	6 050	7 768	9 378	15 166	17 913	20 373	25 176	28 905
Czech Republic	19	88	194	383	185	213	315	387	598	924	1 396
Denmark	44	112	289	523	660	890	1 681	2 116	3 169	4 152	5 242
Finland	68	180	343	660	744	870	1 255	1 479	1 919	2 594	3 318
France	222	632	1 297	1 969	2 511	2 646	3 799	4 607	5 632	7 734	10 076
Germany	492	1 630	3 761	6 442	7 987	7 912	13 163	20 853	27 300	35 055	41 954
Greece	8	48	87	176	170	181	270	350	424	546	642
Hungary	18	26	90	165	86	122	199	278	345	493	733
Iceland	13	29	67	91	136	170	249	286	367	445	483
Ireland	56	97	245	467	579	701	1 201	1 456	1 685	2 194	2 784
Italy	167	432	795	1 264	1 167	1 327	1 977	2 427	2 990	3 919	5 082
Japan	429	1 170	2 900	7 952	7 179	10 513	19 610	30 403	39 608	50 113	55 660
Korea	38	106	243	397	562	623	878	950	1 031	3 049	4 992
Luxembourg	11	26	44	68	97	104	184	203	249	332	406
Mexico	26	58	176	310	324	379	605	804	987	1 309	1 531
Netherlands	127	306	541	1 064	1 332	1 723	3 595	4 963	6 419	10 903	15 951
New Zealand	90	227	482	778	983	1 124	1 668	1 952	2 313	3 221	3 881
Norway	55	130	273	491	528	666	1 122	1 330	1 680	2 550	3 654
Poland	23	61	188	467	373	382	557	791	1 116	1 891	2 702
Portugal	27	59	116	192	214	286	443	601	667	833	1 102
Slovak Republic	15	..	45	110	38	47	61	96	143	203	252
Spain	239	432	759	1 194	1 315	1 764	2 745	3 429	4 196	5 838	7 267
Sweden	145	406	811	1 261	1 246	1 437	2 826	2 881	3 535	4 913	6 568
Switzerland	152	401	854	1 370	1 555	1 769	2 826	3 345	4 053	5 621	6 992
Turkey	7	50	116	285	400	432	855	1 150	1 646	2 482	3 748
United Kingdom	714	1 735	4 404	7 916	10 288	11 714	20 339	26 542	32 690	42 602	51 386
United States	14 674	32 053	65 565	86 025	106 884	120 661	197 769	225 865	254 668	300 918	343 164
OECD	19 590	43 988	92 124	133 086	161 392	184 449	305 939	370 027	435 034	540 399	635 315
World	20 300	…	…	140 841	…	…	324 816	382 266	453 370	563 399	664 318

Source: Netcraft, *www.netcraft.com.*

StatLink http://dx.doi.org/10.1787/625302747564

Table 5.4. **Domain name registrations under top level domains, 2000-08**

		Registrations, July					Annual growth	Share of world
	Domain	**2000**	**2002**	**2004**	**2006**	**2008**	(%)	domains (%)
Australia	.au	148 539	300 000	447 384	721 952	1 199 365	29.8	0.7
Austria	.at	157 387	252 441	341 841	548 060	759 033	21.7	0.5
Belgium	.be	32 709	206 989	348 401	1 056 976	802 287	49.2	0.5
Canada	.ca	60 000	300 000	447 689	720 094	1 063 378	43.2	0.6
Czech Republic	.cz	66 555	119 145	174 914	259 590	453 932	27.1	0.3
Denmark	.dk	208 300	397 552	528 886	708 693	930 904	20.6	0.6
Finland	.fi	17 603	36 210	86 793	137 040	172 201	33.0	0.1
France	.fr	89 097	155 554	268 361	564 839	1 170 383	38.0	0.7
Germany	.de	1 732 994	5 666 269	7 799 823	10 013 686	12 148 809	27.6	7.2
Greece	.gr	18 670	55 190	80 000	150 332	*200 000*	34.5	0.1
Hungary	.hu	39 470	81 804	100 000	250 000	390 000	21.6	0.2
Iceland	.is	3 300	8 200	10 500	15 500	22 000	26.8	0.0
Ireland	.ie	15 506	29 920	40 205	63 933	107 167	27.3	0.1
Italy	.it	417 609	735 156	909 241	1 236 918	1 566 390	18.0	0.9
Japan	.jp	190 709	482 644	587 412	845 603	1 033 412	23.5	0.6
Korea	.kr	494 074	479 643	612 840	693 515	939 819	8.4	0.6
Luxembourg	.lu	11 404	15 454	17 845	24 376	40 305	17.1	0.0
Mexico	.mx	49 947	71 590	91 559	174 490	266 896	23.3	0.2
Netherlands	.nl	532 596	748 510	1 005 292	1 991 799	3 027 731	24.3	1.8
New Zealand	.nz	56 765	107 046	149 269	221 433	341 490	25.1	0.2
Norway	.no	45 541	150 000	208 546	285 947	395 211	31.0	0.2
Poland	.pl	56 708	139 373	262 986	485 891	1 134 298	45.4	0.7
Portugal	.pt	18 739	38 048	57 546	118 452	222 293	36.2	0.1
Slovak Republic	.sk	22 081	57 091	64 100	97 811	161 888	28.3	0.1
Spain	.es	29 590	43 476	85 309	298 600	1 024 795	55.8	0.6
Sweden	.se	45 241	102 785	225 507	468 825	750 000	42.0	0.4
Switzerland	.ch	267 425	445 230	609 426	785 406	1 169 074	20.2	0.7
Turkey	.tr	22 428	40 059	62 163	94 076	161 017	27.9	0.1
United Kingdom	.uk	1 938 740	3 635 585	3 802 885	5 141 040	6 941 940	17.3	4.1
United States	.us	6 468	269 233	875 016	1 003 212	1 397 964	95.8	0.8
OECD ccTLDs		*6 796 195*	*15 170 197*	*20 301 739*	*29 178 089*	*39 993 982*	24.8	23.8
China	.cn	103203	126530	393974	1173330	12 364 615	81.9	7.4
Argentina	.ar	255536	..	..	1150000	1 527 461	25.0	0.9
Brazil	.br	305002	394508	653113	927146	1 366 991	20.6	0.8
India	.in	2 319	..	7000	170000	389 858	89.8	0.2
Rest of world ccTLDs		*1 841 283*	*2 392 311*	*6 091 200*	*9 052 060*	*25 006 018*	38.6	14.9
Total ccTLDs		*8 637 478*	*17 562 508*	*26 392 939*	38 230 149	65 000 000	28.7	38.7
Major gTLDs		*17 476 025*	*27 113 371*	*38 278 040*	*65 242 646*	*94 202 651*	23.4	56.1
.com		13 721 175	21 198 557	30 267 141	52 752 949	75 779 078	23.8	45.1
.net		2 305 075	3 586 124	4 910 121	7 728 195	11 521 124	22.3	6.9
.org		1 449 775	2 328 690	3 100 778	4 761 502	6 902 449	21.5	4.1
.biz		..	700 962	1 028 314	1 423 179	1 973 994	18.8	1.2
.info		..	864 457	1 235 485	3 132 195	4 851 813	33.3	2.9
.name		..	78 041	99,509	205 326	284 692	24.1	0.2
.mobi		..	..	..	..	924 690		0.6
Europe		..	..	..	2 036 467	2 882 361	9.1	1.7
				38 107 061	66 769 851	103 000 000	11.4	
World total				*64 500 000*	*105 000 000*	*168 000 000*	*17.3*	

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 2008.

StatLink http://dx.doi.org/10.1787/625318718760

Table 5.5. Domain name registrations by top-level domain, January 2008

	ccTLD	.com	.net	.org	.info	.biz	.mobi	Total gTLDs	.eu	Total
Australia	1 007 458	1 438 040	143 067	56 051	84 561	32 554	17 693	1 771 966		2 779 424
Austria	722 247	186 338	52 199	27 690	27 198	9 455	2 588	305 468	65 543	1 093 258
Belgium	736 498	197 631	86 348	22 696	9 272	7 552	2 126	325 625	78 217	1 140 340
Canada	943 408	2 636 961	341 003	165 230	238 106	59 873	29 730	3 470 903		4 414 311
Czech Republic	370 810	84 699	28 295	7 717	14 094	4 823	2 869	142 497	58 687	571 994
Denmark	864 882	180 536	36 036	16 515	15 577	7 837	1 164	257 665	41 476	1 164 023
Finland	165 315	169 398	58 053	17 249	5 563	2 538	1 866	254 667	12 812	432 794
France	991 723	1 684 568	283 925	183 274	120 042	45 151	14 243	2 331 203	192 243	3 515 169
Germany	11 673 389	3 208 147	902 644	520 880	476 707	151 000	41 565	5 300 943	861 238	17 835 570
Greece	195 562	88 463	8 781	5 901	13 228	3 681	522	120 576	20 546	336 684
Hungary	350 000	41 408	8 781	3 178	4 080	1 015	421	58 883	22 042	430 925
Iceland	20 250	11 293	5 854	1 362	124	159	181	18 973		39 223
Ireland	91 420	180 536	30 657	11 010	5 069	4 093	2 467	233 832	27 614	352 866
Italy	1 473 960	880 869	180 014	109 851	63 792	35 283	6 881	1 276 690	136 328	2 886 978
Japan	988 886	1 184 896	294 203	59 554	94 575	44 960	11 735	1 689 923		2 678 809
Korea	930 485	756 719	168 390	57 031	13 352	22 940	3 009	1 021 441		1 951 926
Luxembourg	34 803	22 586	4 878	1 362	989	1 015	441	31 271	14 365	80 439
Mexico	231 260	261 626	32 198	26 328	8 407	2 634	582	331 775		563 035
Netherlands	2 696 292	781 113	134 645	70 813	181 238	35 949	18 456	1 222 214	363 626	4 282 132
New Zealand	314 053	178 450	17 196	12 690	18 544	5 045	2 909	234 834		548 887
Norway	361 118	193 866	55 614	24 966	13 475	12 406	3 832	304 159		665 277
Poland	762 503	116 696	31 222	22 243	64 410	13 580	1 906	250 057	102 749	1 115 309
Portugal	184 705	173 162	19 514	9 079	7 047	2 538	702	212 042	10 928	407 675
Slovak Republic	140 349	15 058	2 439	454	11 745	698	301	30 695	12 671	183 715
Spain	864 839	954 710	146 327	87 238	100 633	24 939	15 968	1 329 815	60 854	2 255 508
Sweden	703 456	280 448	55 126	48 117	34 368	18 498	4 473	441 030	95 529	1 240 015
Switzerland	1 056 751	327 503	70 249	48 570	27 322	16 055	7 222	496 921		1 553 672
Turkey	146 083	638 065	143 914	74 898	82 459	12 914	1 184	953 434		1 099 517
United Kingdom	6 486 829	3 347 302	534 677	281 436	350 731	132 438	50 913	4 697 497	371 320	11 555 646
United States	1 376 189	41 234 384	5 313 379	3 634 615	2 266 338	1 041 704	441 471	53 931 891		55 308 080
OECD	39 993 982	61 455 471	9 189 628	5 607 998	4 353 046	1 753 327	689 420	83 048 890	2 548 788	125 591 660
World	65 000 000	76 281 883	11 621 600	6 977 470	4 698 011	1 980 219	..	101 559 183	2 665 087	162 000 000

Note: gTLD registrations at January 2008 and ccTLD registrations during the first half of 2008. gTLD registrations are estimates based on the country location of the registrant of a domain.

Source: Zooknic, August 2008.

StatLink http://dx.doi.org/10.1787/625412641215

Table 5.6. IPv4 addresses allocated by country, yearly basis, 1982-2008

	Before 1998	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	CAGR 1998-2008
Australia	19 400 192	273 664	356 096	931 328	850 944	552 448	790 016	1 504 000	1 731 840	3 887 872	2 739 200	3 238 656	28.0
Austria	1 309 952	227 840	402 048	607 488	774 688	285 952	409 600	785 152	625 920	556 608	661 760	305 920	3.0
Belgium	950 016	73 728	245 760	349 184	402 176	707 584	318 208	680 960	545 024	751 744	421 632	846 848	27.6
Canada	37 569 536	402 688	965 632	1 724 672	1 368 064	1 314 816	903 936	1 716 224	2 127 872	1 874 688	4 451 328	3 278 336	23.3
Czech Republic	740 352	49 152	57 344	106 496	171 008	196 864	313 344	847 616	610 560	1 175 680	637 440	996 864	35.1
Denmark	1 024 000	497 920	212 992	551 808	854 912	517 440	1 079 296	446 080	1 592 832	597 056	501 088	1 309 952	10.2
Finland	2 749 952	367 104	221 184	353 280	358 144	586 624	382 720	1 224 704	1 166 080	972 288	250 368	228 736	-4.6
France	36 749 568	381 696	532 992	859 488	1 424 256	1 566 208	5 005 344	2 085 888	9 168 000	13 019 936	13 377 664	648 352	5.4
Germany	7 042 440	1 408 384	1 690 112	4 007 408	5 753 600	870 848	1 158 720	6 767 392	6 002 752	11 176 992	11 221 056	7 877 632	18.8
Greece	322 048	183 040	130 560	307 968	251 904	23 552	80 384	186 880	263 936	594 432	780 288	610 816	12.8
Hungary	566 016	75 520	49 152	119 808	211 712	74 240	209 408	687 872	288 640	662 016	402 688	283 136	14.1
Iceland	139 264	8 192		36 864	24 576	61 440	86 016	20 480	63 488	75 776	12 288	16 896	7.5
Ireland	258 192	26 640	18 432	233 472	8 192	41 216	196 864	232 192	1 813 760	525 568	555 776	279 808	26.5
Italy	2 133 760	491 520	775 168	1 437 952	2 113 120	1 967 360	2 483 712	1 920 512	4 570 368	799 072	5 097 216	5 848 832	28.1
Japan	67 856 128	1 073 408	2 383 872	2 310 144	10 351 104	10 661 120	12 399 104	12 401 408	23 304 448	8 391 424	7 143 936	10 063 872	25.1
Korea	7 403 264	917 504	2 228 736	8 519 680	4 071 424	4 198 400	3 801 088	3 170 304	8 885 504	7 930 624	7 732 480	7 962 624	24.1
Luxembourg	64 768	8 192	17 408	12 288	24 576	23 040	11 264	64 512	49 152	10 752	65 536	88 640	26.9
Mexico	4 786 432		131 072	393 216	196 608	135 168	655 360	1 048 576	3 670 016	5 242 880	5 242 880	1 792	
Netherlands	2 543 616	468 992	826 624	2 453 024	1 328 384	1 046 304	2 739 776	2 759 968	2 130 696	1 725 696	1 868 672	911 872	6.9
New Zealand	3 069 184	54 784	163 840	152 320	89 088	148 992	162 048	281 088	305 152	506 112	482 048	686 080	28.8
Norway	18 257 664	229 440	90 624	292 352	611 904	156 192	312 064	839 936	1 590 912	589 568	453 888	565 520	9.4
Poland	809 472	307 968	283 904	679 168	846 336	416 832	2 544 896	576 800	900 608	2 750 568	2 043 168	1 256 832	15.1
Portugal	512 512	25 600	279 296	128 064	94 208	164 608	242 688	481 792	645 120	660 224	281 856	655 136	38.3
Slovak Republic	358 144	63 488	17 664	39 168	53 760	54 784	64 512	120 320	253 184	172 288	176 896	89 600	3.5
Spain	1 165 056	245 760	958 464	1 413 120	2 135 552	1 565 952	1 716 224	4 046 848	2 932 512	2 375 936	1 809 536	1 300 992	18.1
Sweden	2 881 792	319 232	821 760	1 208 320	1 002 240	1 521 472	580 672	3 141 632	751 104	2 878 880	2 060 352	460 608	3.7
Switzerland	19 142 656	418 048	229 632	532 736	487 520	505 344	452 096	665 728	967 424	498 432	401 376	158 504	-9.2
Turkey	377 600	270 848	368 896	555 776	139 264	326 656	119 296	1 239 232	2 180 864	140 544	2 620 160	1 690 112	20.1
United Kingdom	40 895 624	1 271 576	2 113 536	4 019 280	3 297 184	4 165 192	5 676 192	1 738 624	9 808 704	3 853 856	6 415 008	3 056 992	9.2
United States	1 064 412 160	44 881 920	18 236 672	25 018 880	25 398 328	20 317 696	21 111 496	29 468 416	45 225 984	44 692 992	48 570 368	53 972 480	1.9
OECD	1 345 491 360	55 023 848	34 809 472	59 354 752	64 694 776	54 174 344	66 006 344	81 151 136	134 172 456	119 090 504	128 477 952	108 692 440	7.0
World	2 101 643 588	59 702 504	42 014 480	72 741 248	82 958 520	69 209 608	87 411 960	125 771 808	171 015 024	168 931 080	206 876 192	203 907 760	13.1
AfriNIC	7 733 824	126 976	65 536	544 768	378 880	235 008	218 624	490 240	1 021 440	2 775 552	5 609 216	1 623 808	29.0
APNIC	79 393 536	4 786 944	9 251 840	20 834 560	28 781 568	26 993 408	33 009 664	42 724 096	53 739 776	51 638 016	69 974 784	88 180 736	33.8
ARIN	549 099 264	11 762 944	19 239 168	26 802 944	26 906 680	21 693 952	22 044 104	31 219 456	47 524 352	46 690 560	53 173 504	57 395 200	17.2
LACNIC	19 976 704	290 816	442 368	875 008	1 606 400	647 168	2 624 000	3 823 616	10 947 840	11 477 504	14 865 920	11 302 144	44.2
Ripe NCC	169 191 940	9 180 392	12 950 032	23 683 968	25 284 736	19 640 072	29 515 568	47 514 400	57 716 080	56 349 448	63 252 768	45 405 872	17.3

Note: Data collected on 5 January 2009. Regional Internet registry (RIR) data does not include blocks assigned to the Internet Assigned Numbers Authority (IANA).

Source: OECD, based on data from the RIRs.

StatLink http://dx.doi.org/10.1787/625421123452

Table 5.7. Routed IPv4 addresses by country, 1997-2007

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR 1997-2007
Australia	18 197 869	19 808 634	19 779 194	36 810 256	51 587 719	34 485 920	35 200 460	37 018 673	39 664 028	45 019 532	47 759 464	10.1
Austria	1 572 352	2 052 352	2 023 424	3 209 729	4 501 392	5 091 328	5 302 016	6 284 032	8 660 736	10 726 912	10 661 888	21.1
Belgium	274 688	173 056	173 056	460 544	666 624	907 520	1 195 776	1 470 496	2 226 992	20 455 936	21 044 480	54.3
Canada	42 856 129	29 748 102	28 893 830	32 232 320	32 984 748	34 265 372	34 582 521	36 708 912	58 391 616	62 386 096	48 923 584	1.3
Czech Republic	384 000	444 672	436 480	591 104	697 088	768 000	1 049 856	1 591 872	2 471 168	4 039 888	5 113 424	29.6
Denmark	975 104	1 300 225	1 292 033	1 537 152	1 912 256	2 156 928	1 976 832	2 329 088	2 842 880	7 111 424	8 761 600	24.6
Finland	5 651 712	6 263 476	6 263 476	6 740 900	6 936 564	7 030 109	7 913 216	8 677 120	9 597 952	12 087 552	11 785 216	7.6
France	17 915 616	24 969 338	24 967 290	25 459 588	26 099 709	26 387 996	28 843 944	31 818 304	35 516 193	52 365 572	63 217 560	13.4
Germany	39 405 971	43 203 812	43 010 532	47 474 948	52 440 195	50 455 336	50 640 603	54 146 634	60 272 657	75 375 333	106 194 696	10.4
Greece	624 128	852 480	844 032	1 101 568	1 315 584	1 442 816	1 371 648	1 654 272	1 722 496	2 744 064	3 364 096	18.3
Hungary	704 128	867 594	858 634	968 192	1 194 624	1 250 432	1 388 544	1 885 440	1 730 816	2 913 024	3 404 544	17.1
Iceland	202 752	280 064	279 552	320 768	341 248	386 816	412 672	510 976	559 872	640 000	641 280	12.2
Ireland	98 560	143 424	143 424	238 464	182 784	245 760	352 000	678 400	1 477 888	4 499 008	4 564 224	46.7
Italy	1 678 080	10 157 569	10 141 185	12 677 120	14 482 496	15 336 192	16 030 720	14 902 784	14 951 936	26 921 552	32 044 800	34.3
Japan	34 235 817	36 440 724	36 125 076	38 415 984	49 213 357	60 322 163	67 593 600	95 834 256	108 666 249	159 509 100	151 417 648	16.0
Korea	6 913 280	11 613 380	10 401 220	17 723 936	23 397 244	26 903 137	32 004 359	36 694 182	47 067 694	56 403 296	64 587 283	25.0
Luxembourg	73 728	48 640	48 640	50 944	76 800	82 176	126 208	163 328	186 112	248 576	274 688	14.1
Mexico	3 779 328	4 729 984	4 728 960	5 122 288	5 556 224	5 816 192	6 256 308	6 791 796	8 200 324	14 898 388	18 321 760	17.1
Netherlands	18 260 632	18 929 520	18 915 952	21 104 870	23 954 857	17 444 224	20 128 032	23 237 638	24 258 044	39 276 773	33 758 272	6.3
New Zealand	2 730 512	2 690 262	2 690 262	2 831 360	2 998 937	3 173 029	3 189 248	3 411 456	3 326 720	3 664 128	4 652 288	5.5
Norway	4 244 992	2 221 824	2 221 824	2 529 536	2 539 776	2 816 512	3 301 632	3 871 744	4 132 352	9 454 966	12 486 176	11.4
Poland	500 224	1 799 936	1 799 936	2 361 856	2 933 760	3 555 584	4 020 480	6 730 024	7 585 024	8 649 600	11 107 136	36.3
Portugal	362 496	510 720	510 720	718 592	875 136	1 008 672	972 288	1 294 592	1 747 712	3 506 944	3 874 560	26.7
Slovak Republic	148 992	219 648	219 648	360 192	416 096	441 856	390 152	444 928	592 992	753 920	845 760	19.0
Spain	2 107 904	2 622 976	2 582 016	3 263 284	4 275 713	4 517 056	5 235 840	7 709 120	10 392 512	19 305 088	21 909 824	26.4
Sweden	2 881 792	3 710 832	3 707 984	4 530 853	5 424 138	5 957 920	6 580 748	9 418 272	10 490 413	17 146 624	19 206 722	20.9
Switzerland	4 075 008	4 565 568	4 462 336	5 253 444	5 939 488	6 459 936	6 571 136	8 166 272	8 744 708	11 858 707	12 810 835	12.1
Turkey	824 832	18 117 632	1 311 744	1 622 528	1 728 000	1 943 552	2 412 800	2 679 040	3 986 176	8 300 032	10 971 136	29.5
United Kingdom	17 942 661	37 882 584	37 592 008	38 465 969	22 006 584	25 248 752	33 031 466	38 211 824	43 372 386	55 841 092	66 578 497	14.0
United States	726 156 894	727 832 576	717 022 860	784 392 573	839 325 273	804 889 773	856 639 878	908 083 464	923 453 218	997 833 021	1 017 348 493	3.4
OECD	955 780 181	1 014 201 604	983 447 328	1 098 570 862	1 186 004 414	1 150 791 059	1 234 714 983	1 352 418 939	1 446 289 866	1 733 936 148	1 817 631 934	6.6
Total	1 027 139 797	1 099 618 044	1 067 432 984	1 215 069 658	1 347 302 205	1 317 717 859	1 408 146 961	1 590 981 743	1 734 418 713	2 000 669 268	2 177 574 200	7.8

Note : Yearly data are collected for the month of November. UK data points include data reported under GB.

Source: Tom Vest *(www.eyeeconomics.com)* from raw data generated by the University of Oregon Route Views project.

StatLink http://dx.doi.org/10.1787/625443417424

Table 5.8. Annual number of IPv6 prefixes allocated by country and by RIR, yearly basis, 1998-2008

	Before 1999	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia		1		1	8	2	2	10	1	15	54
Austria		1		1	8	4	5	5	3	3	13
Belgium			1			5	1	2	2	4	8
Canada			1		2	4	9	3	8	20	17
Czech Republic				1	1	7	4	2	3	7	18
Denmark				1	2	5		1		5	9
Finland			1	2	6	7	4		1		3
France			2		9	11	8	6	8	8	21
Germany		2	1	3	16	29	22	25	14	27	70
Greece		1				1				2	3
Hungary				1	1		1	2	2	2	6
Iceland							1			2	3
Ireland				1	2	3	3	1	7	4	6
Italy			1	2	7	12	9	6	2	6	22
Japan		3	8	16	98	32	23	10	4	12	44
Korea		2	3	6	32	15	13	5	3	12	14
Luxembourg					3	4				2	5
Mexico			1	3		2	1	4	2		2
Netherlands		1	1	2	16	13	17	5	2	10	35
New Zealand						3	1	3	5	13	24
Norway				1	4	2	3	3	1	5	17
Poland			1	1	5	3	10	3	3	3	9
Portugal			1		5	4	1	1	2		4
Slovak Republic							3		2	3	2
Spain				1	3	6	4	4	5		6
Sweden			1	1	5	11	4	1	5	8	17
Switzerland		1			6	8	6	7	6	6	32
Turkey					1	1	1		1	3	10
United Kingdom		1		6	11	13	26	13	13	29	37
United States		1	5	8	15	49	63	55	66	200	221
OECD		14	28	58	266	256	245	177	171	411	732
World	20	18	32	67	308	309	303	247	254	551	1 004
AfriNIC							1	3	19	21	18
APNIC		7	14	25	169	78	64	54	49	116	277
ARIN		1	7	11	17	53	73	59	75	221	238
LACNIC						5	4	31	16	27	31
Ripe NCC		9	11	30	122	173	161	100	95	166	440

Note: Data collected on 5 January 2009. RIR data do not include blocks assigned to the IANA.

Source: OECD. Based on data from the RIRs (www.nro.net).

StatLink http://dx.doi.org/10.1787/625447578864

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Table 5.9. Annual size of IPv6 allocations (/32's) by country and by RIR, 1998-2008

	Before 1999	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia		0.1		0.1	2.9	2.0	4 097.0	4.0	0.0	8 204.0	49.0
Austria		0.1		0.1	7.3	3.3	4.0	5.0	3.0	3.0	13.0
Belgium			0.1			2.3	1.0	2.0	3.0	4.0	6.0
Canada			1.0		2.0	4.0	9.0	3.0	4.0	13.0	11.0
Czech Republic				0.1	0.3	6.0	4.0	2.0	2.0	7.0	18.0
Denmark				0.1	1.3	4.0		1.0		5.0	9.0
Finland			0.1	0.3	3.5	4.6	4.0		1.0		3.0
France			0.3		5.9	9.0	7.0	8 197.0	8.0	8.0	82.0
Germany		0.3	0.1	0.3	10.5	24.9	21.0	9 238.0	267.0	88.0	69.0
Greece		0.1				0.3				2.0	2.0
Hungary				0.1	0.3		1.0	1.0	2.0	2.0	6.0
Iceland							1.0			2.0	3.0
Ireland				0.1	0.4	1.3	3.0	1.0	7.0	4.0	6.0
Italy			0.1	0.3	3.8	10.0	9.0	6.0	4 097.0	6.0	22.0
Japan		0.4	1.0	2.0	34.1	22.3	2 078.6	5 127.0	4.0	1 034.0	37.0
Korea		0.3	0.4	0.8	10.1	6.5	13.0	4 114.0	2 064.0	12.0	14.0
Luxembourg					1.4	3.0				2.0	5.0
Mexico			1.0	3.0		2.0	1.0	4.0	2.0		2.0
Netherlands		0.1	0.1	0.1	12.6	12.0	525.5	5.0	2.0	10.0	34.0
New Zealand						1.0	1.0	6.0	5.0	10.0	22.0
Norway				0.1	3.3	1.0	258.0	3.0	1.0	5.0	16.0
Poland			0.1	0.1	4.3	2.3	10.0	3.0	2 050.0	18.0	8.0
Portugal			0.1		3.3	4.0	0.0	1.0	2.0		4.0
Slovak Republic							2.0		2.0	2.0	2.0
Spain				0.1	2.3	5.0	3.0	4.0	5.0		6.0
Sweden			0.1	0.1	3.3	9.0	3.3	1.0	3.0	7.0	143.0
Switzerland		0.1			4.3	37.0	6.0	7.0	5.0	6.0	32.0
Turkey					1.0	1.0	1.0		1.0	3.0	10.0
United Kingdom		0.1		0.3	6.1	12.0	55.0	11.0	14.0	1 050.0	37.0
United States		1.0	5.0	8.0	10.0	40.0	31.0	53.0	50.0	126.0	14 479.0
OECD		2.6	9.6	16.1	133.8	229.5	7 149.4	26 799.0	8 604.0	10 633.0	15 150.0
World	3 758 161 920	515.0	10.1	65 553.4	158.5	268.9	13 343.9	26 987.0	10 830.0	10 901.0	81 126.0
AfriNIC							1.0	3.0	19.0	15.0	14.0
APNIC		0.9	1.8	3.1	66.8	49.4	6 213.6	9 373.0	4 255.0	9 447.0	253.0
ARIN		1.0	7.0	11.0	12.0	44.0	41.0	57.0	54.0	140.0	14 490.0
LACNIC						5.0	4.0	53.0	16.0	40.0	65 751.0
Ripe NCC		1.1	1.4	3.3	79.8	170.5	7 084.3	17 501.0	6 486.0	1 259.0	618.0

Note: Data collected on 5 January 2009. RIR data do not include blocks assigned to the IANA.

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

StatLink http://dx.doi.org/10.1787/625480256248

Table 5.10. Allocated and routed Internet number ressources by country, year-end 2008

	IPv4 addresses		IPv6 addresses				AS numbers	
	Allocated (/8 equ.)	Routed (/8 equ.)	Allocated /32's	Routed /32's	# prefixes allocated	# prefixes routed	AS's allocated	AS's routed
Australia	2.12	1.66	8 222	4 102	60	23	880	545
Austria	0.41	0.38	32	15	42	22	318	255
Belgium	0.36	0.31	16	6	25	8	125	103
Canada	3.33	2.28	44	9	56	22	1 245	646
Czech Republic	0.32	0.30	32	12	43	27	161	135
Denmark	0.51	0.50	16	5	26	9	166	120
Finland	0.52	0.50	18	9	21	12	122	96
France	5.06	3.32	8 311	8 205	74	35	526	372
Germany	3.64	3.57	9 689	8 513	217	115	1 233	898
Greece	0.22	0.21	4	1	8	3	151	100
Hungary	0.21	0.20	8	2	16	6	200	139
Iceland	0.03	0.03	5	0	6	2	28	23
Ireland	0.24	0.23	23	6	25	14	87	67
Italy	1.73	1.53	4 145	22	72	35	538	414
Japan	9.84	7.50	8 309	5 199	144	74	732	497
Korea	3.85	3.75	5 196	28	54	11	763	630
Luxembourg	0.02	0.02	11	1	14	7	20	16
Mexico	1.28	0.98	14	6	21	6	221	153
Netherlands	1.20	1.12	585	32	105	60	427	314
New Zealand	0.33	0.25	23	8	35	19	222	140
Norway	1.42	1.41	280	6	38	9	124	80
Poland	0.76	0.73	2 093	2 062	43	19	872	742
Portugal	0.22	0.21	12	5	21	8	63	47
Slovak Republic	0.08	0.08	7	5	12	7	66	54
Spain	1.24	1.17	23	11	32	14	286	220
Sweden	1.01	0.94	164	11	54	24	384	267
Switzerland	1.45	1.39	80	47	77	39	390	299
Turkey	0.51	0.48	16	1	18	2	322	214
United Kingdom	5.06	2.86	1 168	37	146	68	1 613	1 109
United States	84.38	49.61	14 746	116	732	241	18 945	11 687
OECD	131.35	87.53	63 293	28 482	2 237	941	31 230	20 382
World	160.42	110.87	72 364	37 000	2 885	1 189	43 084	28 904
Brazil	1.65	1.39	128	3	5	0	514	340
China	9.54	7.68	35	14	44	19	429	181
India	0.93	0.57	17	2	19	4	224	187
Russian Federation	1.16	1.01	40	6	55	24	2 279	1 851
South Africa	0.82	0.68	13	5	23	8	147	67

Note about IP address measurement units: Networks are assigned different sized “blocks” of IP addresses, according to need. To compare address blocks of different sizes, these are converted into the same measurement units (in the case of IPv6 in particular, the individual unit is rarely used because numbers would be so very large). In the IPv4 address space, a commonly used unit is "/8". In the IPv6 address space, a commonly used size to quantify IP addresses is "/32."

Source: Data from the RIRs (*www.potaroo.net* , collected 5 January 2009) and from sixxs (*www.sixxs.net* , collected 9 January 2009).

StatLink http://dx.doi.org/10.1787/625541246576

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Table 5.11. Routed autonomous systems by country, 1997-2007

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR 1997-2007
Australia	46	160	153	194	255	293	325	364	402	467	502	27.0
Austria	25	48	44	68	89	112	132	163	192	223	250	25.9
Belgium	7	16	16	24	31	32	49	60	65	88	99	30.3
Canada	93	142	139	196	260	315	372	439	473	530	598	20.5
Czech Republic	7	13	12	20	30	43	61	68	84	104	122	33.1
Denmark	7	15	14	29	37	38	49	61	74	87	111	31.8
Finland	17	26	26	32	42	51	61	72	76	94	106	20.1
France	29	121	118	149	194	210	237	261	299	373	419	30.6
Germany	52	203	193	326	455	515	587	683	792	825	890	32.8
Greece	13	35	34	52	58	64	66	73	77	100	102	22.9
Hungary	25	39	38	44	60	67	79	87	95	108	129	17.8
Iceland	3	3	2	5	5	8	10	15	15	18	19	20.3
Ireland	2	9	9	12	12	12	20	28	38	49	62	41.0
Italy	23	80	78	133	219	248	273	295	317	359	391	32.8
Japan	115	173	165	197	252	339	409	439	473	493	501	15.9
Korea	38	117	112	260	342	329	415	444	466	498	566	31.0
Luxembourg	1	5	5	6	7	9	11	11	11	14	14	30.2
Mexico	35	52	50	69	84	89	102	108	119	130	140	14.9
Netherlands	28	59	55	85	126	152	186	230	260	326	354	28.9
New Zealand	4	24	24	35	43	54	55	72	81	94	115	39.9
Norway	5	8	8	22	30	33	41	48	54	70	82	32.3
Poland	5	27	27	70	126	164	203	294	379	515	665	63.1
Portugal	4	15	15	25	25	25	27	33	38	43	45	27.4
Slovak Republic	8	12	12	15	22	26	31	34	40	47	48	19.6
Spain	8	29	28	57	101	121	145	167	179	173	197	37.8
Sweden	19	38	36	51	74	91	116	141	165	211	256	29.7
Switzerland	19	51	47	77	113	128	146	174	197	227	277	30.7
Turkey	8	32	28	51	75	88	100	120	140	160	203	38.2
United Kingdom	82	173	167	236	336	419	535	646	732	948	1 070	29.3
United States	1 627	3 475	3 280	4 879	6 342	7 306	8 119	8 995	9 698	10 704	11 472	21.6
OECD	2 355	5 200	4 935	7 419	9 845	11 381	12 962	14 625	16 031	18 078	19 805	23.7
RoW	544	1 125	1 063	1 553	2 121	2 618	3 123	3 747	4 420	5 473	6 801	28.7
Total	2 899	6 325	5 998	8 972	11 966	13 999	16 085	18 372	20 451	23 551	26 606	24.8

Note: Annual data are collected in November. UK data points include data reported under GB.

Source: Tom Vest *(www.eyeeconomics.com)* from raw data generated by the University of Oregon Route Views project.

StatLink http://dx.doi.org/10.1787/625608308436

Table 5.12. **Average routed IPv4 addresses per AS by country, 1997-2007**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR 1997-2007
Australia	395 606	123 804	129 276	189 744	..	117 699	108 309	101 700	98 667	96 402	95 138	-13.3
Austria	62 894	42 757	45 987	47 202	50 577	45 458	40 167	38 552	45 108	48 103	42 648	-3.8
Belgium	39 241	10 816	10 816	19 189	21 504	28 360	24 404	24 508	34 261	232 454	212 571	18.4
Canada	460 819	209 494	207 869	164 451	126 864	108 779	92 964	83 619	123 450	117 710	81 812	-15.9
Czech Republic	54 857	34 206	36 373	29 555	23 236	17 860	17 211	23 410	29 419	38 845	41 913	-2.7
Denmark	139 301	86 682	92 288	53 005	51 683	56 761	40 344	38 182	38 417	81 741	78 933	-5.5
Finland	332 454	240 903	240 903	210 653	165 156	137 845	129 725	120 516	126 289	128 591	111 181	-10.4
France	617 780	206 358	211 587	170 870	134 535	125 657	121 704	121 909	118 783	140 390	150 877	-13.1
Germany	757 807	212 827	222 852	145 629	115 253	97 972	86 270	79 278	76 102	91 364	119 320	-16.9
Greece	48 010	24 357	24 824	21 184	22 682	22 544	20 783	22 661	22 370	27 441	32 981	-3.7
Hungary	28 165	22 246	22 596	22 004	19 910	18 663	17 577	21 672	18 219	26 972	26 392	-0.6
Iceland	67 584	93 355	139 776	64 154	68 250	48 352	41 267	34 065	37 325	35 556	33 752	-6.7
Ireland	49 280	15 936	15 936	19 872	15 232	20 480	17 600	24 229	38 892	91 816	73 617	4.1
Italy	72 960	126 970	130 015	95 317	66 130	61 839	58 721	50 518	47 167	74 990	81 956	1.2
Japan	297 703	210 640	218 940	195 005	195 291	177 941	165 266	218 301	229 738	323 548	302 231	0.2
Korea	181 928	99 260	92 868	68 169	68 413	81 772	77 119	82 645	101 004	113 260	114 112	-4.6
Luxembourg	73 728	9 728	9 728	8 491	10 971	9 131	11 473	14 848	16 919	17 755	19 621	-12.4
Mexico	107 981	90 961	94 579	74 236	66 146	65 350	61 336	62 887	68 910	114 603	130 870	1.9
Netherlands	652 165	320 839	343 926	248 293	190 118	114 765	108 215	101 033	93 300	120 481	95 362	-17.5
New Zealand	682 628	112 094	112 094	80 896	69 743	58 760	57 986	47 381	41 071	38 980	40 455	-24.6
Norway	848 998	277 728	277 728	114 979	84 659	85 349	80 528	80 661	76 525	135 071	152 270	-15.8
Poland	100 045	66 664	66 664	33 741	23 284	21 680	19 805	22 891	20 013	16 795	16 702	-16.4
Portugal	90 624	34 048	34 048	28 744	35 005	40 347	36 011	39 230	45 992	81 557	86 101	-0.5
Slovak Republic	18 624	18 304	18 304	24 013	18 913	16 994	12 586	13 086	14 825	16 041	17 620	-0.6
Spain	263 488	90 447	92 215	57 251	42 334	37 331	36 109	46 162	58 059	111 590	111 217	-8.3
Sweden	151 673	97 653	103 000	88 840	73 299	65 472	56 731	66 796	63 578	81 264	75 026	-6.8
Switzerland	214 474	89 521	94 943	68 227	52 562	50 468	45 008	46 933	44 389	52 241	46 249	-14.2
Turkey	103 104	566 176	46 848	31 814	23 040	22 086	24 128	22 325	28 473	51 875	54 045	-6.3
United Kingdom	218 813	218 974	225 102	162 991	65 496	60 260	61 741	59 151	59 252	58 904	62 223	-11.8
United States	446 316	209 448	218 605	160 769	132 344	110 168	105 511	100 954	95 221	93 221	88 681	-14.9
OECD	405 851	195 039	199 280	148 075	120 468	101 115	95 257	92 473	90 218	95 914	91 776	-13.8
Total	354 308	173 853	177 965	135 429	112 594	94 129	87 544	86 598	84 809	84 951	81 845	-13.6

Note: Annual data are collected in November.

Source: Tom Vest *(www.eyeeconomics.com)* from raw data generated by the University of Oregon Route Views project.

StatLink http://dx.doi.org/10.1787/625661176374

Table 5.13. Top 10 networks defined by number of peers, 2004-08

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

Source: FixedOrbit, *www.fixedorbit.com.*

StatLink http://dx.doi.org/10.1787/625676266356

Table 5.14. Bots by country, 2006-07

	2006	2007	Growth 2006-07 (%)
Australia	65 730	40 739	-38.0
Austria	12 087	14 290	18.2
Belgium	23 931	19 062	-20.3
Canada	144 915	116 802	-19.4
Czech Republic	9 428	6 529	-30.7
Denmark	11 316	11 385	0.6
Finland	4 298	4 166	-3.1
France	371 306	238 223	-35.8
Germany	364 994	469 439	28.6
Greece	7 187	8 440	17.4
Hungary	25 414	25 754	1.3
Iceland	930	1 176	26.5
Ireland	7 549	9 166	21.4
Italy	140 224	271 010	93.3
Japan	73 662	55 935	-24.1
Korea	144 858	97 610	-32.6
Luxembourg	1 711	1 986	16.1
Mexico	44 632	44 555	-0.2
Netherlands	31 926	24 731	-22.5
New Zealand	6 251	4 104	-34.3
Norway	11 467	12 179	6.2
Poland	179 688	258 437	43.8
Portugal	54 334	71 903	32.3
Slovak Republic	4 749	6 940	46.1
Spain	313 633	357 619	14.0
Sweden	16 307	20 143	23.5
Switzerland	28 306	32 366	14.3
Turkey	68 640	153 612	123.8
United Kingdom	265 656	193 826	-27.0
United States	858 151	680 589	-20.7
OECD	3 293 280	3 252 716	-1.2
China	1 568 434	383 643	-75.5
Brazil	151 707	259 156	70.8
Russia	32 422	72 294	123.0
India	53 230	38 502	-27.7
South Africa	10 020	3 808	-62.0
World total	5 952 459	4 923 233	-17.3

Source: Symantec, *www.symantec.com,* data at year-end.

StatLink http://dx.doi.org/10.1787/625686535583

Table 5.15. Attack traffic, originating countries

Percentage of traffic, quarterly

	Q1 2008	Q2 2008	Q3 2008	Q4 2008
Australia	0.73	0.51	0.17	0.36
Austria	0.46	0.51	0.06	0.23
Belgium	0.09	0.23	0.27	0.14
Canada	1.10	0.90	1.94	1.68
Czech Republic	0.23	0.18	0.90	0.27
Denmark	0.29	0.55	1.03	1.15
Finland	0.09	0.51	1.09	0.18
France	1.14	1.89	0.87	1.42
Germany	1.58	5.56	2.20	2.15
Greece	0.21	0.18	0.21	0.21
Hungary	0.15	0.30	0.25	0.48
Iceland	0.04	..	0.03	0.01
Ireland	0.06	0.12	0.10	0.07
Italy	0.72	1.19	0.71	1.28
Japan	3.56	30.07	3.13	2.00
Korea	3.43	2.25	9.37	2.52
Luxembourg	..	0.01	0.00	0.03
Mexico	1.34	0.68	1.08	0.73
Netherlands	0.22	0.47	1.38	0.44
New Zealand	0.11	0.15	0.02	0.46
Norway	0.35	0.15	0.08	0.12
Poland	1.05	1.58	1.17	0.99
Portugal	0.19	0.31	0.07	0.25
Slovak Republic	0.06	0.05	0.01	0.07
Spain	0.97	1.54	0.86	1.48
Sweden	0.20	0.48	3.86	10.67
Switzerland	0.41	0.48	0.11	0.31
Turkey	2.69	0.59	0.67	0.61
United Kingdom	1.16	1.56	1.20	1.45
United States	14.33	21.52	19.68	22.85
OECD	36.96	74.52	52.52	54.61
Rest of world	63.04	25.48	47.48	45.39
Brazil	4.75	1.53	2.64	1.68
China	16.77	8.90	26.85	19.30
India	2.53	1.02	1.63	1.16
Russia	0.80	1.64	1.94	2.33
South Africa	0.11	0.32	0.08	0.10

Source: Akamai, *www.akamai.com.*

StatLink http://dx.doi.org/10.1787/625701516802

ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Chapter 6

Broadcasting

Operators are investing heavily in new, high-speed broadband networks and this allows a much richer audiovisual experience than early broadband connections were capable of transmitting. As a result, the audio visual landscape is rapidly changing with audio and video now delivered over a range of different networks and devices. Television is no longer the sole conduit for diffusion of video data as consumers now watch video content on an array of devices.

Introduction

The audiovisual landscape is rapidly changing with audio and video now delivered over a range of different networks and devices. Television is no longer the sole conduit for diffusion of video data as consumers now watch video content on an array of devices.

Broadcasters, telecommunication operators (fixed and mobile), Internet service providers, content aggregators, advertisers and users are all active parts of a new, converged market. Content is repackaged to ensure that it is accessible over all available networks and devices. This repackaging of content takes advantage of new opportunities offered by different media such as ringtones, clips, games and graphics. Many electronic equipment providers, from mobile phones to handheld audio/video device manufacturers are also trying to ensure that their users can access content directly and away from home.

The availability of a range of devices receiving audiovisual content, as well as the development of new forms of content on the Internet (*e.g.* YouTube, Facebook, etc.) is also leading to a change in viewing habits. Between old television broadcasting, network sites like ABC.com and video aggregators such as Hulu and Dailymotion, the line between television, PC and portable viewing options is blurring. Advertisers want a better sense of who's watching what and where.

An increasing share of advertising expenditure in OECD countries is following this shift as viewing habits have changed and, in particular, as consumers spend more time on the Internet. The importance of online advertising is also evident from some of the partnerships, mergers and acquisitions that have recently taken place (*e.g.* Google-DoubleClick). Television broadcasting revenues are increasingly coming from subscription fees and less from advertising, especially in countries where there is a high number of multichannel households.

Traditional public and commercial broadcasters are facing audience fragmentation and have to diversify their offers in order to retain a sufficiently large audience, either by starting new digital channels themselves or by expanding to new platforms such as broadband Internet and mobile phones. New players such as IPTV operators, ISPs and network operators, each with a range of digital television channels and online video services are entering the broadcasting markets. Providers now commonly offer a variety of linear (traditional scheduled TV services) and non-linear (on-demand commercial content and content on the Internet) audiovisual services. This is in contrast to the historical role of traditional broadcasters and channel operators who produced, commissioned or bought programmes and then scheduled and transmitted them to viewers.

These developments are shifting market definitions and boundaries, both technologically and economically, and leading to debates about how traditional broadcasting policies and regulations should respond. They are also leading to new policy questions in related sectors. For example, the increasing use of IP networks to transport audio-video content is one factor behind the debate over who should carry the cost of distribution for content-rich services. This then filters into arguments on high-speed broadband network developments, and to considerations regarding investment and competition.

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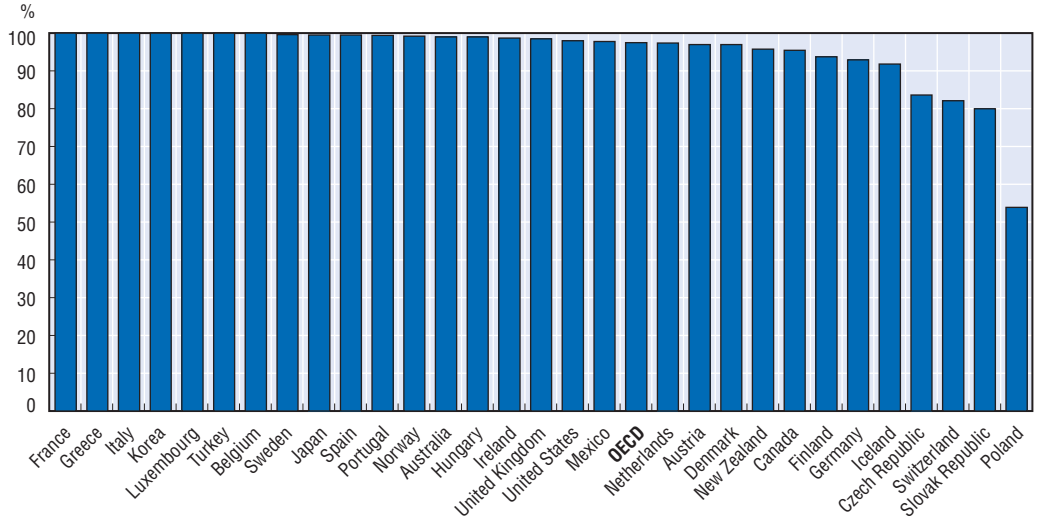
Traditional broadcasting

Traditional linear diffusion of content maintains an advantage over other media because of the near ubiquity of televisions in households (see Table 6.1). On average, 95% of all households in the OECD have at least one television. Only six countries have television penetration of less than 90% of households (Figure 6.1). This provides a strong base for terrestrial, cable and satellite broadcasters. At the same time, it represents a challenge to new media operators who try to attract viewers to other devices. Video services offered by ISPs need the ability to transmit video to television sets to capture audience share.

Figure 6.1. **Percentage of households with a television, 2007**



Source: OECD, ITU, EAO.

StatLink http://dx.doi.org/10.1787/622023671156

The number of households equipped with television sets grew slightly by 1% across the OECD between 2006 and 2007. The number of households with televisions grew in 19 countries with the strongest gains in Ireland, France and the Slovak Republic. Four countries had declines in households with televisions and the steepest declines were in Poland, Canada and the Netherlands.

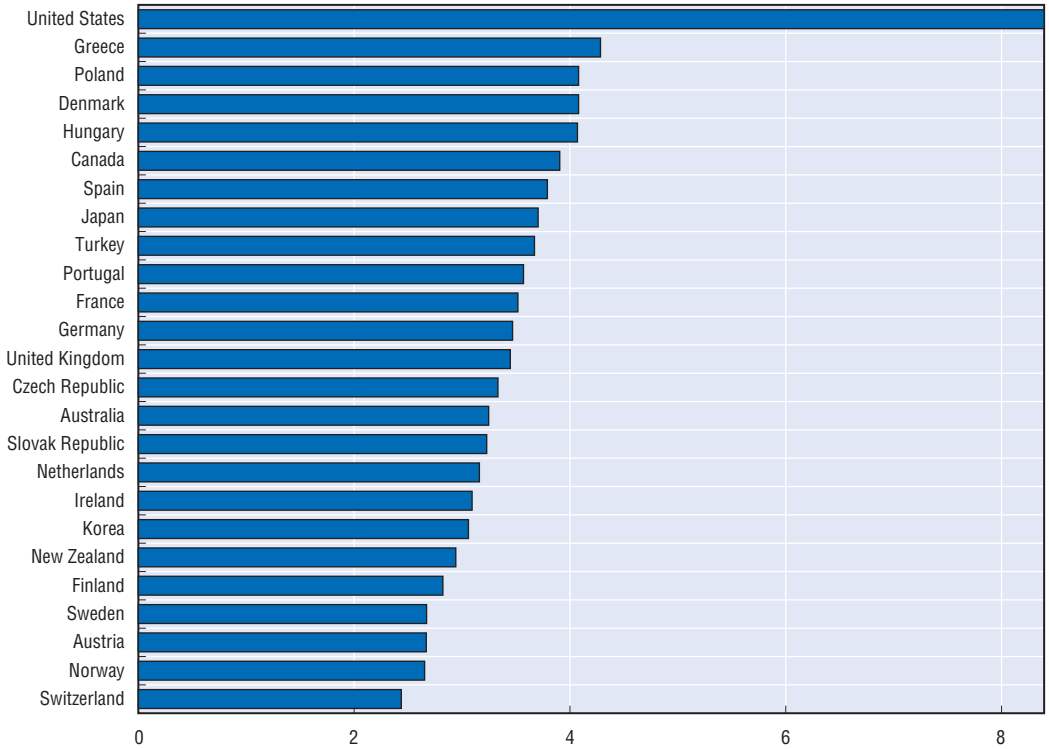
People in households with televisions continue to use them. Table 6.2 provides data on the average television viewing time across the OECD. Households in the OECD tend to watch between two and four hours of television per day. Switzerland has the lowest reported viewing times at just over two hours. Television viewing in the United States is much higher than any other country in the OECD (Figure 6.2).

American households watched an average of 8.2 hours per day. This is nearly double the next highest reported average of over four hours in Greece (4.2 hours) and roughly three times more than households in Switzerland (2.4 hours).

The business models for television are changing with operators looking for new revenue sources as viewership declines. One approach to support television has long been to levy an annual tax on colour televisions (Table 6.3). These fees are commonly used to fund public broadcasting channels.

In 2007 there were 15 countries with an average annual licence fee of USD 197. The most expensive annual fees were in Denmark (USD 415), Norway (USD 359) and Sweden

Figure 6.2. **Average household television viewing time, hours per day, 2007**



StatLink http://dx.doi.org/10.1787/622025043407

(USD 295). The least expensive fee among countries imposing a tax was Korea at USD 3 per year. The remaining 15 countries do not impose an annual tax on colour televisions.

OECD residents with televisions access linear video content over four main distribution methods: terrestrial broadcast, cable, satellite and IPTV. Data on IPTV subscribers were unavailable from national regulators but it is possible to build a picture of how residents in different countries access television over the remaining three distribution methods.

Figure 6.3 shows the relative market shares of different distribution methods using combined data from 2006 and 2007, according to availability. Terrestrial broadcasting is the dominant delivery method in eight countries. Terrestrial networks are particularly important in countries such as Greece and Italy. Cable is the dominant technology in 15 countries with Switzerland, Belgium and the Netherlands having the most cable subscribers relative to other technologies. DBS is the dominant delivery method only in Austria but there are a total of 11 countries where the number of DBS subscribers outnumbers terrestrial broadcast viewers.

Free-to-air

Free-to-air broadcasting is categorised as the distribution of radio or television programmes to the general public over assigned frequencies using allocated spectrum (AM, FM, VHF, UHF or L-Band). These are usually 'free-to-air' but at times may be encrypted requiring users to have a subscription in order to watch. Programmes can be transmitted either as analogue or digital linear TV signals. With digital terrestrial television (DTT), the

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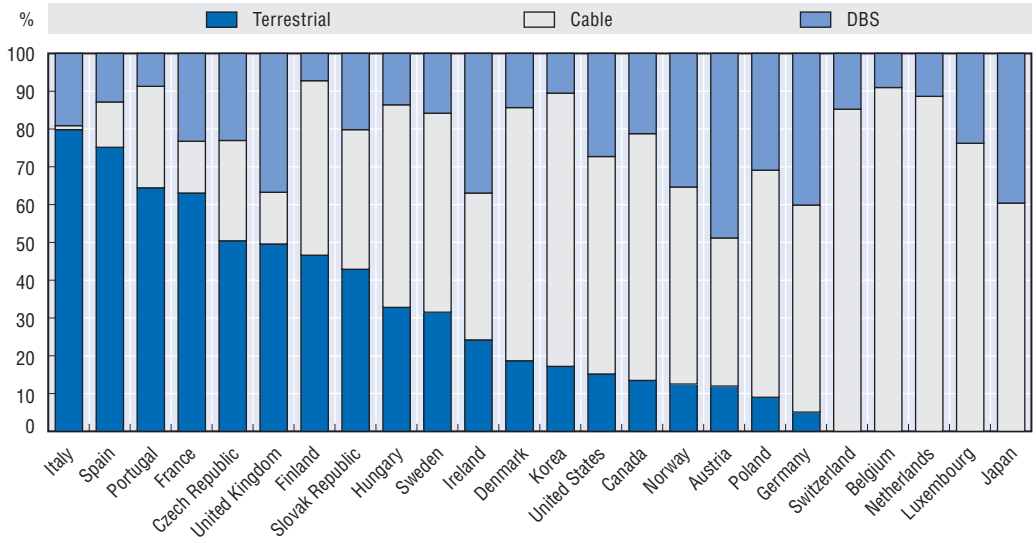
Figure 6.3. **Breakdown of television access by distribution type**

2006 or 2007, percentage of households with a television



Note: Japan is excluded because DBS statistics were higher than total households with television sets. This is due to the inclusion of mobile television subscriber data.

StatLink http://dx.doi.org/10.1787/622122285751

digital signal is transmitted using standards such as DVB-T in Europe, Australia and India, ATSC in the United States, or ISDB-T in countries such as Japan or Brazil. Multiple standards are currently being considered in Korea while China adopted the DMB-T/H standard. Digital signals are also used for distribution over cable, satellite and mobile networks.

The shift from analogue to digital broadcasting over free-to-air networks is one of the key broadcasting developments in the OECD over the past two years. Digital broadcasting is roughly six times more efficient than analogue, allowing more channels to be carried over a much smaller band of frequencies. The digital switchover will free up significant amounts of spectrum (often referred to as the "digital dividend") which can then be allocated to new services such as new mobile networks, wireless broadband or new high-definition (HD) television channels.

The freed-up spectrum is particularly valuable as it is situated in the band below 1 GHz, which allows for a broad territorial coverage and very good reception inside buildings. Much of the interest in the spectrum is focused on providing wireless Internet access. Governments want to ensure the most efficient reallocation of the spectrum so they are considering different options aiming to maximise social, cultural and economic benefits. The digital dividend is considered an opportunity to improve and expand services, promote better digital coverage and improve access to electronic communication networks.

As an example, Ofcom, the UK Communication authority, launched a digital dividend review[1] to discuss on which basis to award the spectrum resulting from the digital switchover as well as for the utilisation of the so-called interleaved spectrum. They set out a proposal for the packaging and auction design for the digital dividend, favouring a market-led approach to spectrum, in order to maximise welfare.

In the United States, the first auction for spectrum in the 700 MHz band, made available as part of the digital television transition, took place in March 2008 and raised

USD 19 billion. Auction winners are 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 spectrum reclaimed from the shift to digital broadcasting in the country.[2] Freed radio frequencies will allow the launch of new services, which will again include both audiovisual services and electronic communications.

In Italy, a call for tender was issued by the Italian communication authority (AGCOM) in 2007 for the assignation of part of the digital dividend resulting from the analogue switch-off. The procedure allows independent TV content providers, TV networks having coverage deficit, and local television to participate in tenders for access to part (40%) of multiplex network capacity of three main national television broadcasters.

Digitalisation and analogue switch-off: an update

The pace of transition to digital television is shown in Table 6.4, which presents information as of the end of 2008. In 2007, the rollout of digital television services varied considerably across OECD countries. For example, 75% of households in the United Kingdom receive digital signals but penetration rates of digital television are under 6% in Hungary and the Czech Republic. On the basis of data from the Italian broadcaster RAI Cinema, at least 75% of users in European countries currently are accessing digital terrestrial television using an *ad hoc* "decoder" or "set-top box", while only a small percentage have purchased integrated digital television (iDTV) sets.

A number of new channels were created following the diffusion of digital television (Table 6.5). The digitisation of signals has led to the creation of new television channels in some OECD markets. In particular, traditional broadcasters are launching suites of thematic channels at targeted audiences to counter the erosion of their audience shares due to the growth of multichannel offerings. The BBC in the United Kingdom added five new channels (BBC3, BBC4, CBeebies for children, BBC Parliament and BBC24). In 2006, the German RTL group launched three new channels: RTL Crime, RTL Passion and RTL Living.

Overall, in most countries the audience share of the incumbent terrestrial channels seems to have slightly declined, to the benefit of new market entrants. Viewership growth among new channels is mainly taking place at the expense of the other additional channels that do not form part of DTT offerings, such as satellite.

Cable

Cable networks transmit programmes over a dedicated wire network to subscribers for a monthly subscription fee. Cable services are increasingly interactive and offer video-on-demand in addition to linear broadcast programming due to the digitalisation of signal and the convergence of data and video services.

Cable penetration varies significantly across the OECD. Countries such as the Netherlands, Switzerland, Canada and the United States have near universal cable television coverage while Greece, Italy and Iceland have no significant networks (Table 6.6). This leads to highly differentiated cable penetration rates, which are shown in Figure 6.4.

The Netherlands, Switzerland, Belgium, Canada and the United States have over 90% of homes passed by cable television networks. However, high coverage does not necessarily mean high subscription rates due to competition from free-to-air, satellite and now IP-based television services.

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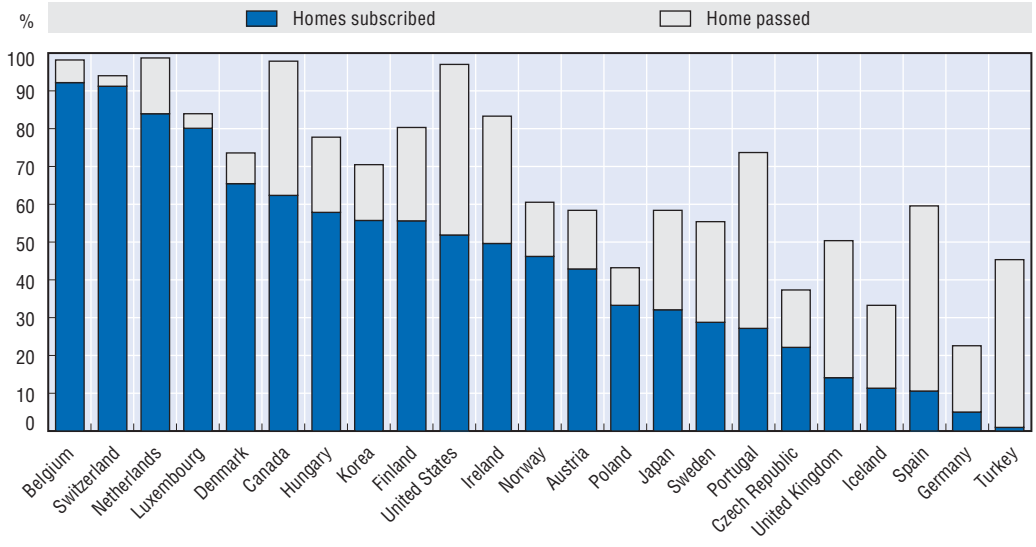
Figure 6.4. **Cable: Highest percentages of homes passed and subscribed, 2000-07**



StatLink http://dx.doi.org/10.1787/622131760880

Cable operators in four countries have been able to achieve a 90% take rate or better for their television services: the Netherlands, Switzerland, Belgium and Luxembourg. The highest penetration rate as a percentage of homes passed is in Switzerland where only 3% of homes passed do not subscribe. The Swiss success is partially due to agreements between housing complexes and cable companies which oblige all tenants to subscribe. There are three countries where less than half of homes passed subscribe to cable: the United Kingdom, Spain and Portugal. Low cable take-up rates are often the result of strong competition from free-to-air and digital satellite services.

Cable operators were among the earliest to benefit from offering converged services because of their existing strong position in terms of video. While telecommunication operators struggled to achieve bandwidth capable of sustaining high quality television transmission and to obtain rights to video content, cable operators were able to offer phone and data services quickly. Cable networks are among the best situated for delivering multi-channel high definition video as well.

Satellite

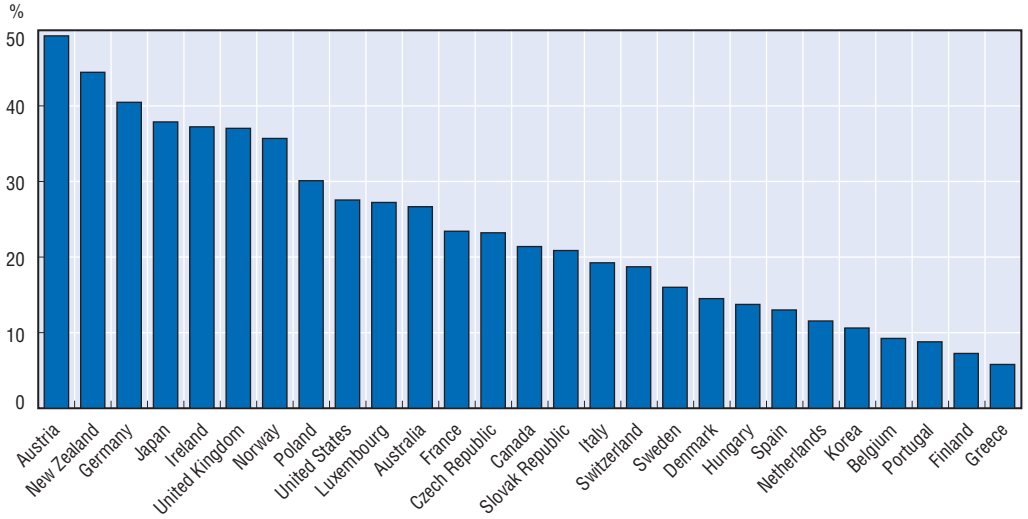
Direct broadcast satellite services (DBS) offer audio and video programming in a linear fashion. These channels may be free to end users (ad-supported or public channels) or available via subscriptions (premium satellite services). Satellite transmission can also be analogue or digital.

Table 6.7 shows the number of subscribers of digital satellite services across the OECD. There are relatively few analogue direct satellite subscribers compared with new digital services. Austria, Finland and Germany still have a significant number of analogue subscribers.

Japan has more DBS subscribers than households with television sets. This statistical anomaly has a simple explanation. Japanese (and Korean) mobile users can subscribe to DBS services and watch using a mobile handset. The market for satellite subscriptions on mobile phones is partially a result of long commute times faced by commuters in Japan

and Korea. Operators in both countries have even installed terrestrial repeaters for the satellite signals inside the subway system. Other countries with large DBS markets are Austria, New Zealand, Germany and Ireland (Figure 6.5).

Figure 6.5. **Direct broadcast satellite subscribers as a percentage of households with televisions, 2006-07**



Note: Japanese data does not include mobile handsets with DBS subscriptions.

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New broadcasting platforms

Broadcasting over mobile networks

Despite growth in the Korean and Japanese markets, the growth in video over cell phones has been slow across the OECD. The services offered by carriers are still in their infancy and subscribers must transition to new handsets and pay for new subscriptions in order to benefit from the enhanced service offerings.

Television on mobile handsets is available in other countries but take-up has not been as significant as in Korea and Japan. In Italy, operators have been successful selling mobile-TV enabled handsets but television usage remains low. The television packages are often used as marketing instruments with some usage included in the subscription as part of a package. The mobile operator 3 in Italy provides mobile TV services over its own network and users have access to the main Italian commercial TV channels and premium content channels such as SkyNews.

Operators look to mobile broadcast television as a way to solve some inherent bandwidth limitations on their networks. Broadcasting data in a linear fashion is much more spectrally efficient than streaming on-demand video to handsets. The struggle operators face is that mobile users seem to require more "on-demand" content given the times when they would be free to watch programming on a mobile. Korean and Japanese operators have addressed this content timing problem in an interesting way. Content providers such as KBS in Korea supply standard programming during off-peak times but broadcast specialised programming during rush hours and over the lunch break period.

Broadcasting over IP networks

The rollout of broadband enabled the distribution of video over IP-based networks. The early iterations of DSL could support one video stream at standard television definition. Current network upgrades extending the reach of fibre optics can now support multiple streams of high-definition video content, available on demand.

Internet protocol television (IPTV) services emerged following the development of faster broadband infrastructure. IPTV is usually offered by telecommunication operators as part of their "multiple play" service offers, which include Internet connectivity, telephone and television. The services can be provided as broadcast style services (linear), and/or as pure VoD offerings (non-linear) in broadcast quality. The picture quality of IPTV is comparable to video viewed over digital terrestrial, satellite or cable networks and the services were designed to be viewed on a television.

IPTV services are different from video content delivered over the Internet (Internet television) via sites such as YouTube, Hulu or Dailymotion. The IPTV network is a closed and managed network which distributes content to subscribers directly from the telecommunication exchange through a set-top box at the residence. Operators tightly control the content they package and distribute in the same way as a terrestrial or cable operator. The video and audio quality of IPTV is typically much more reliable than video streamed from the Internet.

Some believe that this could change with the introduction of faster broadband and improved IP quality of service for Internet television. Some content owners and broadcasters make their television programmes available for streaming from sites such as Hulu.com or directly off their own sites. Often these services are restricted geographically by IP address as a way to control distribution.

Other video sites such as Dailymotion and YouTube provide access to user-created content. As the speed of last-kilometre networks improves, streaming video sites may become even stronger competitors to traditional broadcasters. For now though, Internet video is mainly viewed on a computer or handheld device while IPTV is viewed on televisions. Internet video has yet to make the transition to widespread viewing via television sets despite a strong push from equipment manufacturers.

Digital downloads

The business model of traditional broadcasting (both radio and television) is under competitive pressure not just from streaming content models but also from digital downloads. The success of digital music and video outlets such as Apple's iTunes store highlights a new trend in how people buy and consume audiovisual content.

The market for digital downloads is mainly based on a pay-per-episode or pay-per-song business model. Users purchase a video or audio file which is downloaded over a broadband connection to a home computer or similar device to be played at a later time. The digital download market first appeared to be a threat to DVD and CD sales but now some have argued that buying programming directly from download sites can be less expensive per month than pay-television subscriptions for certain viewing patterns.[3]

Another key trend to evolve over the previous two years in the OECD is video podcasting. Video podcasts are video files which can download automatically for watching on a computer, television or handheld device. Video podcasts are typically free and there is

no clear business model emerging yet on how content providers will cover their costs. For now, video podcasts remain largely commercial-free.

Changing revenue models

Advertising has long been the main financial source for terrestrial broadcasting operators transmitting free-to-air, together with licence fees for public television channels. The business models of cable and satellite broadcasters, conversely, are mainly based on subscription models where users have to subscribe to the service in order to be able to access the content. The proliferation of access platforms has also intensified competition in the field of advertising and this has put pressure on ad-supported TV channels.

The United Kingdom Communications Market Report 2008 noted that the gap between subscription and advertising revenues widened in the past few years. In the United Kingdom, subscription revenues first exceeded net advertising revenues in 2003, and the gap between the two has widened since. By 2007, subscriptions had reached USD 8.6 billion (GBP 4.3 billion), 21% ahead of advertising, which reached USD 7 billion (GBP 3.5 billion) in the same year. This is linked to the increase of multichannel/multiplatform households and the migration to pay satellite and cable TV services.

In Canada, the CRTC Communications Monitoring Report 2008 noted that revenues reported by video-on-demand and pay-per-view represented the largest growth area for subscription-based services between 2006 and 2007. These services increased revenues 9% or USD 211 million (CAD 226 million) in one year. The traditional revenues (commercial and advertising) reported by the CBC decreased roughly 9% in the same period. Other private conventional free-to-air television – for which advertising is the primary source of revenues – experienced limited growth of 1.3%. Since 2005, revenues from subscription and other services have become the largest revenue component of total television revenues.

Regulation

Broadcast regulations have been in transition in many countries taking into account developments in new technologies and in certain cases new platforms which support 'broadcast-like' content. New technologies and the convergence developing between telecommunication and broadcast markets are playing an important role in redefining the regulatory landscape. This convergence is resulting in the need for much closer collaboration between broadcast and telecommunication regulators as well as in regulatory frameworks. A number of OECD countries have a single body responsible for regulating market entry in broadcasting (carriage) and cable operators and the same body also is responsible for content regulation, content, access to spectrum and licensing (Table 6.8). In some cases, even though there is a single regulatory body, the legal framework has not yet converged into a single law governing all networks and network-based services. However, many countries have moved into this direction ensuring more consistency across the different communication platforms and services.

Definition of broadcasting

Legal definitions of broadcasting differ across the OECD but more in terms of nuance than in the broad coverage of the definitions (Table 6.9). In general, most countries define broadcasting to include transmissions of radio and television programmes which can be received by the general public either directly (terrestrial transmission) or through cable or satellite platforms. Differences arise in definitions in the treatment of programmes

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distributed over the Internet and video-on-demand (Table 6.9). A number of countries treat video-on-demand services differently than broadcasting by subjecting them to little or no regulation (Australia, Canada, Denmark, Italy), whereas other countries, citing the principle of technological neutrality, would treat video-on-demand in a similar way to broadcasting services. Several countries seem to be contemplating changing their legal framework in order that video-on-demand is treated as a broadcast service. The Internet, which in early days was not subject to much regulation, is increasingly being regulated at the national level where countries have the capability to do so. As an example, Australia extended the Online Content Scheme aimed at protecting consumers from inappropriate and harmful content to content accessed via the Internet. In many other OECD countries content services provided over the Internet are considered as information services, or are implicitly or explicitly excluded. Canada, for example, made an exemption for new media undertakings to ensure that they would not be covered by existing broadcast regulations.

Ownership limitations

Most countries have some form of limitation affecting broadcasting. Essentially limitations cover three areas: limitations on the number of stations, foreign ownership limitations and cross-ownership and/or cross-sector ownership provisions. The different provisions are set out in Table 6.10. Since several countries support the concept of having a 'plurality of voices', some countries use legal provisions to achieve this goal, which places limitations on the number of stations (radio or TV channels) that a single entity can have in a specific licence area. The extent of foreign ownership limitations differs across the OECD. While Australia lifted all foreign ownership provisions on media companies in 2006, other countries limit foreign owners to a minority share. Plurality of voices is often also achieved through placing limitations on cross-media and cross-sector provisions. Table 6.10 also provides a brief overview of country policies in this area. When Australia reformed its legislation in 2006, it placed limitations on mergers and acquisitions of media companies depending on the number of different media groups in a metropolitan licence area. Other countries impose market share restrictions which would limit cross-ownership in several media platforms.

Local content and must carry

Table 6.11 provides details of local content requirements imposed on broadcasters and any must-carry requirements. Some countries have fairly extensive and detailed local content regulations (Australia, Canada, the Netherlands). In many cases cable operators are required to provide national broadcast services on their platform as well as any local terrestrial broadcast programmes.

Notes

1. Key documents related to the review can be found at: *www.ofcom.org.uk/radiocomms/ddr/documents/*.
2. The report from the *Commission du dividende numérique* is available in French at: *www.dividendenumerique.fr/pdf/Rapport_de_la_CDN_-_23_Juillet_2008_-final.pdf*.
3. Several articles discussing cable-download substitution are available at: *www.getrichslowly.org/blog/2007/03/01/the-new-math-cheap-alternatives-to-cable-television/, http://online.wsj.com/article/SB122299231747100497.html, http://gigaom.com/2008/10/21/in-defense-of-cable/*.

Table 6.1. Data on television, cable and home satellite usage, 1995-2007

	Households (thousands)									Television-equipped households (thousands)								
	1995	2000	2001	2002	2003	2004	2005	2006	2007	1995	2000	2001	2002	2003	2004	2005	2006	2007
Australia	6 690	7 250	7 367	7 506	7 645	7 784	7 921	8 058	8 187	6 500	7 177	7 293	7 431	7 569	7 706	7 842	7 978	8 105
Austria	3 131	3 283	3 320	3 282	3 278	3 431	3 460	3 508	3 537	2 648	3 185	3 220	3 184	3 196	3 328	3 356	3 403	3 431
Belgium	4 079	4 238	4 278	4 319	4 362	4 402	4 440	4 440	4 416	3 794	4 176	4 179	4 181	4 275	4 300	4 330	4 363	4 414
Canada	10 655	11 637	11 821	12 002	12 189	12 375	12 587	12 788	12 991	10 485	11 575	11 796	11 924	12 067	12 276	12 474	12 660	12 400
Czech Republic	3 880	3 822	3 828	3 828	3 828	3 828	4 013	4 028	4 052	3 213	3 804	4 164	4 151	3 095	3 086	3 263	3 329	3 389
Denmark	2 374	2 419	2 452	2 437	2 476	2 476	2 517	2 517	2 533	2 061	2 349	2 379	2 364	2 402	2 402	2 429	2 429	2 457
Finland	2 181	2 262	2 284	2 301	2 318	2 342	2 366	2 390	2 417	1 915	2 160	2 183	2 163	2 166	2 197	2 198	2 220	2 265
France	22 885	24 180	24 400	24 640	24 870	25 000	25 310	25 228	*25 301*	21 557	22 580	22 840	23 060	23 300	23 650	24 120	24 541	26 263
Germany	36 938	38 124	38 456	38 720	38 944	39 122	38 600	39 300	39 700	32 634	36 790	37 110	37 365	38 165	36 190	36 500	36 800	36 900
Greece	3 510	3 590	3 600	3 610	3 620	3 630	3 640	4 148	3 649	3 332	3 500	3 510	3 520	3 530	3 612	3 622	3 646	3 667
Hungary	3 795	3 751	3 759	3 780	3 836	3 893	3 951	3 817	4 002	3 773	3 740	3 729	3 717	3 701	3 810	3 900	3 962	3 962
Iceland	95	100	102	114	115	116	117	116	120	91	98	99	101	101	101	115	110	110
Ireland	1 123	1 287	1 305	1 328	1 382	1 406	1 454	1 484	1 470	991	1 204	1 194	1 262	1 329	1 359	1 379	1 350	1 450
Italy	21 168	21 176	21 488	21 805	22 053	22 187	22 582	22 907	23 216	16 091	20 660	20 900	20 693	22 053	22 187	22 582	22 907	23 216
Japan	44 108	47 420	48 015	48 638	49 261	49 838	50 382	51 713	52 325	35 377	46 946	47 631	48 297	48 965	49 339	50 029	51 403	52 063
Korea	12 958	15 765	16 081	16 489	16 988	17 392	17 858	18 327	18 680	14 517	15 113	15 500	15 854	16 380	19 486	19 859	20 094	20 440
Luxembourg	155	169	172	174	181	184	181	183	185	155	168	170	170	177	180	179	181	185
Mexico	18 500	21 512	23 206	24 682	25 000	25 322	24 719	25 792	*25 792*	16 000	18 471	6 757	6 823	6 905	7 000	22 542	25 228	25 228
Netherlands	6 559	6 954	7 041	7 041	6 996	7 049	7 091	7 006	7 191	5 850	6 685	6 757	6 823	6 905	7 000	7 000	7 075	7 000
New Zealand	1 260	1 422	1 441	1 458	1 482	1 508	1 535	1 549	1 585	1 145	1 395	1 413	1 431	1 454	1 480	1 504	1 517	1 517
Norway	1 845	1 923	1 962	1 981	2 001	2 022	2 043	2 054	2 054	1 582	1 980	1 990	1 992	1 961	1 958	1 961	2 010	2 037
Poland	13 050	13 130	13 131	13 337	13 536	13 710	13 886	12 700	*13 899*	11 996	9 026	8 917	8 902	8 780	8 805	8 605	7 745	7 488
Portugal	3 310	4 155	5 106	5 232	5 323	5 395	5 470	5 533	5 590	3 191	3 503	3 561	3 532	3 561	3 547	3 547		5 556
Slovak Republic	1 893	1 932	1 666	1 681	1 898	2 144	2 421	1 950	*2 422*	1 742	1 858	1 881	1 883	1 869	1 879	1 881	1 885	1 938
Spain	12 224	13 026	13 320	13 860	14 187	14 528	14 865	15 855	16 114	11 683	12 961	13 805		14 120	1 473	14 774	15 792	16 033
Sweden	4 087	4 363	4 393	4 449	4 407	4 400	4 441	4 465	*4 394*	3 368	4 219	4 232	4 261	4 316	4 319	4 268	4 352	4 376
Switzerland	2 970	3 153	3 196	3 222	3 244	3 267	3 286	3 252	*3 308*	2 435	2 661	2 702	2 760	2 778	2 658	2 682	2 693	2 717
Turkey	12 700	14 400	14 600	14 820	15 043	15 269	15 498	17 000	*15 715*	11 500	13 770	14 257		14 690	15 700	16 700	17 640	17 640
United Kingdom	23 302	24 900	25 100	25 200	25 400	25 200	25 400	25 800	26 000	20 736	24 100	24 300	24 500	24 700	24 600	24 900	25 300	25 600
United States	98 500	102 600	104 000	107 400	108 600	109 900	111 600	113 700	115 100	95 300	102 000	104 400	106 700	108 400	109 600	110 200	111 400	112 800
OECD	379 926	403 945	410 888	419 336	424 462	429 119	433 633	441 607	445 944	345 663	387 853	382 869	359 044	392 908	385 228	418 740	424 012	434 648

Note: Data in italics are estimates.

Source: OECD, ITU and EAO.

StatLink http://dx.doi.org/10.1787/625717055766

Table 6.2. Average household TV viewing time

Hours per day

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	3.22	3.23	3.18	3.22	3.30	3.28	3.18	3.12	3.18	3.23	3.18
Austria	2.37	2.43	2.45	2.47	2.53	2.70	2.68	2.73	2.77	2.72	2.62
Belgium	..	..	..	..	..	..	..	..	..	..	..
Canada	..	..	..	..	..	..	..	..	3.73	3.84	3.83
Czech Republic	..	..	..	3.07	3.18	3.63	3.40	3.42	3.43	3.27	..
Denmark	..	..	..	..	..	..	3.00	3.00	3.00	..	4.00
Finland	2.48	2.48	2.68	2.80	2.78	2.85	2.88	2.78	2.82	2.82	2.77
France	..	..	..	3.22	3.28	3.33	3.37	3.40	3.43	3.40	3.45
Germany	3.05	3.13	3.08	3.17	3.20	3.35	3.38	3.50	3.50	3.95	3.40
Greece	..	..	..	3.18	4.05	3.73	3.88	4.07	4.08	4.20	..
Hungary	..	..	..	..	..	..	..	..	..	..	3.99
Iceland	..	..	..	..	..	..	..	..	..	..	..
Ireland	..	..	..	3.02	2.97	3.07	2.97	2.95	3.00	3.03	..
Italy	..	..	..	..	..	..	3.83	4.00	4.10	..	..
Japan	3.57	3.70	3.58	3.75	3.85	3.62	3.70	3.92	3.72	3.72	3.63
Korea	3.05	..	..	..	..	..	..	3.17	..	3.20	3.00
Luxembourg	..	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	..	..
Netherlands	..	..	2.72	2.72	2.77	2.87	3.12	3.20	3.25	3.28	3.10
New Zealand	2.77	2.83	2.77	2.80	2.80	2.85	2.88	2.88	2.78	2.93	2.88
Norway	2.40	2.50	2.50	2.70	2.60	2.60	2.70	2.80	2.70	2.60	2.60
Poland	..	..	3.57	3.53	3.78	3.85	3.92	3.93	4.02	4.00	..
Portugal	..	..	3.37	3.35	3.20	3.08	3.45	3.57	3.53	3.50	3.50
Slovak Republic	..	..	4.03	4.00	4.13	4.20	4.17	3.92	3.35	3.17	..
Spain	..	..	3.57	3.50	3.47	3.52	3.55	3.63	3.62	3.62	3.72
Sweden	..	..	..	..	..	..	..	..	2.43	2.57	2.62
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	..
United Kingdom	..	..	..	..	..	3.34	3.44	3.42	3.39	3.36	3.38
United States	7.20	7.25	7.38	7.52	7.65	7.70	7.92	8.02	8.18	8.23	8.23

Source: OECD and ITU.

StatLink http://dx.doi.org/10.1787/625740251670

Table 6.3. Annual television license fee

USD

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	..	..	..	..	..	..	..	..	..	..	..
Austria	..	..	..	..	..	..	264	..	..	..	..
Belgium	..	..	..	..	..	..	..	..	..	..	..
Canada	..	..	..	..	..	..	..	..	..	..	..
Czech Republic	..	..	..	..	..	..	..	..	..	53	71
Denmark	..	..	..	..	238	279	319	351	340	351	415
Finland	170	165	158	152	147	156	186	230	242	251	275
France	120	125	121	105	102	110	131	144	145	145	159
Germany	..	..	..	..	..	..	..	..	255	255	280
Greece	..	..	..	..	..	..	..	..	..	..	..
Hungary	..	..	..	..	..	..	..	..	..	..	..
Iceland	..	..	..	..	..	..	..	..	..	..	..
Ireland	..	..	..	..	96	101	169	188	194	198	216
Italy	..	..	..	..	..	..	109	123	125	125	142
Japan	123	114	131	138	123	119	129	138	135	128	127
Korea	2.6	1.8	2.1	2.2	1.9	2.0	2.1	2.2	2.4	2.6	2.7
Luxembourg	..	..	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	..	..	..	..	..	..	..
Netherlands	..	..	..	..	..	..	..	..	..	..	..
New Zealand	73	59	58	50	..	..	..	..	..	..	..
Norway	211	203	204	186	191	222	261	283	306	318	359
Poland	31	31	30	30	34	38	43	48	55	61	67
Portugal[1]	..	..	..	..	..	..	..	..	..	..	..
Slovak Republic	..	..	..	..	..	..	..	..	..	..	..
Spain	..	..	..	..	..	..	..	..	..	..	..
Sweden	201	198	195	182	161	179	224	255	257	267	295
Switzerland	171	171	165	160	160	174	208	227	225	225	242
Turkey	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	..	..	..	158	158	167	190	220	230	244	279
United States	..	..	..	..	..	..	..	..	..	..	..

Notes: Data for Denmark includes a value added tax of 25%.

1. TV licence fee abolished in January 1991.

Source: OECD and ITU.

StatLink http://dx.doi.org/10.1787/625745611300

Table 6.4. The digital switchover

	Target date for analogue switch-off	Criteria used to decide if analogue service can be switched 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	Acccording 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.
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	None
Finland	Terrestrial: 31 August 2008 Cable: 29 February 2008	The target date has passed.
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 stop 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	Terrestrial television 2008 Cable/satellite television: not defined (market-driven)	The sole criterion is ensuring that the population is supplied with broadcasting. This criterion does not apply to private providers of broadcasting who can decide to omit a simulcast phase for commercial reasons.
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.

Table 6.4. The digital switchover *(continued)*

	Target date for analogue switch-off	Criteria used to decide if analogue service can be switched off
Ireland	2012	
Italy	2012	The switchover will be be carried out gradually on a region-by-region basis.
Japan	24 July 2011 (analogue HDTV DBS switched off on 30 November 2007; analogue SDTV DBS will be switched off on 24 July 2011)	No criteria
Korea	Expected to be in December 2012	According to the "Special Act for Digitalisation", KCC is trying to improve digital TV penetration as much as possible by December 2012.
Luxembourg	Analogue broadcasting virtually ceased in 2007.	
Mexico	31 December 2021	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, if necessary, recommendations. Based on the Committee's recommendations, the Secretary will determine whether it is necessary to continue analogue transmissions of a specific station.
Netherlands	Analogue terrestrial was switched off on 10-11 December 2006.	
New Zealand	Not yet determined. The date will be decided in 2012 or when 75% of the population has moved to digital services, whichever comes sooner.	An analogue switch-off steering group is to be established to provide advice on ASO but the date will be determined on the basis of an analysis of take-up rates with, as indicated, a decision being made in 2012 or when 75% of the population has access to digital free-to-air or subscription services. The cost-benefit analysis undertaken provides a mechanism for forecasting take-up rates following the announcement of a date.
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 NRK, the Ministry of Culture and Church Affairs decides whether ATT switch-off can take place on a region-to-region basis.
Poland	31 December 2012 with eventuality of extending the date to the end of 2014.	Analogue TV service can be switched off after reaching the same level as analogue coverage.
Portugal	Not yet defined, but 2012 at the latest, as this is the target date proposed by the Commission in Communication (2005)204 of 24 May 2005.	Not yet defined, but coverage, penetration rate and availability of terminal equipment will probably be taken into consideration.
Slovak Republic	31 December 2012	Date set for switch-off. No other conditions.

Table 6.4. The digital switchover *(continued)*

	Target date for analogue switch-off	Criteria used to decide if analogue service can be switched off
Spain	Analogue switch-off will start in some areas on 23 July 2008, and the deadline is 3 April 2010.	There are no additional conditions once the deadline expires.
Sweden	The switchover was completed in October 2007.	
Switzerland	Analogue transmission stopped in February 2008.	The switchover occurred in steps according to language regions over a four-year period.
Turkey	2012	Speed of transition to digital broadcasting and viewer access rates to digital broadcasts/remaining amount of viewers of analogue broadcasts.
United States	12 June 2009	

StatLink http://dx.doi.org/10.1787/625751125333

Table 6.5. Channel availability

	Total available national terrestrial FTA channels (2006)	Cable and satellite combined
		Number of channels (2006)
Australia	..	..
Austria	3	19
Belgium (Flemish)	4	28
Belgium (French)	2	17
Canada (1)	4	..
Czech Republic	4	14
Denmark	4	13
Finland		13
France	7	131
Germany	2	145
Greece	10	26
Hungary	3	35
Iceland	4	4
Ireland	5	2
Italy	9	196
Japan (1)	128	..
Korea (1)	4	..
Luxembourg	1	7
Mexico (1)	3	..
Netherlands	3	55
New Zealand (1)	10	..
Norway	3	11
Poland	7	33
Portugal	4	18
Slovak Republic (1)	4	..
Spain	6	89
Sweden	4	48
Switzerland	3	8
Turkey	23	86
United Kingdom	5	382
United States	9	..

(1) Data for 2005.

Source: OECD, FCC, EAO Yearbook 2006.

StatLink http://dx.doi.org/10.1787/625751836578

Table 6.6. Cable television: subscribers, households passed and penetration rate

	Cable television subscribers (thousands)								Households passed by cable (%)								Households passed by cable which subscribe (%)							
	2000	2001	2002	2003	2004	2005	2006	2007	2000	2001	2002	2003	2004	2005	2006	2007	2000	2001	2002	2003	2004	2005	2006	2007
Australia	1 340	..	1 450	1 500		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Austria	1 248	1 295	1 313	1 311	1 338	1 315	1 333	1 344	56		57	58		58	58	58	68	..	69	70	71	72	73	..
Belgium	3 789	3 815	3 760	3 775	3 790	4 000	4 042	..	95	..	96	96	96	96	97	..	94	..	93	93	92	95	94	..
Canada	7 983	7 848	7 626	7 589	7 662	7 698	7 912	8 091	93		95	98	96	96	97	..	73	..	67	65	64	64	64	..
Czech Republic	955	965	925	941	1 457	1 476	800	900	..		27	27			36	37	14	..	16	..	..	..	58	59
Denmark	1 041	1 078	1 140	1 606	1 580	1 561	1 578	1 646	..	..	..	71	70	68	70	73	..	..	..	91	91	91	90	89
Finland	806	843	832	894	1 042	1 014	1 041	1 046	..	..	69	74	76	78	80	..	..	..	64	..	68	69	69	..
France	2 915	3 124	3 404	3 471	3 554	3 567	3 616	..	..	..	..	..	..	..	..	..	..	..	39	..	40	40	41	..
Germany	20 380	20 300	20 700	20 130	20 720	22 100	21 600	20 210	..	..	..	..	..		22	..	..	..	..	..	..	53	22	..
Greece	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hungary	1 607	1 593	1 929	2 000	2 068	2 103	2 124	..	..	..	..	..	..	..	..	77	..	..	82	83	83	81	82	74
Iceland	1	5	6	7	7	13	47	..	..	..	33	33	33	33	..	..	..	..	16	18	18	34	..	..
Ireland	670	615	596	533	530	568	579	564	..	..	79	83	81	70	69	..	64	..	60	53	55	58	60	..
Italy	70	70	113	86	103	158	202	253	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Japan	18 705	21 254	23 332	24 684	26 046	27 440	28 746	29 862	39	44	48	50	52	55	56	58	..	..	..	..		55	..	..
Korea	2 560	5 248	7 455	11 405	12 907	14 129	14 169	14 764	55	59	70	..	..	69	66	67	16	33	45	67	74	79	77	79
Luxembourg	124	138	138	140	141	148	154	160	..	..	86	86	85	84	83	..	..	..	93	94	94	94	96	..
Mexico	2 283	2 501	2 513	2 661	2 942	3 372	3 757	..	9		15	..		19			..	..	..	..	..	..	..	..
Netherlands	6 200	6 320	6 290	6 390	6 400	6 350	6 251	..	..	..	98	97	96	96	95	98	..	..	94	95	96	95	93	85
New Zealand	21	27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Norway	824	834	840	853	854	905	916	1 060	..	..	60	62	62	61	60	..	..	..	73	70	73	75	76	..
Poland	3 539	3 498	3 800	3 902	4 000	4 025	4 073	4 500	..	..	41	42	42	43	43	..	..	..	73	74	76	76	77	..
Portugal	925	1 119	1 262	1 335	1 343	1 400	1 421	1 490	63	60	64	66	67	69	69	73	36	37	38	38	37	37	37	37
Slovak Republic	659	602	626	648	685	666	692	717	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Spain	298	588	811	997	1 107	1 408	1 701	1 915	25	37	43	45	56	57	56	59	9	12	14	9	11	12	15	18
Sweden	2 200	2 300	2 336	2 338	2 365	2 380	2 300	2 300	..	..	62	62	62	62	62	55	..	..	..	..	..	51	54	52
Switzerland	2 629	2 684	2 717	2 763	2 795	2 838	2 883	2 881	..	..	96	96	95	94	93	..	..	..	94	95	95	96	97	..
Turkey	885	909	955	1 044	..	1 093	1 104	1 126	..	..	..	..	..	40	44	45	..	..	..	..	..	2	2	2
United Kingdom	3 600	3 600	3 400	3 300	3 300	3 300	3 400	3 500	..	..	49	49	50	50	50	50	..	..	27	27	26	26	27	28
United States	66 000	66 900	66 100	66 000	60 200	58 800	65 600	64 900	97	96	97	98	99	100	96	96	67	67	64	62	60	59	54	54
OECD	154 256		166 369	172 304	168 935	173 828	182 040	..	..		..	..		..	..	..	..	..	..	..	..	..	..	..

Source: OECD, ITU, EAO.

StatLink http://dx.doi.org/10.1787/625764555030

Table 6.7. Direct broadcast satellite subscribers

In thousands

	1995	2000	2001	2002	2003	2004	2005	2006	2007	% digital (2007)	% of total TV households (2006 or 2007)
Australia		1 282	1 423	1 425	1 492	1 619	1 731	1 890	2 142	100	26
Austria	972	1 369	1 417	1 433	1 470	1 600	1 730	1 710	1 675	70	49
Belgium	255	220	..	158	237	316	350	400	..	..	9
Canada	..	967	..	2 014	2 202	2 318	2 489	2 628	2 631	100	21
Czech Republic	..	..	..	470	..	..	..	500	780	100	23
Denmark	211	800	..	800	259	378	381	383	353	100	14
Finland	153	245	224	206	193	254	234	213	163	..	7
France	305	2 413	2 909	3 219	3 516	3 689	4 000	6 040	6 100	100	23
Germany	9 525	12 900	..	13 650	..	..	14 000	14 900	14 800	56	40
Greece	130	190	..	70	419	432	445	210	210	100	6
Hungary	859	..	..	521	594	667	510	540	540	100	14
Iceland	..	..	..	6	..	..	..	..	..	..	
Ireland	90	150	..	..	315	337	393	465	535	100	37
Italy	479	2 350	..	2 550	2 408	3 106	3 600	4 030	4 430	100	19
Japan	9 430	13 068	28 085	29 324	30 450	31 354	31 934	33 150	19 548	..	38
Korea	..	..	12	516	11 137	1 652	1 855	1 949	2 152	100	11
Luxembourg	10	30	..	..	..	..	..	..	50	..	27
Mexico	..	668	..	980	..	..	..	..	..	..	
Netherlands	294	330	..	306	400	493	600	500	800	100	11
New Zealand	..	217	300	391	442	506	563	597	668	100	44
Norway	232	530	..	504	504	504	570	560	721	100	35
Poland	..	2 500	..	3 121	3 231	3 341	2 230	2 310	..	..	30
Portugal		132	224	289	341	375	394	436	484	100	9
Slovak Republic	310	620	..	520	522	523	420	390	..	..	21
Spain	738	1 685	2 036	1 996	1 796	1 653	1 961	2 044	2 065	100	13
Sweden	705	1 050	..	1 083	1 083	1 083	737	720	694	100	16
Switzerland	210	295	..	488	491	494	420	500	..	..	19
Turkey	219	1 836	..	3 284	4 086	4 888	..	..	..	..	
United Kingdom	3 610	4 624	5 500	6 800	7 100	7 600	8 300	8 800	9 400	100	37
United States	2 200	14 800	17 200	19 400	21 600	24 900	27 200	29 058	30 803	100	27
OECD	30 937	65 270	..	95 523		..	..	..	..	..	

Source: OECD, ITU, EAO.

StatLink http://dx.doi.org/10.1787/625772623637

Table 6.8. **Bodies responsible for broadcasting regulation**

		Terrestrial broadcasting service	Cable television service
Australia	**Carriage**	Australian Communications and Media Authority (ACMA)	ACMA
	Content	ACMA	ACMA
	Spectrum	ACMA	
	Licensing	ACMA	ACMA
Austria	**Carriage**	Kommunikations-behörde Austria (KommAustria) grants licenses to broadcasters and multiplex operators, approves the technical facilities (sites and spectrum) necessary for broadcasting, and supervises private broadcasters and the Bundeskommunikationssenat (BKS), the court of appeals concerning KommAustria's decisions and supervising the public service broadcaster.	Kommunikations-behörde Austria (KommAustria) and BKS. There is no licensing system for cable TV services (only registration is necessary).
	Content	Same as above	Same as above
	Spectrum	Same as above	
	Licensing	Same as above	Same as above
Canada	**Carriage**	CRTC	CRTC
	Content	CRTC	CRTC
	Spectrum	Industry Canada	
	Licensing	CRTC and Industry Canada	CRTC and Industry Canada
Czech Republic	**Carriage**	Czech Telecommunications Office (CTO)	CTO registers cable operators based on notification of communications activity which represents electronic communication business.
	Content	The RRTV grants licences for broadcasting according to content and coverage area.	The RRTV Council grants licences for broadcasting according to content and also registration for re-transmission services via cable systems.
	Spectrum	The CTO grants individual technical licences to use radio frequencies (which fixes technical parameters and transmitter location for broadcasting transmission services).	
	Licensing	RRTV: the programme and area coverage, authorisation for radiofrequency usage of every transmitter.	

Table 6.8. **Bodies responsible for broadcasting regulation *(continued)***

		Terrestrial broadcasting service	Cable television service
Denmark	**Carriage**	None	None
	Content	Parliament (public service) RTB (controls)	RTB (registration, if not registered in other EU member state) NTA (controls must-carry obligations)
	Spectrum	NTA (plan and co-ordination) Ministry of Culture (principles of allocation)	
	Licensing	RTB (content) NTA (technical)	None
Finland	**Carriage**	Ministry of T&C	
	Content	Ministry of T&C	
	Spectrum	Ministry of T&C/Ficora	
	Licensing	Ministry of T&C/Ficora (radio transmitters)	
France	**Carriage**	The *Agence Nationale des Fréquences* (National Frequencies Agency) manages the spectrum comprehensively by frequency bands. Each ministry and licensing authority is responsible for the specific management of the frequency bands allocated to it and in particular for the assignment of frequencies and frequency bands to the various users by granting licences. The *Conseil Supérieur de l'Audiovisuel* (Higher Audiovisual Council), for its part, authorises the use of frequency bands and frequencies allocated or assigned for broadcasting uses in accordance with Article 22 of the Act of 30 September 1986, under the conditions laid down in Articles 29, 30, 30-1 and 33-2 of this act. In addition, under Article L.36-7 of the Postal and Telecommunications Code, the *Autorité de Régulation des Communications Électroniques et des Postes* (ARCEP, Regulatory Authority for Electronic Communications and Postal Services) allocates to telecommunications operators the frequency resources that they need to carry out their activity and, in the case that interests us here, allocates the frequencies used for the carriage of terrestrial broadcasting services under the same conditions.	These networks do not use frequencies allocated by the *Conseil Supérieur de l'Audiovisuel*, but by the *Autorité de Régulation des Communications Électroniques et des Postes* (see text on terrestrial broadcasting service).
	Content	Same as above	Same as above
	Spectrum	Same as above	
	Licensing	Same as above	Same as above

Table 6.8. **Bodies responsible for broadcasting regulation *(continued)***

		Terrestrial broadcasting service	Cable television service
Germany	**Carriage**	Public service broadcasters have their own bodies to supervise channels and to monitor compliance with the rules on protection of minors. Private broadcasters are subject to the supervision of the 14 Länder media institutes that are also responsible for the licensing of the providers. In order to monitor compliance with the rules on protecting minors, the Länder media institutes have recourse to the judgement of nation-wide bodies of voluntary self- regulation.	
	Content	Same as for carriage	
	Spectrum	The Federal Network Agency as superior federal authority in the division of the Federal Ministry of Economics and Technology (BMWi). These structures also apply to cable and satellite television.	
	Licensing	Spectrum licensing: The Federal Network Agency as superior federal authority in the division of the Federal Ministry of Economics and Technology (BMWi).	
Hungary	**Carriage**	National Communications Authority, Hungary	
	Content	National Radio and Television Commission	National Radio and Television Commission
	Spectrum	National Communications Authority, Hungary	
	Licensing	National Communications Authority, Hungary	National Communications Authority, Hungary (notification)
Ireland	**Carriage**	Commission for Communications Regulation (ComReg)	Broadcaster must negotiate rights of carriage
	Content	Broadcasting Commission of Ireland	
	Spectrum	ComReg	
	Licensing	Broadcasting Commission of Ireland	
Italy	**Carriage**		
	Content	*For fixed TV:* Mincom releases the authorisation. AGCOM defines the authorisation obligations and conditions. *For mobile TV:* MinCom: releases the authorisation. AGCOM: has defined the authorisation obligations and conditions (AGCOM Delibera no. 266/06/CONS).	MinCom releases the authorisation. AGCOM has defined the authorisation obligations and conditions (AGCOM Delibera no. 289/01).
	Spectrum	Mincom is responsible for issuing the PNRF (Frequency National Repartition Plan). AGCOM is responsible for issuing the PNAF (Frequency National Allocation Plan). No spectrum is used because the service is based on fixed network.	

Table 6.8. Bodies responsible for broadcasting regulation *(continued)*

		Terrestrial broadcasting service	Cable television service
Italy *(continued)*	**Licensing**	*For fixed TV:* MinCom: releases the licenses. AGCOM: defines the license obligations and conditions. *For mobile TV:* MinCom: releases the licenses. AGCOM: defines the license obligations and conditions (AGCOM Delibera no. 266/06/CONS).	AGCOM issues licenses to operate telecommunications networks.
Japan	**Carriage**	Ministry of Internal Affairs and Communications (MIC)	Ministry of Internal Affairs and Communications (MIC)
	Content	Ministry of Internal Affairs and Communications (MIC)	Ministry of Internal Affairs and Communications (MIC)
	Spectrum	Ministry of Internal Affairs and Communications (MIC)	
	Licensing	Ministry of Internal Affairs and Communications (MIC)	Ministry of Internal Affairs and Communications (MIC)
Korea	**Carriage**	Korea Communications Commission	Korea Communications Commission
	Content	Korea Communications Standards Commission	Korea Communications Standards Commission
	Spectrum	Korea Communications Commission	
	Licensing	Korea Communications Commission	Korea Communications Commission
Luxembourg	**Carriage**	Institut Luxembourgeois de Régulation (market regulation)	As for terrestrial broadcasting service
	Content	Conseil national des Programmes (surveillance of content)	As for terrestrial broadcasting service
	Spectrum	Ministre des Communications	
	Licensing	Gouvernement, sur avis de la Commission indépendante de la radiodiffusion	As for terrestrial broadcasting service
Mexico	**Carriage**		
	Content	Secretary of Government (Article 10 of the Federal Radio and Television Law)	Secretary of Government
	Spectrum	Secretary of Communications and Transportation/ Federal Telecommunications Commission (Article 9 of the Federal Radio and Television Law)	
	Licensing	Secretary of Communications and Transportation / Federal Telecommunications Commission (Article 13 of the Federal Radio and Television Law)	Secretary of Communications and Transportation/ Federal Telecommunications Commission

Table 6.8. Bodies responsible for broadcasting regulation *(continued)*

		Terrestrial broadcasting service	Cable television service
Netherlands	**Carriage**	OPTA	OPTA
	Content	Commissariaat voor de Media	Commissariaat voor de Media
	Spectrum	Agentschap telecom	
	Licensing	Commissariaat voor de Media	Commissariaat voor de Media
New Zealand	**Carriage**	N/A	N/A
	Content	The Broadcasting Standards Authority (BSA) develops codes and regulates content in response to complaints from broadcasting consumers (although broadcasters are required to respond to complaints in the first instance). The Advertising Standards Authority (ASA), a self-regulating industry body, develops codes in respect of advertising on all media.	BSA, ASA
	Spectrum	Ministry of Economic Development (MED) MED manages spectrum and issues licences for its use. The Ministry for Culture and Heritage and the Ministry of Maori Development (Te Puni Kokiri) have a role in assessing applications for some licences (non-commercial TV and radio, including Maori TV and Iwi radio), specifically in relation to broadcast content.	
	Licensing	Ministry of Economic Development (MED) MED manages spectrum and issues licences for its use. The Ministry for Culture and Heritage and the Ministry of Maori Development (Te Puni Kokiri) have a role in assessing applications for some licences (non-commercial TV and radio, including Maori TV and Iwi radio), specifically in relation to broadcast content.	N/A
Norway	**Carriage**	The Post- and Telecommunications Authority	As for terrestrial broadcasting service
	Content	Ministry of Culture and Church Affairs/ The Media Authority	As for terrestrial broadcasting service
	Spectrum	The Post- and Telecommunications Authority	
	Licensing	Ministry of Culture and Church Affairs/Ministry of Transport and Communication	

Table 6.8. Bodies responsible for broadcasting regulation *(continued)*

		Terrestrial broadcasting service	Cable television service
Poland	**Carriage**	President of Office of Electronic Communications National Broadcasting Council	National Broadcasting Council
	Content	National Broadcasting Council	National Broadcasting Council
	Spectrum	President of Office of Electronic Communications National Broadcasting Council	
	Licensing	National Broadcasting Council President of Office of Electronic Communications	National Broadcasting Council
Portugal	**Carriage**	National Communications Authority (*ICP-ANACOM*) regulates, supervises and assures the representation of the electronic communications sector under the terms of its statutes and of the electronic communications law. ERC: responsible for specifying TV and radio broadcasting services that must be carried ("must-carry" obligations) by entities providing electronic communications networks, and also the services that must be delivered by the broadcasters ("must-deliver" obligations).	
	Content	Media Regulatory Entity *(ERC - Entidade Reguladora para a Comunicação Social*) is the media regulatory body (broadcasting sector, in particular content issues). It is an independent administrative body, accountable to the Portuguese Parliament *(Assembleia da República)*.	
	Spectrum	ICP-ANACOM assures the radio spectrum management, including planning, the assignment of spectrum resources and their supervision.	
	Licensing	ANACOM: licensing of spectrum resources ERC: licensing of television and radio terrestrial broadcasting channels ERC: licensing of the "distribution operator", the entity responsible for the selection and aggregation of television programme services	ERC: granting permits for tv and radio channels distributed by cable ERC: licensing of the "distribution operator", the entity responsible for the selection and aggregation of television programme services Under Portuguese Law, permits to use a cable network are called authorisations.
Slovak Rep.	**Carriage**	Telecommunications Office	Council for Broadcasting and Retransmission with Telecommunications Office
	Content	Council for Broadcasting and Retransmission	Council for Broadcasting and Retransmission
	Spectrum	Telecommunications Office	
	Licensing	Council for Broadcasting and Retransmission with Telecommunications Office	Council for Broadcasting and Retransmission

Table 6.8. Bodies responsible for broadcasting regulation *(continued)*

		Terrestrial broadcasting service	Cable television service
Spain	**Carriage**	*Use of radio spectrum:* State Secretariat for Telecommunications and the Information Society *Authorisation:* Telecommunications Market Commission	Telecommunications Market Commission
	Content	*TV national spectrum:* Ministry of Industry, Tourism and Trade (State Secretariat for Telecommunications and the Information Society) *TV autonomous and local spectrum:* Autonomous Community	*TV with spectrum larger than one autonomous community:* Ministry of Industry, Tourism and Trade (State Secretariat for Telecommunications and the Information Society) *TV autonomous and local spectrum:* Autonomous Community
	Spectrum	Ministry of Industry, Tourism and Trade (State Secretariat for Telecommunications and the Information Society)	
	Licensing	*TV national and autonomous public spectrum:* Ministry of Industry, Tourism and Trade (State Secretariat for Telecommunications and the Information Society) *TV autonomous private digital spectrum and local spectrum:* Autonomous Community	*TV with spectrum larger than one autonomous community:* Ministry of Industry, Tourism and Trade (State Secretariat for Telecommunications and the Information Society) *TV autonomous and local spectrum:* Autonomous Community
Sweden	**Carriage**	RTVV and PTS	RTVV and PTS
	Content	RTVV	RTVV
	Spectrum	PTS	
	Licensing	RTVV	no
Switzerland	**Carriage**	OFCOM or ComCom	OFCOM
	Content		
	Spectrum	DETEC	
	Licensing	DETEC	DETEC
Turkey	**Carriage**	By the broadcaster itself	Türksat Inc. (platform operator)
	Content	Radio and Television Supreme Council (RTÜK)	RTÜK
	Spectrum	Telecommunications Authority	
	Licensing	RTÜK	RTÜK
United States	**Carriage**	FCC	FCC
	Content	FCC	FCC
	Spectrum	FCC	
	Licensing	FCC	Local authorities (local franchise/rights of way) and FCC (spectrum)

StatLink http://dx.doi.org/10.1787/625800634413

Table 6.9. **Regulatory definitions of broadcasting**

Australia	**Definition** Section 6(1) of the Broadcasting Services Act 1992 (Commonwealth) (the BSA) defines 'broadcasting service' as: … a service that delivers television programmes or radio programmes to persons having equipment appropriate for receiving that service, whether the delivery uses the radiofrequency spectrum, cable, optical fibre, satellite or any other means or a combination of those means, but does not include: (a) a service (including a teletext service) that provides no more than data, or no more than text (with or without associated images); or (b) a service that makes programmes available on demand on a point-to-point basis, including a dial-up service; or (c) a service, or a class of services, that the Minister determines, by notice in the Gazette, not to fall within this definition. The BSA defines seven categories of broadcasting services covering both radio and television: • national broadcasting services (Commonwealth government-funded, independently administered free-to-air [FTA] radio and television services operated by the Australian Broadcasting Corporation [ABC] and the Special Broadcasting Service [SBS]). • community broadcasting services (non-profit making organisations funded by government grants, limited sponsorship, and listeners subscriptions or donations, which make television and radio programmes available FTA to the general public. • commercial broadcasting services (profit-making private businesses predominately funded by advertising revenue which provide FTA television and radio programmes to the general public in the areas they are licensed to serve. • subscription broadcasting services (Pay TV). Services provided by cable, satellite or microwave available only on payment of subscription fees and funded by subscriptions and limited advertising revenue). • subscription narrowcasting services (reception is limited by audience appeal, location, time period, or some other reason); • open narrowcasting services (FTA television and radio services whose reception is limited by audience appeal, location, time period, or some other reason); and • international broadcasting services (targeted, to a significant extent, to audiences outside Australia). **How are Internet services defined?** Schedule 5 Part 1(3) of the Broadcasting Services Act 1992 (BSA) defines an 'internet carriage service' as a listed carriage service that enables end-users to access the Internet. This is same meaning as in the Telecommunications Act 1997. Schedule 5 Part 2 (9) of the BSA sets out the circumstances in which an Internet carriage service is taken to be supplied to the public. If: • an Internet carriage service is used for the carriage of information between two end-users; • each end-user is outside the immediate circle of the supplier of the service; • an Internet carriage is used to supply point-to-multipoint services to end-users; • at least one end-user is outside the immediate circle of the supplier of the service; • an internet carriage service is used to supply designate content services (other than • point-to-multipoint services to end-users; and • at least one end-user is outside the immediate circle of the supplier of the service. In 2000 a determination was made under the BSA that audio and video services transmitted over the Internet are not considered broadcasting services as long as they do not use the broadcasting services bands.

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Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Australia *(continued)*	**How are Internet services defined? *(continued)*** The protections provided by the Online Content Scheme were extended through legislative amendments which commenced on 20 January 2008. Industry codes operate to support the legislative reforms. Schedule 7 of the BSA protects consumers from inappropriate or harmful content accessed through the internet, mobile phones and convergent devices, and applies to content delivered through emerging content services such as subscription-based internet portals, chat rooms, live audio-visual streaming, and link services. The Australian Communications and Media Authority (ACMA) administers Schedule 7 of the BSA. Under Schedule 7, prohibited content includes: • content that has been classified or is likely to be classified X18+; • content that has been classified or is likely to be classified RC (refused classification); • content that has been classified or is likely to be classified R18+ unless it is subject to a restricted access system; and • content that has been classified or is likely to be classified MA15+ and is provided on a commercial basis (*i.e.* for a fee) unless it is subject to a restricted access system. Where content is hosted in Australia and is found by ACMA to be prohibited, ACMA has the authority to direct the relevant content service provider to remove the content from their service. Where content is not hosted in Australia and is prohibited, ACMA will liaise with authorities in that country to have the content taken down if possible, and will notify the content to the suppliers of approved filters, so that access to the content using such filters is blocked. In addition, regardless of where the content is hosted, if ACMA considers the content to be of a sufficiently serious nature, it must notify the content to an Australian police force. **How is video-on-demand defined?** Video-on-demand services are point-to-point services and hence not broadcasting for the purpose of the BSA. Video-on-demand services are covered by the provisions of Schedule 7 to the BSA.
Austria	**Definition** According to the Constitutional law on assuring the independence of broadcasting (BVG-Rundfunk, BGBl. Nr. 396/1974), broadcasting is the transmission to the public of all kinds of exhibits (text, sound or video) using electrical oscillations with or without an electrical conductor as well as the operation of technical equipment for this purpose. This definition applies across all possible platforms. It also includes encrypted subscription services as long as the encryption is applied to a linear (video) stream (that is why real video-on-demand services are not covered by the broadcasting definition). **How are Internet services defined?** Due to the definition in the Austrian constitutional act on broadcasting, broadcasting services are services addressed to the general public. Therefore it is assumed at present that broadcasting services provided over internet do not have to be treated as broadcasting, as these services are not capable to reach an arbitrary number of recipients with the identical content at the same time. However, IP-based video services, such as TV over DSL, which can guarantee the availability of broadcasting streams to all subscribed customers at the same time, are treated as a broadcasting service (*e.g.* on TV). So far there is no specific content regulation treating “broadcasting-alike-services” provided over internet, but there will be a regulation in the course of the implementation of the Directive 2007/65/EC on Audiovisual Media Services. **How is video-on-demand defined?** Due to the same considerations as Internet, Video-on-demand services are not treated as broadcasting regardless of the transmission method.

Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Canada	**Definition** The definition of the term "broadcasting" applies across all platforms as defined in the Broadcasting Act. It reads as follows: "broadcasting means any transmission of programmes, whether or not encrypted, by radio waves or other means of telecommunication for reception by the public by means of broadcasting receiving apparatus, but does not include any such transmission of programmes that is made solely for performance or display in a public place." **How are Internet services defined?** All services provided over the Internet are exempt pursuant to Public Notice CRTC 1999-17, issued 17 December 1999. Note that in Notice of consultation – Call for comments on the scope of a future proceeding on Canadian broadcasting in new media, Broadcasting Public Notice CRTC 2008-44, 15 May 2008, the Commission stated that would be re-examining the new media broadcasting environment to determine whether the exemption orders relating to new media continue to be appropriate or, to what extent, if any, such orders need to be revised. A public hearing on this subject is currently scheduled to be held in 2009. **How is video-on-demand defined?** Video-on-demand services provided over the Internet are also captured by the exemption order for new media broadcasting undertakings.
Czech Republic	**Definition** "Broadcasting" has no exact equivalent in Czech. The ZEK defines it as an element of electronic communication networks. The ZRTV wording, which is in force for the time being, provides the following definition: "Radio and TV transmission means primary dissemination of original radio and television programmes and services directly connected with programmes, including teletext on analogue TV transmission, all intended to be received by the public in secured or unsecured form, through conditional access systems by means of electronic communication networks. Broadcasting according to ZEK belongs to "electronic communication services" which are provided by means of "electronic communication networks". In accordance with the EU legislation the ZEK is based on the principle of technological neutrality, *i.e.* does not distinguish among particular technologies that are used for information transmission to an end user (consumer). TV/radio signals are mostly received through terrestrial transmission (both analogue and digital) while transmission via fixed telephone line of IPTV is rare. Various combinations of signal transmission to an end-user are also used (satellite and cable terrestrial). **How are Internet services defined?** Distribution of radio and TV programmes on Internet is not considered (by RRTV Council and CTO) to be radio and TV broadcasting and the Media Act does not apply to it. Such programmes are viewed as distribution of audio-video information and not as distribution of programming. For Internet distribution the RRTV Council does not grant a license nor carry out a registration of distributed programmes. The Authors´ Act prohibits live broadcasting over Internet, TV corporations release through Internet only programmes of their own production. Thus Internet is being used by all four national TV channels and a number of regional channels. Note: The IPTV service provided by Telefónica O2 is not considered as a service provided via Internet network. **How is video-on-demand defined?** The regulation is based on the principle of technological neutrality.

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Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Denmark	**Definition** According to the Danish Broadcasting Act, section 2, item 1, broadcasting is defined as "broadcasting of sound and television programmes to the general public by means of radio equipment" (that is radiofrequency spectrum assigned for terrestrial use). However the act also applies to "distribution through communal aerial installations of sound and television programmes which are not also broadcast as mentioned in item 1" (section 2, item 2). Within the meaning of the Act, the term "communal aerial installation" means communal aerial installations and other cable systems for the distribution of sound and television programmes to premises used for private residence". The act also applies to distribution of digital terrestrial TV (Chapter 2) and by satellite (section 47). **How are Internet services defined?** Implementation of the AVMS directive is on its way. **How is video-on-demand defined?** Not yet decided.
Finland	**Definition** Broadcasting shall refer to the initial transmission or provision by wire or over the air, including that by satellite, in unencoded or encoded form, of radio and television programmes intended for reception by the public. **How are Internet services defined?** There is no separate regulation regarding the Internet. All communications networks and technologies are equally regulated (technological neutrality) through the Communications Market Act. **How is video-on-demand defined?** Technological neutrality.
France	**Definition** Audiovisual services include communication audiovisual services as defined in Article 2 of Law 86-1067 of 30 September 1986) as well as services making audiovisual, cinematographic or audio works available to the public irrespective of the technical means used. Communication audiovisual services are all communications to the public of radio or TV services, irrespective of the technical means used, as well as all electronic communication of services different from radio or television and not included in the definition of online communication as defined by Article 1 of Law 2004-575 of 21 June 2004 on trust in the digital economy. **How are Internet services defined?** Services provided on the Internet are generally defined as communications services to the public online (Article 1 of the Act of 21 June 2004) and as such do not fall under the jurisdiction of the CSA, with the exception of radio and television broadcast services on the Internet. The definition of television services in Article 2 of the Law of 30 September 1986, as amended ("…considered a television service any communication service to the public by electronic means to be received simultaneously by the public or category of public and whose main programme is composed of a continued orderly emissions containing images and sounds") excludes VOD, but includes TV over IP. This will change as a result of the transposition of the Directive of 11 December 2007 on audiovisual media services. **How is video-on-demand defined?** The law does not at present define a "video service on demand". Video-on-demand can be distributed on an electronic network not using frequencies assigned by the CSA without any prior formality. Indeed, Article 33-1 of the Act of 30 September 1986 as amended limits the obligation to obtain agreements for services to radio or television. There is currently no authorisation procedure specific to these services to distribute them using terrestrial or satellite transmission. A change of this arrangement is underway, under the transposition of the Directive of 11 December 2007, *i.e.* "audiovisual media services".

Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Germany	**Definition** Broadcasting as defined in Section 2 (1) of the Interstate Agreement on Broadcasting is the provision and transmission for the general public of presentations of all kinds of speech, sound and picture using electromagnetic oscillations without junction lines or along or by means of a conductor. The transmission platform is therefore irrelevant. The definition includes presentations which are transmitted in encoded form or can be received for a special payment. The definition does not include telemedia, which are regulated separately by the federal Telemedia Act and Chapter VI of the Interstate Agreement on Broadcasting (law of the Länder). **How are Internet services defined?** Telemedia are considered as other information and communication services compared to broadcasting and telecommunication. Telemedia with a programme-related content and information on current transmissions are vital components of the services offered by broadcasters and are therefore protected by the Constitution. This is particularly the case in the light of advancing technological developments and changing user patterns. Telemedia are in principle free of licensing requirements unless a radio- or TV programme is transmitted simultaneously via internet. This service is exceptionally defined as broadcasting. Both, broadcasting and telemedia, have to comply with the rules of the Interstate Agreement on the Protection of Minors from harmful content in Media. **How is video-on-demand defined?** The legal definition of a video-on-demand service as broadcasting or as a license-free telemedia has not depended on the nature of the transmission but on its content and its relevance for opinion-formation so far. Due to the Audiovisual Media Services Directive adopted by the European Parliament and Counsel in December 2007 video-on-demand services will no longer be defined as broadcasting. It is planned to transform this part of the directive into national law by May 2009. In addition to that, the Länder have to transform a decision by the EU-Commission from April 2007 into national law that will lead to various legal restrictions on video-on-demand-services in telemedia provided by public service broadcasters. These regulations will be subject of the 12th amendment of the Interstate Agreement on Broadcasting that is intended to enter in to force by May 2009.
Hungary	**Definition** "Broadcast dissemination" shall mean electronic communications services irrespective of the type of transmission system used, where the analogue or digital signals produced by the broadcaster are transmitted unchanged to the terminal equipment of subscribers and users, irrespective of the type of transmission system and technology employed. Broadcast dissemination shall also include broadcast diffusion, broadcasting by satellite systems, broadcasting over hybrid transmission networks comprising fibre optics and coaxial cables, furthermore, transmission using an Internet Protocol through any transmission system, if the character and the conditions of service is in conformity with broadcast dissemination, or it is a suitable substitute for broadcasting and any other form of communication. Broadcast dissemination shall include, furthermore, the type of broadcasting that is made available to subscribers for a fee, including if it is offered in a package together with other electronic communications services. The transmission of signals with the aid of a network suitable for the connection of less than ten terminal equipment shall not be treated as broadcast dissemination **How are Internet services defined?** Services provided over the Internet are not regulated. **How is video-on-demand defined?** Video-on-demand service has not been on the market recently and it is not regulated.

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Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Ireland	**Definition** The legislative definition of "broadcast" is as follows: transmission, relaying or distribution by wireless telegraphy, a cable or MMD system, a satellite device, or any other transmission system of communications, sounds, signs, visual images or signals, directly or indirectly for reception by the general public whether such communications , sounds, visual images or signals are actually received or not, but does not included internet. **How are Internet services defined?** Under the current broadcasting legislation, the Broadcasting Commission of Ireland has no responsibility for broadcasting services transmitted by means of the internet. **How is video-on-demand defined?** Video-on-demand is considered to be a telecommunications service and is subject to telecommunications regulation, *i.e.* general authorisation for all networks and wireless telegraphy licensing in the case of wireless networks.
Italy	**Definition** Television programmes are defined as the audiovisual content organised by an editor (content provider), addressed to the general public and broadcast with any technical means. Subscription and encrypted services are also included in the definition. (Communication law 112 of 2004 and Consolidated Act on Radio and Television - D. Lgs. 177/05) **How are Internet services defined?** Audiovisual services provided over the Internet are not currently covered by existing Italian legislative and regulatory framework. However, a specific monitoring activity is conducted by AGCOM and the consumer associations. According to an *ad hoc* co-operation agreement, AGCOM will be able, on the basis of reports received from consumer associations against an internet operator, to file the violations against the rules regarding protections of minors and intellectual rights to the Postal and Communication Police. **How is video-on-demand defined?** VOD services are not currently covered by existing Italian legislative and regulatory framework, with the exception of article 44 of the legislative decree no. 177 of 31 July 2005 (Consolidated Act on Broadcasting), which introduces an obligation for the operators offering on demand services aimed at the promotion of European works. AGCOM will shortly release a regulation stating the terms for such obligation.
Japan	**Definition** "Broadcasting" means transmission of radio communication intended to be received directly by the general public (Broadcast Law Article 2 (1)). "Cable broadcasting" is defined as transmission of a cable telecommunication intended to be received directly by the public (Cable Television Broadcast Law Article 2 (1)) and distinguished from "Broadcasting". "Broadcast on telecommunications services" means transmission of telecommunications intended to be directly received by the public, all or part of which is transmitted on telecommunications service provided by a person who operates a telecommunications business.(Law Concerning Broadcast on Telecommunications Service Article 2 (1)) Subscription (paid) services and encrypted (scrambled) services are included in "Broadcasting" or "Cable broadcasting". or "Broadcast on telecommunications services" **How are Internet services defined?** "Broadcasting(/cable broadcasting/broadcast telecommunications service)" means transmission of communication intended to be received directly by the general public. Video-on-demand services over the internet are provided in Japan, though they are not defined in broadcasting related legislation. **How is video-on-demand defined?** Regulations on video-on-demand services are classified into telecommunications services and subject to same regulations regardless of the transmission methods.

Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Korea	Definition
	Broadcasting: Broadcasting refers to the planning, programming/production and the transmission of a broadcasting programmes to the public(including receivers with individual contracts; "viewers") through telecom facilities
	Television broadcasting: A type of broadcasting that sends out broadcasting programmes composed of instant images of standstill or moving objects and the accompanied voice and sound
	Radio broadcasting: A type of broadcasting that sends out broadcasting programmes composed of voice and sound
	Data broadcasting: A type of broadcasting that sends out broadcasting programmes mainly composed of data(letter, number, figure, diagram, image and other kinds of information system), the accompanied image, voice and sound, and the combination of both, by using channels of the broadcaster(except for cases provided or intermediated through telecom networks such as the internet; the rest is the same)
	Mobile multimedia broadcasting: A type of broadcasting that sends out television, radio and data broadcasting in a combined manner through multiple channels for the purpose of mobile reception
	Internet multimedia broadcasting: A type of broadcasting that is delivered using Internet Protocol over a network infrastructure, which may include delivery by a broadband connection.
	How are Internet services defined?
	IPTV (Internet TV, Internet Protocol TV) is a broadcasting-telecommunications convergence service whereby real-time broadcasting and telecommunications services are provided together over a broadband Internet network.
	Based on user request, real-time broadcasting programmes (terrestrial, PP channel, etc.) and various interactive telecommunications services (VOD, text messaging, e-commerce, online game, karaoke, etc.) are provided together.
	Its features include interactivity; user participation and choice; diverse and limitless assortment of content; and the potential to develop creative applied services - all enabled through the Internet.
	By enabling users to select amongst various broadcasting contents, and providing VOD and various kinds of interactive and customised applied services, IPTV provides a wide range of high-quality convergence service never-before experienced.
	How is video-on-demand defined?
	VoD service providers are subject to notification, while real-time broadcasting programme providers are subject to either registration or approval. Real-time broadcasting programme providers that have obtained a license, registered, or received approval under the Broadcasting Act, need only to make a notification as an IPTV content provider, limited to the scope of service for which they have been licensed, etc.
	Article 20(Application of Enforcement Ordinance of the Broadcasting Act) of the Enforcement Ordinance of IPTV Law is only applied to IPTV content providers that provide real-time broadcasting programme, and IPTV content providers that provide VoD are exempt from this provision.
	Article 20 of the Enforcement Ordinance of IPTV Law prescribes the application of the Enforcement Ordinance of the Broadcasting Act for the following: deliberation on content; composition and management of real-time broadcasting programmes; programming by content providers; programming of domestic broadcasting programmes; programming of outsourced broadcasting programmes; advertisement; sponsor announcement; programme provision; measures to ensure universal right to view programmes; sequential programming of relay broadcasting; re-transmission; disaster broadcast, etc.

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Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Luxembourg	**Definition** Under the Act of 27 July 1991 on electronic media (the "Act"), the term "broadcasting" means the transmission of TV and radio satellite, terrestrial and cable frequency. The term is not defined as such in the Act, but the meaning is clear from the definition of "transmission programme": Transmission of a programme, the primary broadcast, wired or wireless, terrestrial or satellite, coded or not, television programme or radio to the public. It includes the communication between programmes for rebroadcast to the public. It does not include communication services provided in response to an individual request, information or other services, such as facsimile services, electronic data banks and other similar services Moreover, the Act provides specific provisions for cable, satellite and terrestrial. **How are Internet services defined?** Under the existing law, the broadcasting rules do not apply to services available only on the Internet, unless they request a concession such as for cable programmes. **How is video-on-demand defined?** There is no specific regulatory regime applicable to video-on-demand.
Mexico	**Definition** Article 2 of the Federal Radio and Television Law indicates that broadcasting service is that given through the electromagnetic waves propagation of audio, or audio and associated video signals, making use or exploitation of the radio electric frequency bands attributed by the State, precisely for that service, with which the people can receive directly and freely the signals of it, using the *suitable* devices for it. **How are Internet services defined?** No provisions yet. **How is video-on-demand defined?** No provisions yet.
Netherlands	**Definition** The media law defines broadcasting as an electronic media service that involves the production and distribution of radio and television programmes. The distribution over the air or via fixed networks can be encoded or not and can be aimed at the general public or just part of the public. This includes terrestrial distribution via DVB-T (analogue terrestrial is no longer available), satellite, cable networks and fixed telecommunications networks (*e.g.* IPTV). **How are Internet services defined?** Article 1 of our Media Act provides definitions of terms like 'TV broadcaster/broadcasting' (article 1, under d of the Media Act), 'programme service' (article 1, under f of the Media Act) and 'programme' (article 1, under g of the Media Act). 'TV broadcasting' is defined as "an electronic media service engaged in the provision and broadcasting of television programmes". 'Programme service' is defined as "an electronic product with visual or audio content intended to be broadcast to and to be received by the general public or a part thereof, with the exception of data services, services available only on individual demand, and other interactive services". 'Programme' is defined as "a clearly distinct and as such recognisable part of a programme service". So far, due to these legal descriptions, audiovisual services offered via internet or mobile networks are not considered as broadcasting but as telecommunications because they are available on individual demand. This will change in near future when the Audiovisual Media Services Directive will be implemented in our country. As a consequence of that linear (streaming) services offered via web or mobile platforms like IPTV or web TV will be considered as TV broadcasting and subject to media legislation.

Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Netherlands *(continued)*	**How is video-on-demand defined?** Several cable operators who offer pay per view services in the Netherlands held the position that they did not need a licence for private broadcasting because their services should not be regarded as a programme service in the sense of the Dutch Media Act but as an (interactive) telecommunications service. So, the operators were of the opinion that their services did not have to meet the European quota and other programme provisions of the Dutch media legislation. After an investigation the Commissariaat conversely came to the conclusion that each of these services must be considered as a programme service since they were not transmitted on individual request but at fixed times. The operators use a so called carrousel programming in which a same movie is broadcast on different channels with only short intervals in between. Due to this system the viewer is not completely free in choosing the moment of watching a movie and you cannot speak of (full) interactive services. Such a near video-on-demand service must be regarded as a programme service for special broadcasting purposes which should obtain a licence for private broadcasting. Since the Commissariaat considers it as only one programme service broadcast via different channels, one licence per service is enough. In a procedure between the Commissariaat voor de Media and cable operator/programme provider Mediakabel the Dutch Council of State, the highest administrative court in our country, has referred the case to the European Court of Justice. In case C-89/04 the European Court has put the Commissariaat in the right and ruled that a pay-per-view service which consists of transmitting television programmes intended for reception by the public and which is not supplied on individual demand is a television broadcasting service and, as such, subject to the provisions of the Television without frontiers directive, including the European content quotas. The determining criterion for the concept of "television broadcasting service" is the broadcast of television programmes intended for reception by the public. Priority should therefore be given to the standpoint of the service provider in the analysis of this concept. Mediakabel claimed that it provided an interactive service supplied at individual request falling within the category of information society services and thus outside the scope of competence of the Dutch regulator, the Commissariaat voor de Media.
New Zealand	**Definition** Broadcasting is “any transmission of programmes, whether or not encrypted, by radio waves or other means of telecommunication for reception by the public by means of broadcasting receiving apparatus but does not include any such transmission of programmes: *a)* made on the demand of a particular person for reception only by that person; or *b)* made solely for performance or display in a public place.” This definition has been supplemented by a more general definition of “content” to allow the funding agencies NZ On Air and Te Mangi Paho to support programmes intended specifically for digital platforms other than television and radio. **How are Internet services defined?** Such services are not likely to be captured by the definition of ‘broadcasting’ in the Broadcasting Act. Services of this nature are therefore likely to be subject in different aspects to the Films, Video and Publications Classification Act 1993, and the Telecommunications Act 2001. The application may vary according to factors such as the origin of the service being provided (national or international) and whether or not electronic files are downloaded or streamed. The scope of broadcasting standards regulation, and its possible application to “broadcasting-like content”, is to be re-considered as part of a review of broadcasting regulation, currently under way. **How is video-on-demand defined?** Video-on-demand services do not meet the definition of ‘broadcasting’ in the Broadcasting Act. They are each likely to be subject to the Films, Videos and Publications Classification Act, and also the Telecommunications Act (the Radiocommunications Act may also apply to aspects of satellite services). The application may vary according to factors such as the origin of the service being provided (national or international) and whether or not electronic files are downloaded or streamed.

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Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Norway	**Definition** According to the unofficial translation of Act no. 127 of 4 December 1992 relating to broadcasting, section 1: "Broadcasting" means the transmission of speech, music, images and the like by wire or over the air, intended or suitable for direct and simultaneous reception by the public." This definition applies to all platforms and includes encrypted transmissions. **How are Internet services defined?** In order for a service to be defined as broadcasting it must be intended "for direct and simultaneous reception by the public" cf. the definition of broadcasting given in section 1 above. On-demand services are regulated in the Act on Electronic Commerce which implements the Directive on e-commerce (2000/31/EC). **How is video-on-demand defined?** The Act on electronic commerce corresponds relatively closely to the Directive on e-commerce (2000/31/EC).
Poland	**Definition** Broadcasting is the kind of radiocommunication service in which transmission or retransmission is intended for direct reception by general public. This service includes sound, television and other data and additional facilities transmissions (or retransmissions) by: terrestrial diffusion, satellite distribution and cable systems. According to the Polish Broadcasting Act: Chapter 1, article 4: • "Transmission" means over-the-air transmission of a programme service for simultaneous reception by the general public (general reception system) and also introduction of a programme service into a cable network (collective reception system), • "Retransmission" means the reception and simultaneous transmission of a complete and unchanged programme service transmitted by a domestic or foreign broadcaster, with an exception of programme services transmitted by way of cable network. According to the Polish Broadcasting Act: Chapter 1, article 1: The main tasks of radio and television broadcasting: • to provide information; • to ensure access to culture and art; • to facilitate access to learning and scientific achievements; • to disseminate civil education; • to provide entertainment; • to promote domestic production of audiovisual works. **How are Internet services defined?** This activity is not regulated in Poland.
Portugal	**Definition** Radio broadcasting: the unilateral transmission of sound communications, using radio-electric waves or any other appropriate method destined for reception by the general public. Remark: The term "radio broadcasting" applies across platforms, excluding internet transmissions. The Radio Broadcasting Act (Law No. 4/2001 of 23rd. February, amended by Law No. 7/2006 of 3rd March is not applicable to radio broadcasting services transmitted through internet). Television broadcasting: the transmission of unencrypted or coded transmission of moving images with or without sound, through an electronic communications network, intended for simultaneous reception by the general public, with the exception of:

Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Portugal *(continued)*	• communication services operating on individual demand; • the mere retransmission of third party broadcasts; • the occasional transmission of events, by means of technical devices installed at places where such events take place, and intended for the public gathered there. As per the terms of The Television Broadcasting Act (Law No. 27/2007, of 30 July), the concept of "televisinon broadcasting" is covered by the broader concept of "television activity": the activity consisting in the organisation, or selection and aggregation, of television programme services, for the purpose of their transmission and reception by the general public. The concept of "television activity" covers also two different media operators: *i)* "television operator", the legal person responsible for the organisation of television programme services who is legally entitled to perform the television activity; and *ii)* the "distribution operator", the legal person responsible for the selection and aggregation of television programme services, as well as for their provision to the public, by means of electronic communications networks The term "broadcasting" includes 'subscription' and 'encrypted' services. Remarks: The term "television broadcasting" applies across platforms. Subscription and encrypted services fall under the heading of broadcasting. **How are Internet services defined?** This kind of service is under proper consideration although most of the cases fall under electronic communications legal framework. Services provided over the internet with some link to television broadcasting services are under regulatory impact assessment analysis. Eventually the near-future modification of Television Broadcasting Act, in order to implement the "Audiovisual Media Services Directive" (AVMSD) within the Portuguese legal framework, could address this specific topic. The Television Broadcasting Act makes no distinction, applying itself to the transmissions done over the Internet. The fact these services are transmitted over the internet does not imply different definition. **How is video-on-demand defined?** There is no difference. Regulation should aim for technological neutrality. The transposition of the AVMS Directive will specifically address this issue.
Slovak Republic	**Definition** According to Paragraph 3 Section 5 and 6 of the Act. No. 220/2007 Coll. on Digital Broadcasting the broadcasting of a programme service is defined as the diffusion of the original encrypted or free-to-air programme service for the purpose of public reception by the means of telecommunication net or telecommunication equipment. There are two types of this service, the first one is radio programme service including supplementary content services, the second is television programme service including supplementary content services. Broadcasting of a programme service excludes the diffusion of information and other communications through the Internet or other communications based on on-demand principle. **How are Internet services defined?** Under the current legislation these services are not specifically regulated. However, the amendments of legislation are being prepared. **How is video-on-demand defined?** Under the current legislation these services are not specifically regulated. However, the amendments of legislation are being prepared.

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Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Spain	Definition
	In the Telecommunications Organisation Act (LOT) broadcasting services are telecommunication services in which communication is carried out in one way and directed to several reception points simultaneously. Rendering these services under the indirect management regime will require administrative concession. (LOT 25.1)
	Television will always be considered to be a broadcasting service and, in no case, can it be rendered as a final or added-value service. Television is understood as the telecommunication means which allows broadcasting or transmitting non-permanent images by means of electromagnetic waves propagated by cable, by satellite, in the space with no artificial guide or by any other means.
	Without affecting the provisions herein, the television legal regime shall be governed by its specific laws. (LOT 25.2)
	Broadcasting or transmitting images using facilities which, despite not having connection to external networks and not using the public domain, render services in a vehicle, in piece of property, in a community of owners set up in accordance with Act 49/1960, dated 21 July, or in an urban block of neighbouring farms shall not be considered to be television.
	Likewise, the mere reception of images to be transmitted under the conditions described in the paragraph above – which shall be governed by the collective antenna law - or the transmission of images mentioned in the first paragraph of Section 14.31 shall not be considered to be television. (LOT 25.3)
	In Act 25/1994 on the inclusion of Directive 89/552/CEE, television without borders, into the Spanish legal organisation
	For the purposes of this Act, it shall be understood that:
	a) "Television" is the primary broadcasting, with or without cable, terrestrial or by satellite, codified or not, of televised programmes for the public.
	This meaning shall include the communication of programmes between natural or legal persons, public or private, which aim at broadcasting television for the public. Nonetheless, this definition does not include those communication services rendered upon individual request, whose aim is supplying information elements or providing other services, such as facsimile services, electronic databases and similar services.
	Both definitions are compatible and, in all, it is considered that there is television when communication is point-multipoint, public, with no interaction and adopting the form of public communication. They include any broadcasting systems as well as encrypted broadcastings, pay-per-view television (PPV) and nearly video-on-demand (NVOD).
	Radio and television by terrestrial electric waves are considered to be public service. Satellite television (since 1995) and cable television (since November 2003) are services rendered under the free competition regime.
	How are Internet services defined?
	In accordance with the general regulations for rendering radio and cable television broadcasting services, radio and television transmitted over the Internet are a form of radio or cable television and they are subjected to the same system of ruled authorisations, obligations and rights as any other provider of the telecommunications service.
	In practice, since the above mentioned General Regulations have been passed, there is a television broadcasting service transmitted over IP which is operating under an authorisation granted for cable broadcasting.
	How is video-on-demand defined?
	There is a Draft of a General Audiovisual Act which will incorporate to the Spanish legal system Directive 89/552/EEC, as amended by Directive 2007/65/EC, on Audiovisual Communication Services. The future General Audiovisual Act will govern the legal framework as well as the contents broadcasted by video-on-demand services.

Table 6.9. **Regulatory definitions of broadcasting *(continued)***

Sweden	**How are Internet services defined?** Not included in legislation now, but will be as Sweden implements the new EU directive, "Television without frontiers". **How is video-on-demand defined?** At present VoD is not included in the regulatory framework.
Switzerland	**Definition** According to Article 1 of the Federal Law on Radio and Television (LRTV RS 784.40), the scope of that law covers the distribution, packaging technology, the transmission and reception of radio programmes and television. According to Article 2, letter g LRTV, the term "broadcast" means the transmission, using telecommunications technologies, programmes for the general public. The rules governing broadcasting apply to offers to the community in the form of programmes that are likely to have an impact on the general public (see FF 2003 1508). **How are Internet services defined?** If the services in question are designed as radio and television programmes (a programme is a series of transmissions offered continuously on a programmed basis, transmitted by telecommunications technologies and destined for the general public), they fall under the federal law on radio and television. Exceptions are news transmission of low transmission power, such as: time or weather observation data, fixed or moving weather images, the emergency numbers, information on services or public administration events, public transport schedules, and which contain no advertising or sponsorship. **How is video-on-demand defined?** Video-on-demand which allows for individualised services, is subject to the Federal Law on Telecommunications.
Turkey	**Definition** A broadcaster has been defined as "the legal person who has the editorial responsibility for the composition of radio and television programme services for reception by the general public and transmits them or has them transmitted, complete and unchanged, by a third party". When viewed from both a technical and an administrative point, broadcasting is a set of activities implemented by such a legal person. Today, broadcasters can own their infrastructure (infrastructure includes the allocated frequency and erection of own transmitters) only for the provision of their terrestrial broadcasts. As for the satellite and cable broadcasts, broadcasters they cannot install their own infrastructure. Platform operators possessing infrastructure cannot act like broadcasters. Broadcasting has been defined as "a range of activities that covers the transmission of all radio and television programmes and data services for public to view." **How are Internet services defined?** There are no legal arrangements that have been put in place to date.. This issue is still under discussion among broadcasters, platform operators and regulators since broadcasters do not have a legal power to own an infrastructure like a telecommunications carrier and use their frequency for such purposes other than broadcasting activities and their responsibility, as stipulated by the Law, is only limited to content regulation. **How is video-on-demand defined?** Viewing fixed (permanent) video broadcasts through the internet environment is not regarded as television broadcasting. Such videos will be evaluated in accordance with the Turkish Penalty Law.

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Table 6.9. **Regulatory definitions of broadcasting *(continued)***

United States	**Definition** Under the Communications Act of 1934, the term "broadcasting" means the dissemination of radio communications intended to be received by the public, directly or by the intermediary of relay stations. **How are Internet services defined?** The FCC's approach has been to foster an open competitive environment, subject to social and consumer protection obligations, for services seen as substitutes for traditional services. With regard to services accessed over the Internet, the Commission has established four principles: 1)*To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet*, consumers are entitled to access the lawful Internet content of their choice; 2)*To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet*, consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement; 3)*To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet,* consumers are entitled to connect their choice of legal devices that do not harm the network.; 4)*To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet*, consumers are entitled to competition among network providers, application and service providers, and content providers. **How is video-on-demand defined?** Video-on-demand is not treated differently from other subscription services.

StatLink http://dx.doi.org/10.1787/625805881846

Table 6.10. Regulatory provisions on ownership

Australia	Limitations on number of stations Under sections 53 and 54 of the BSA, a licensee cannot control more than two radio licences in a licence area, more than one TV channel in a licence area, or control TV licences that reach more than 75% of the population. There is no limit to the number of subscription licences one organisation may hold. Foreign ownership There are no longer any specific restrictions on foreign investment, ownership or control of Australian media companies in the BSA. On 18 October 2006, the Parliament passed legislation that removed sections relating to foreign ownership and control from the BSA. While the BSA no longer provides any broadcasting-specific restrictions, all proposals for foreign investment in Australian media companies may be subject to restriction or even blocked by the Australian government, through the Treasurer, under the *Foreign Investment Policy,* the *Foreign Acquisitions and Takeovers Act 1975* (FATA) and the *Foreign Acquisitions and Takeovers Regulations 1989* (FATR). Under section 17H of the FATA, in conjunction with section 12 of the FATR, the media industry in Australia is defined as a 'prescribed sensitive sector'. As a result, proposals for foreign investment in the Australian media sector must seek prior approval from the Treasurer, through the Foreign Investment Review Board, under the *Foreign Investment Policy* where the proposal is: • a portfolio investment of 5% or more; or • any direct (that is non-portfolio) investment irrespective of size. Under sections 18 to 21 of the FATA, the Treasurer may block a proposal for the foreign acquisition of shares, assets, directorship or control of a media corporation in Australia if they determine that the result would be contrary to the national interest. Alternatively, under section 25 of the FATA the Treasurer may allow a foreign investment proposal provided that the foreign person or corporation complies with certain conditions imposed by the Treasurer to ensure that the result is not contrary to the national interest. The 'national interest' test is as a matter of policy not specifically defined or subject to criteria, to ensure that all relevant circumstances can be addressed and that evolving national interests can be protected. The *Foreign Investment Policy* states that the government determines what is 'contrary to the national interest' by having regard to the widely held community concerns of Australians. Cross-media and cross-sector provisions On 18 October 2006, the Parliament passed a legislation that changed cross-media ownership restrictions in the BSA. Part 5, Division 5A of the BSA details the provisions governing media diversity. This division creates a requirement that mergers and acquisitions of media companies may only take place if there remain at least five independent media groups in a metropolitan licence area; or at least four in the licence area of a regional market. In addition, mergers and acquisitions may involve no more than two of the three regulated platforms (television, radio and associated newspaper) in any one licence area. ACMA is responsible for administering, and enforcing compliance with, these media diversity rules and ensuring that the safeguards are not breached.

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Table 6.10. Regulatory provisions on ownership *(continued)*

Austria	Limitations on number of stations There exist no limitations on the number of stations. Foreign ownership The stake of foreign shareholders (*i.e*. other than EEA-members) must not exceed 49% of any private television (terrestrial, cable) or DBS broadcaster. This provision has not recently changed. Cross-media and cross-sector provisions A person or partnership may hold several licenses for analogue terrestrial television, as long as the coverage areas defined in the licenses do not overlap. In addition, the coverage areas for analogue terrestrial television that can be attributed to a person or partnership shall not overlap. A coverage area shall be attributed to a person if that person has possibilities of direct participation or influence with the license holder (*e.g.* who/which hold more than 25% of the share capital or the voting rights of a media owner or exert a dominating influence). A media owner shall be precluded from providing terrestrial television as well as television broadcasting in cable networks and television or radio broadcasting via satellite if he exceeds the following ranges or levels of coverage in one of the listed markets: 1. Terrestrial radio programmes (more than 30% of a nationwide range); 2. Daily press (more than 30% of a nationwide range of the daily press); 3. Weekly press (more than 30% of a nationwide range of the weekly press); 4. Cable networks (more than a level of 30% of coverage to the population by means of cable network on the national territory). A media owner shall be precluded from providing non-nationwide terrestrial television if he exceeds the below ranges or levels of coverage in the respective coverage areas in more than one of the listed markets: 1. Terrestrial radio programmes (more than a range of 30% in the coverage area); 2. Daily press (more than a range of 30% in the coverage area); 3. Weekly press (more than a range of 30% of the coverage area); 4. Cable network (more than level of coverage of 30% of the population by means of cable networks on the national territory). Persons or partnerships of the same media group must not provide one particular part of the national territory, except for any technically unavoidable overlapping (spill over), with more than one one analogue terrestrial television programme. These provisions have not recently changed. A person or partnership or persons or partnerships of the same media group must not supply the same location on the national territory, except for any technically unavoidable overlapping (spill over), with more than two digital terrestrial television programmes. This clause does not apply to TV programmes transmitted via the multiplex platform for mobile terrestrial broadcast (this last exemption dates from the amendment of the Private Television Act, BGBl. I 52/2007).

Table 6.10. Regulatory provisions on ownership *(continued)*

Canada	Limitations on number of stations Limitations on the number of stations only exist for Radio and Television undertakings in a given market. There are no limitations as to the number of stations one can own on a national basis provided that the number does not represent a dominance situation. For television, dominance was recently defined as having control of more that 45% of total combined television audience share. The Commission also indicates that it will pay particular attention to any transition that would grant control of more than 35% combined television audience share. With respect to cable and DTH the CRTC recently determined that it will not approve applications for a change in the effective control of broadcasting distribution undertakings (BDUs) in a market that would result in one person being in a position to effectively control the delivery of programming services in that market. The Commission is not prepared to allow one person to control all BDUs in any given market. For radio, the 1998 Radio Commercial Policy provides for certain limitations as to what a broadcaster can own in a given market. For example, in markets where there are eight or more commercial radio stations, a broadcaster can own four radio stations (maximum two AM and maximum two FM) broadcasting in a given language. In a market of fewer than eight commercial radio stations, the limit is set at three (either two AM and one FM or two FM and one AM) in a given language. For television, the limitation is set at generally one television station in any size market in a given language. Foreign ownership The limitations of foreign ownership are as per the Direction to the CRTC (ineligibility of non-Canadians). In general, foreign ownership is limited at 20% for any licensee. The level of foreign ownership allowable is higher for a holding corporation – which is set at 33 1/3%. The foreign ownership restriction is applicable for all types of broadcasters – radio, television, distributors. Cross-media and cross-sector provisions With respect to cross-media ownership the CRTC introduced a new policy that, as a general rule, will not approve applications for a change in the effective control of broadcasting undertakings that would result in the ownership or control, by one person, of a local radio station, a local television station and a local newspaper serving the same market. The CRTC also replaced existing provisions requiring the separation of Newsrooms with a new Journalistic Independence Code. The Code's principles concerning the separation of management structures, news management decisions and editorial boards were deemed sufficient to ensure that Canadians can access a broad range of news coverage.
Czech Republic	Limitations on number of stations There is no limitation. Foreign ownership Each foreign owner has to satisfy conditions in Czech Republic business code. Cross-media and cross-sector provisions One legal or natural person can be a holder only of one license for national analogue broadcasting. One legal or natural person can be a holder of at most two licenses for providing of national digital broadcasting at the same time.
Denmark	Limitations on number of stations None in Broadcasting Act (only general competition law applies). Foreign ownership None in Broadcasting Act (only general competition law applies). Cross-media and cross-sector provisions None in Broadcasting Act (only general competition law applies). In the tender for DTT gatekeeper, the competition authority had 50 % of the say, and it was a main reason that Boxer got the license, as Boxer was not present in Denmark whereas the two other applicants, MTG and Telenor, had a more critical evaluation on those grounds.

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Table 6.10. Regulatory provisions on ownership *(continued)*

Finland	No limitation
France	Limitations on number of stations For terrestrial television (Article 41 of the Law of 30 September 1986, as amended): The same person may hold: • One permit for a national television broadcast in analogue mode, this does not apply to personal mobile television (TMP); • Seven authorisations have been given for national television broadcast in digital mode, other than for personal mobile television. The combination of authorisations by the same person for local services (in analogue or digital) must not exceed 12 million inhabitants and a person cannot hold two authorisations in a single area. The law also regulates the joint ownership of authorisations for national and local television services prohibiting the combination of these permits if the audience share of the national service exceeds 2.5% of total television audience (the precise form for this calculation will be clarified by a decree not yet published). For other electronic networks: no limitation. Foreign ownership For terrestrial television: According to Article 40 of the Act, a person or entity "foreign" (other than Community) cannot hold more than 20% of the capital or voting rights of the publishing company receiving authorisation to disseminate radio or television services when the service is made available in French. This limit does not apply to services where more than 80% of the capital and voting rights are held by public broadcasters belonging to states of the Council of Europe, with over 20% of voting rights held by French public broadcasters. For other electronic networks: The same physical person cannot hold more than two permits for a television service broadcast exclusively on frequencies for radio and satellite television. Cross-media and cross-sector provisions For terrestrial television: Articles 41-1, 41-1-1, 41-2-1 and 41-2 of the Act establish thresholds for the concentration of multimedia which apply at national or sub-national level. At the national level, a permit may not be issued when it results in an operator being in two of the three following situations: • Controls the content of one or more terrestrial television services covering at least 4 million inhabitants; • Controls the content of one or more terrestrial broadcasting radio stations covering at least 30 million inhabitants; • Controls the content or controls a political or general information daily newspaper having over 20% of the total national diffusion. At the local level, a permit cannot be issued when it would be to place the operator in more than two of the three following situations: • Control content on one or more terrestrial television services, whether national or not, received in the specific area; • Control content on one or more terrestrial radio stations, national or not, where the combined potential audience in this area exceeds 10% of the total potential combined audience; • Control content or control one or more political or general information newspapers, whether national or not, circulated in this area. For other electronic networks: no limitation.

Table 6.10. Regulatory provisions on ownership *(continued)*

Germany	Limitations on number of stations None. Foreign ownership None. Cross-media and cross-sector provisions There are restrictions to the detriment of providers which involve newspaper publishers with a dominant market position.
Hungary	Limitations on number of stations Set out in Act 1 of 1996 on radio and television broadcasting. Foreign ownership Nationals of any EEA member dtate and legal persons established in the territory of an EEA member state must hold at least 26% of the voting rights in a public limited company with national broadcasting rights. A single company may hold a maximum of 49% of the voting rights in a private limited company that is engaged in terrestrial transmission of television programmes without being connected to the national network. Cross-media and cross-sector provisions Set out in Act 1 of 1996 on radio and television broadcasting (Article 124-127).
Ireland	Limitations on number of stations Terrestrial radio services: any one entity is limited to 25% of the total number of licensed radio services. Foreign ownership No specific restrictions. Cross-media and cross-sector provisions Governed by the *BCI Ownership and Control Policy 2008* which is based on broadcasting legislation from 1988-2007. The principal provisions in respect of cross-media ownership are as follows: 1. This applies to terrestrial radio services licensed under the Radio and Television Act 1988 only. The BCI to have regard to: *"the desirability of allowing any person, or group of persons, to have control of, or substantial interests in, an undue number of sound broadcasting services in respect of which a sound broadcasting contract has been awarded under this Act".* 2. All broadcasting services: "the desirability of allowing any person, or group of persons, to have control of, or substantial interests in, an undue amount of the communications media in" a specified area. 3. All broadcasting services: The BCI may prohibit the assignment of, or any material change in, the ownership of an applicant, either by specifying a condition in the contract itself, or by making the assignment subject to the previous consent in writing of the BCI, in which case the BCI shall have regard to the ownership and control provisions set out in section 6(2) of the 1988 Act.
Italy	Limitations on number of stations 20% of programmes diffused on national basis (for terrestrial TV). A content provider is prohibited from holding, equally through its subsidiary or associated companies, authorisations or permits for broadcasting more than 20% of total television programmes. Foreign ownership A legal entity based in a foreign country cannot control a national terrestrial broadcaster, if the entity's country does not have reciprocal conditions. Cross-media and cross-sector provisions An undertaking that broadcasts more than one channel on the national territory cannot acquire shares of daily newspaper companies or participate in the establishment of new daily publishers until 31 December 2010. Undertakings which, either directly or through their associates or subsidiaries, earn revenues in the electronic communications sector exceeding 40% of the total revenues of the sector, cannot gain more than 10% of the total revenues in the Integrated System of Communications (SIC). SIC is composed of the following business areas: daily and periodical press, yearbook and electronic publishing including internet publishing, radio and television, movie theatres, external advertising, product and service communication initiatives, sponsoring.

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Table 6.10. Regulatory provisions on ownership *(continued)*

Japan	Limitations on number of stations Terrestrial broadcasting: the number of stations controlled by a person is basically limited to one. "Control" shall mean (for example): • between terrestrial broadcasters (in one broadcasting service area): more than 10% of one's voting rights; • between terrestrial broadcasters (in different broadcasting service areas): one-fifth or more of one's voting rights. • cable television broadcasters: no regulation. • satellite broadcasters: there are limitations on number of transponders. Foreign ownership Terrestrial broadcasting: no radio station license for terrestrial broadcaster shall be granted to: • a person not holding Japanese nationality; • a foreign government or its representative; • a foreign legal person or organisation; • a legal person or organisation, managed by a foreigner; • foreign interests to hold directly or indirectly one-fifth or more the aggregate voting right. Facility-supplying satellite broadcasting: same restrictions as above. Cable television broadcasting: no regulation. Cross-media and cross-sector provisions In principle, A person cannot control television broadcasters, AM radio broadcasters and newspaper companies at the same time in one broadcasting service area. "Control" shall mean a person owns more than one-tenth of the voting rights of a legal person or entity.
Korea	Limitations on number of stations Terrestrial television: Korea maintains a license system. Cable: under 20% of all regions (about 15 system operators) and cannot exceed 33% of the aggregate sales proceeds of the cable industry. Programme provider: cannot exceed 33% of the aggregate sales proceeds of entire programme provider. DBS: 1 Foreign ownership Terrestrial television: 0% Cable: below 49% Programme provider: below 49% General programming or specialised programming of news reports : 0% DBS: below 33% Cross-media and cross-sector provisions 1. Newspapers: • cannot own terrestrial television, news report PP (programme providers), and general programming PP; • may own up to 49% of the shares of cable SO (system operator); • may own up to 33% of the shares of satellite broadcasting service provider; • may own up to 49% of the shares of general PP. 2. Terrestrial television and SO (system operator) cannot have joint operations. 3. SO and satellite broadcasting service provider may own one-fifth or less of PP. 4. PP may own one-fifth or less of the number of SO zones.

Table 6.10. Regulatory provisions on ownership *(continued)*

Luxem-bourg	Limitations on number of stations No limitation. Foreign ownership No restrictions. Cross-media and cross-sector provisions No restrictions except with respect to cross-advertising by the public service operator between television and the press.
Mexico	Limitations on number of stations Terrestrial television: no limit. However, market dominance could preclude the granting of more stations to a single licensee. Cable: no limit. However, the owner of a license cannot be granted more than two licensees for the same area of coverage. Satellite: no limit. Foreign ownership Terrestrial television: Licenses to use – for commercial purposes – a radio or television channel using any modulation system, in amplitude or frequency, will be granted only to Mexican citizens or to societies whose associates are Mexicans. Permits for cultural, experimental or radiophonic schools will only be granted to Mexican citizens or non-profit Mexican societies. *Cable and MMDS:* Cable and MMDS licensees granted to societies should not exceed a 49% foreign ownership and 51% Mexican. The part of the social capital signed by foreign investors is attached to the terms of the Federal Telecommunications Law and Foreign Investment Law. If it is granted to a natural person then the ownership is 100% Mexican. Satellite: DTH licensees granted to societies have a 49% foreign ownership and 51% Mexican. The part of the social capital signed by foreign investors is attached to the terms of the Federal Telecommunications Law and Foreign Investment Law. If it is granted to a natural person then the ownership is 100% Mexican.
Nether-lands	Limitations on number of stations Article 82f of the Dutch Media Act contains an ownership rule: "No more frequency space than one FM frequency or combination of FM frequencies shall be used to transmit the radio programmes of one and the same establishment". Cross-media and cross-sector provisions Since June 2007 there is a Temporary Act on Media Concentration. The main principle of this act is the relaxation of cross-ownership rules. Before a publisher could only own a private broadcaster as long as his share on the daily newspaper market was not 25% or more. The Temporary Act enables publishers to have a total share on the three markets of newspapers, TV and radio of a maximum of 90% (total market in this instance 300%). On the newspaper market the share (circulation) may not exceed 35%. For the individual radio and TV markets no maximum percentage has been set since plurality is supposed to be safeguarded by the presence of PSB. The new act applies to increasing share by mergers et cetera and not to autonomous growth. So a share exceeding 90% on all three markets or 35% on the newspaper market as a consequence of increased popularity amongst the audience is permitted.
New Zealand	Limitations on number of stations No sector specific regulation. Acquisitions are subject to the mergers and acquisitions provisions of the Commerce Act and a 'substantially lessen competition' test is applied. Foreign ownership Foreign investment requires Overseas Investment Commission approval. Cross-media and cross-sector provisions None.

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Table 6.10. Regulatory provisions on ownership *(continued)*

Norway	Limitations on number of stations None. The Media Authority may, in accordance with the Act on Media Ownership, block or impose conditions on acquisitions in press or broadcasting companies resulting in a significant market share (set limits in single markets and cross-ownership). Foreign ownership None. Cross-media and cross-sector provisions A company has a significant market share (*cf.* above) if it at the same time controls 30% or more and 20% or more in either of the markets for radio, TV and the press. A company has a significant market share if it simultaneously controls 20% of each of the three markets above. A company has significant market share if it controls 10% or more in one of the three above mentioned markets and acquires in full or in part a company that is part of a group that controls at least 10 % in the same market.
Poland	Foreign ownership As a result of the revision of the Broadcasting Act, which entered into force on 1 May 2004, the provisions concerning participation of foreign capital in companies granted a radio or TV licence were changed in respect to persons or companies originating from Member State of European Economic Area. 1. Broadcasting licences may be granted to natural persons of Polish nationality who permanently reside in Poland or to legal persons having their permanent seat in Poland. 2. Companies having foreign shareholders may be awarded a broadcasting licence if : 1) the stake held by foreign persons in the share capital of the company does not exceed 49%; 2) the company's articles of association or statutes contain a clause which provides that: a) persons of Polish nationality who permanently reside in Poland constitute a majority of members of the Board of Management of the said company, b) the share of votes exercised by foreign persons and subsidiaries, as defined by the Code of Commercial Companies and Partnerships, of foreign persons may not exceed 49% of votes in a meeting of a limited company's members or the general meeting of shareholders, c) persons of Polish nationality who permanently reside in Poland constitute a majority of members of the Supervisory Board of the said company; 3. The license may also be granted to: 1) a foreign person, or 2) a subsidiary, as defined by the Code of Commercial Companies and Partnerships, of a foreign person, - having a seat or permanent residence in a member state of the European Economic Area, with exclusion of restrictions imposed by virtue of paragraph 2. Art. 40a 1. Purchase or acquisition of shares or interest, or the acquisition of rights in shares or interest in a company holding a broadcasting licence to transmit a programme service, by a foreign person, shall require a consent of the Chairman of the National Council; the provisions of Article 33 paragraph 3, Article 35 paragraph 2, Article 36 paragraph 2 and Article 38, shall apply thereto as appropriate. 2. The actions referred to in paragraph 1, performed by an entity controlled by a foreign person shall be deemed performed by the controlling entity, as defined by the Code of Commercial Companies and Partnerships. 3. The Chairman of the National Council shall issue and withdraw the consent referred to in paragraph 1, on the basis of a resolution of the National Council. 4. Actions, referred to in paragraph 1, performed without the consent shall be null and void. 5. The provisions of paragraph 1 - 3 shall not apply to foreign persons or subsidiaries, as defined by the Code of Commercial Companies and Partnerships, of foreign persons whose having a seat or permanent residence in a member state of the European Economic Area.

Table 6.10. Regulatory provisions on ownership *(continued)*

Portugal	Limitations on number of stations As of January 2008: Television: There is no specific regulation. Radio (Radio Broadcasting Act): • Individuals and companies may only detain holdings in a maximum of five radio broadcasting operators; • Holdings greater than 25% of equity capital of more than one radio station operator with local programme services are not permitted in the same municipal area. Foreign ownership As of January 2008, no specific rules. Cross-media and cross-sector provisions None.
Slovak Republic	Limitations on number of stations One entity can own only one television or radio license. There is an exception with respect to monotype television license. Foreign ownership There are no limitations on foreign ownership under new digital legislation. Under the retreating analogue regime there is a condition of "adequate ownership participation of slovak entities and their participation in the corporations bodies" to be observed. Cross-media and cross-sector provisions Press publisher under specified conditions can not be also multiregional or state broadcaster. Ownership or personal connection between radio and television broadcaster or national press publisher is prohibited. There are also more detailed restrictions on intra media ownership participation.
Spain	Foreign ownership Local television: Capital share of persons who are not from any member State of the European Union cannot exceed directly or indirectly 25% of the amount. Cross-media and cross-sector provisions Natural or legal persons, who, directly or indirectly, have a capital share or voting rights equal to or above 5% of the total amount in a public television service licensed corporation cannot have a significant share in any other public television service licensed corporation that has exactly the same coverage in the same district. No natural or legal person, who, directly or indirectly, has a capital share or voting rights equal to or above 5% of the total amount in a state public television service licensed corporation cannot have a significant share in any other autonomous or local coverage licensed corporation as long as the population in the districts covered by their broadcast in each of those spectrums exceeds 25% of the national totals. Likewise, natural or legal persons not included in the paragraph above, who, directly or indirectly, have a capital share or voting rights equal to or above 5% of the total amount in an autonomous public television service licensed corporation cannot have a significant share in any other autonomous or local coverage licensed corporation whose spectrum is included in the former, as long as the population in the districts covered by their broadcast in each of those spectrums exceeds 25% of the autonomous total. In no case, will it be allowed to have a significant capital share or significant voting rights in a public television service licensed corporation across-the national, autonomous or local spectrum if they coincide in the same reception point of the broadcast simultaneously. No public television service concession holder can have a significant share in any other corporation which is in the same condition as in the cases mentioned in the section above. (Section 19, Private Television Act).
Sweden	No limitation.

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Table 6.10. Regulatory provisions on ownership *(continued)*

Switzer-land	Limitations on number of stations According to Article 44, para. 3, LRTV, a broadcaster or company to which he belongs may obtain licenses to two TV and two radio concessions. Foreign ownership According to Article 44, 1st al. Let. f LRTV, the candidate for a concession must be a person resident in Switzerland or a corporation with headquarters in Switzerland.
Turkey	Limitations are in accordance with the permitted number of transmitters for an area (for terrestrial broadcasts). Foreign ownership 25% Cross-media and cross-sector provisions Limited. This means that a broadcasting enterprise has the right only to own one radio and one television channel. Any enterprise owning one radio and one TV channel is not allowed also to own a newspaper or a magazine.
United States	Limitations on number of stations For TV, there is no limit on the number of stations one entity could own on a national basis as long as the stations do not collectively reach more than 39% of the US population. In any individual local TV market, an entity can own up to two TV stations if one station is not among the top-4 rated stations and there are at least eight independent TV stations in the market. Radio has no limit on the number of stations owned nationally nor on the percent of population reached. The law does, however, limit the number of radio stations owned in any given local radio market. In markets with 45 or more stations, the limit is eight stations. There is a sliding scale for markets with fewer than 45 stations. Foreign ownership: Limited to 20% of any entity. Cross-media and cross-sector provisions *Newspaper/broadcast:* Under the newspaper/broadcast cross-ownership rule as modestly relaxed in 2007, the Commission will presume a proposed newspaper/broadcast transaction is in the public interest if: *1)* the market at issue is one of the 20 largest Nielsen Designated Market Areas ("DMAs"); *2)* the transaction involves the combination of only one major daily newspaper and only one television or radio station; *3)* if the transaction involves a television station, at least eight independently owned and operating major media voices (defined to include major newspapers and full-power TV stations) would remain in the DMA following the transaction; and *4)* if the transaction involves a television station, that station is not among the top four ranked stations in the DMA. Each application for such a combination will be evaluated on its own merits, and applicants must demonstrate that the combination is in the public interest. Transactions that do not meet the new test will be presumed not to be in the public interest; however, under limited circumstances after evaluation of four specific factors, the Commission may reverse the negative presumption. The four factors include: *1)* DMA concentration; *2)* a commitment to invest in newsroom operations; *3)* whether the transaction will increase local news; and *4)* whether the outlet will exercise independent news judgment. In assessing whether reversal of a negative presumption is in the public interest, the Commission will balance the needs of the public for media and viewpoint diversity with its concerns about the financial health of traditional media outlets in the context of each particular transaction. *Radio/television:* The radio/television cross-ownership rule allows a party to own up to two television stations and up to six radio stations in a market where at least 20 independently owned media "voices" would remain post-merger. In markets where parties may own a combination of two television stations and six radio stations, the rule allows a party alternatively to own one television station and seven radio stations. A party may own up to two television stations and up to four radio stations in markets where, post-merger, at least 10 independently owned media voices would remain. A combination of two television stations and one radio station is allowed regardless of the number of voices remaining in the market.

StatLink http://dx.doi.org/10.1787/625882866710

Table 6.11. **Local content requirements and must-carry regulations**

Australia	**Local content requirements** *Commercial free-to-air television* ACMA Australian Content Standard requires: • 55% of programming between 6am and midnight. • 250 points per annum of first release Australian or New Zealand drama programmes between 5pm and 11.30pm. Points accrue according to a complex calculation of a range of factors such as hours and costs. • 20 hours of first-release Australian or New Zealand documentary programmes per year. ACMA Children's Television Standards requires: • 390 hours (130 hours of pre-school [P] programmes and 260 hours of children's [C] programmes); • 100% of P programmes must be Australian or New Zealand; • 32 hours of first-release Australian or New Zealand children's drama averaged over three years; • 8 hours repeat children's drama. ACMA Australian Content in Advertising Standard requires: • 80% of total advertising time between 6am and midnight. *Subscription television* BSA requires: • 10% of total drama programme expenditure by drama channels to be expended on new Australian or New Zealand drama. *Public broadcasters* • The ABC Charter in Section 6 of its Act requires the ABC to "provide programmes that contribute to a sense of national identity and inform and entertain, and reflect the cultural diversity of, the Australian community." • The SBS Charter in Section 6 of its Act requires the SBS to contribute to meeting the communications needs of Australia's multicultural society, including ethnic, Aboriginal and Torres Straight Islander communities. **Must-carry and electronic programme guide (EPG) must-list requirements** Not applicable
Austria	**Local content requirements** The nine region-wide radio programmes of the PSB are produced by the regional studios; single parts of the programmes in which there is a special public interest may also be broadcast on a nationwide basis. In the television programmes of the PSB, the interests of the States (Länder) must be taken into account by regional programmes at regular intervals and by reasonable shares of nationwide programming. Local content requirements regarding the programmes of private radio or television broadcasters are defined in their respective licenses. These requirements have not changed since January 2004. **Must-carry and electronic programme guide (EPG) must-list requirements** The Private Television Act states the obligation of cable network operators to broadcast the radio- and television programmes of the PSB and the television programme of private nation-wide broadcasters. Under certain circumstances also local television programmes can plead must-carry status in a local cable network. Furthermore, this law states the obligation of the multiplex operator of the first two nationwide multiplex platforms (MUX A +B) to broadcast the two television programmes of the PSB (ORF) and the television programme of the private nationwide analogue terrestrial broadcaster (ATV). As regards the multiplex platform for mobile TV (DVB-H), all terrestrial transmitted nationwide TV programmes (at the time of the commencement of BGBl I 52/2007, 1 August 2007) can plead must-carry status until 31 December 2009. According to the Private Television Act electronic programme guides have to arrange all programmes equally in terms of visual configuration, location and clarity. The order of the programmes has to follow impartial criteria.

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Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Canada	**Local content requirements** *Terrestrial television*: Canadian content: 60% overall / 50% from 6pm to midnight; eight hours per week of priority (Canadian drama, documentaries, music & variety) programming during the 7pm to 11pm. peak viewing period. These regulations were reviewed in 2007 without significant change. *Radio:* 35% of musical selections broadcast must be Canadian These regulations were reviewed in 2007 and placed a greater accent on emerging artists. *Specialty services:* requirements regarding Canadian content and programming genres vary according to the nature of service of the respective undertakings. These regulations are currently under review. **Must-carry and electronic programme guide (EPG) must-list requirements** DBS and cable distributors must give priority to and have a predominance of Canadian programming services. These regulations are currently under review.
Czech Republic	**Local content requirements** Some commercial providers have obligations regarding local programming as part of their terms of license, as required by the relevant act. **Must-carry and electronic programme guide (EPG) must-list requirements** These requirements have been modified by the Act No. 235/2006 Coll., mentioned above.
Denmark	**Local content requirements** DTT: Commercial gatekeeper with 3 MUX (MUX 3-4-5, about 29 channels) (Boxer) will have an obligation to distribute news, entertainment, sports, music and popular science (minimum 5% of each) as of 1 November 2009. Boxer must also make room for a local news channel (like SBS Net), at least one channel from neighbouring countries (can vary in parts of Denmark) and two new channels not yet on the Danish market. DTT: Public service gatekeeper (Digi-TV = DR+TV2) on MUX 1 must carry DR 1, DR 2, TV 2 Danmark, one channel with regional news (one hour), sign language translation (three hours) and non-commercial local tv (20 hours). MUX 1 began on 1 April 2006. DTT: MUX 2 (DR) must carry a new channel for children/history, a new parliamentary channel and other new PSB-channels (1 November 2009). **Must-carry and electronic programme guide (EPG) must-list requirements** Analogue cable: PSB-channels from DR or TV 2 (= DR 1, DR 2, TV 2 Danmark) Digital cable: same stations if they are transmitted digitally. Cable operators are allowed to transform the signal back to analogue if they also distribute the digital signal.
Finland	**Local content requirements** No local requirements, but some European content regulations are enacted in the Act on Television and Radio Operations: A television broadcaster shall reserve for European works a majority proportion of his annual transmission time, excluding the time appointed to news, sports events, games, advertising, teletext services and teleshopping. Further provisions in accordance with Council Directive (89/552/EEC) on the Coordination of Certain Provisions Laid Down by Law, Regulation or Administrative Action in Member States and article 6 of the Directive (97/36/EC) of the European Parliament and of the Council amending the said Directive as to what programmes shall be deemed European works referred to in subsection 1 shall be issued by government decree. (394/2003) **Must-carry and electronic programme guide (EPG) must-list requirements** *Must-carry requirements:* Must-carry requirements are enacted in Communications Market Act: A telecommunications operator providing a network service in a cable television network has an obligation to transmit the following over the network without charge: 1. Public service television and radio programmes that can be freely received in the municipality in which the network is located; 2. Freely receivable ancillary and supplementary services related to these programmes; 3. Television and radio programmes than are provided in the municipality in which the network is located; 4. Material supplied for a particular item in a programme referred to in subsection 3, advertisements included in the programmes and other similar services forming part of the programmes. *EPG must-list requirements:* No regulations.

Table 6.11. **Local content requirements and must-carry regulations *(continued)***

France	**Local content requirements** Content requirements are defined for licensed local providers in agreements signed between the CSA and each broadcaster. The broadcaster must devote at least half of the total weekly transmission time to programmes dealing with subjects that reflect the area's social, economic and cultural reality. Among this 50%, 20% must be first-run programmes. The agreement signed with the CSA may require a progressive increase in the number of first-run programmes. **Must-carry and electronic programme guide (EPG) must-list requirements** For DTT: Act N° 2007-309 of 5 March 2007 on the modernisation of audiovisual broadcasting and the television of the future has introduced a number of provisions to promote new extensions of territorial coverage by DTT: • Free domestic analogue channels are required to provide DTT coverage for 95% of the population in exchange for a five-year extension of the channels' licences starting at the date of their analogue switch-off; • An incentive mechanism for the other domestic private broadcasters that have made further commitments regarding coverage; their licences will be extended for up to five years. Lastly, in order to complete the territorial coverage for free DTT channels, the Act of 5 March 2007 lays down that free-to-air broadcasters must make their programmes available to at least one common satellite service provider within three months of the legislation's enactment. Local broadcasters must undertake to ensure territorial coverage of the area defined in the CSA's call for applications.
Germany	**Local content requirements** In its services and programmes, public service broadcasting must also provide a comprehensive overview of regional events in all significant areas of life. RTL and SAT 1 must broadcast separate regional programmes lasting at least 30 minutes each day to the regions. **Must-carry and electronic programme guide (EPG) must-list requirements** Section 52 of the Interstate Agreement. The current version has been in force since 1 March 2007.
Hungary	**Local content requirements** Outlined in Act 1 of 1996 on Radio and Television Broadcasting. **Must-carry and electronic programme guide (EPG) must-list requirements** Outlined in Act 74 of 2007 on the rules of broadcasting and digital switchover providers of television (Article 24-28; Article 33-34).
Ireland	**Local content requirements** Programme content contracts vary per licensee and are set out in the terms of their broadcasting contracts.
Italy	**Local content requirements** All content requirements derive by the TVWF directive of 1997. No major changes in the regulation regarding content have been introduced, with the exception of the regulation on European works (see below). The new AVMS Directive has not been ratified yet in Italy. All provisions apply to terrestrial, cable and DBS programmes, unless something different is specified. *Advertising* Hourly limit: • PBS: 12% hourly limit. • Commercial broadcasters: 18% hourly limit. • Quantitative provisions only applicable to short forms of advertising. For teleshopping and telepromotion there is a daily limit of 72 minutes.

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Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Italy ***(continued)***	Rules on scheduling of advertising: advertising and teleshopping spots shall be inserted between programmes. Advertising and teleshopping spots may be inserted during programmes following a specific set of rules: • In programmes consisting of autonomous parts, or in sports programmes and performances containing intervals, advertising and teleshopping spots shall only be inserted between the parts or in the intervals. • Feature films and films made for television (excluding series, serials, light entertainment programmes and documentaries), provided their scheduled duration is more than 45 minutes, may be interrupted once for each period of 45 minutes. A further interruption shall be allowed if their scheduled duration is at least 20 minutes longer than two or more complete periods of 45 minutes. • For other kind of programmes a period of at least 20 minutes should elapse between each successive advertising break within the programme. • Broadcast of religious services cannot be interrupted by advertising. News and current affairs programmes, documentaries, religious programmes and children's programmes, when their scheduled duration is less than 30 minutes, cannot be interrupted by advertising or by teleshopping. If their scheduled duration is 30 minutes or longer, the 20 minutes rules applies. • Protection of minors. Broadcasting of programmes which might seriously impair the physical,mental or moral development of minors, in particular programmes that involve pornography or gratuitous violence is forbidden. Cable and satellite broadcasters cannot broadcast programmes which might impair the physical, mental or moral development of minors unless they use conditional access system and broadcast these kind of content between 11pm and 7am. *European works* The regulation on the promotion of European works has been changed by Law 244/2007 and the Law 31/2008, that amended articles 6 and 44 of the legislative decree no. 177 of 31 July 2005 (Consolidated Act on Broadcasting). The new obligations are summarised below: • All national broadcasters and content providers must reserve more than 50% of their transmission time to European works, excluding time devoted to news, sports events, games, advertising, teletext services, talk shows and teleshopping. The same provisions apply with reference to peak viewing times; • At least 10% of the transmission time of each broadcaster and content provider must be reserved to European recent works (produced in the past five years), and 20% of this percentage should be reserved to cinema movies that are original Italian expression. The PSB will reserve to European recent works 20% of its transmission time; • Each broadcaster/content provider must reserve at least 10% (15% for the PSB) of its whole income for European works created by producers who are independent of broadcasters. Within this quota, the free-to-air channels must devote a sub-quota of 30% to cinema movies that are original Italian expression, while the pay-TV channels must reserve a sub-quota of 35% to works that are original Italian expression; • The provisions of the AGCOM "Quotas Regulation (AGCOM decision 9/99)" remain valid, but are going to be amended shortly. None of the aforementioned regulations apply to providers of video content over the Internet. **Must-carry and electronic programme guide (EPG) must-list requirements** No must-carry requirement is envisaged by the broadcasting law nor the existing regulatory framework.

Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Japan	**Local content requirements** Any broadcaster shall, in compiling the broadcast programmes for domestic broadcasting, follow what is laid down in the following items: 1. Shall not disturb public security and good morals and manners; 2. Shall be politically impartial; 3. Shall broadcast news without distorting facts; 4. As regards controversial issues, shall clarify the point of issue from as many angles as possible. (Broadcasting Law Article3-2(1)) Any broadcaster shall establish the standards for the compilation of broadcast programmes (hereinafter referred to as "the Standards of Broadcast Programmes") according to the type of the broadcast programmes and to the type of viewers these programmes are designed for, and shall compile the broadcast programmes in accordance with such standards. (Broadcasting Law Article3-3(1)). **Must-carry and electronic programme guide (EPG) must-list requirements** A cable television broadcaster who is also a licensee for cable television broadcasting facilities in the zone designated by the Ministry of Internal Affairs and Communications where the receiving interference occurs should receive the terrestrial television broadcasting and retransmit all the broadcasting programmes thereof intact and simultaneously. (Cable Television Broadcast Law Article 13) There are no requirements regarding EPG must-list. These regulations are not applied to video-on-demand service providers over the Internet.
Korea	**Local content requirements** Regional production: 23%-31%) The regulation does not apply to the providers of video content over the internet excluding IPTV. **Must-carry and electronic programme guide (EPG) must-list requirements**: None.
Luxembourg	No obligations.
Mexico	**Local content requirements** *Terrestrial television* When granting a permit for official stations it is a requisite to fulfil among the purposes of the station to: • Strength regional identity in the frame of national unity; • Privilege national contents, and • Foster local and national values and creativity through the broadcast of independent production. Article 73 of the Federal Radio and Television Law indicates that broadcasters must take advantage and encourage local and national artistic values as well as Mexican artistic expressions, dedicating as live broadcast the minimum amount of time indicated by the Secretary of Government, accord with the peculiarities of the broadcasters and taking into account the opinion of the National Radio and Television Council. *Cable:* When granting a license for cable infrastructure, it is a requisite to fulfil the purposes of the Regulation of the Services of Television and Audio Restricted, in which article 6 indicates that the owner of a licensee should report the Secretary of Government the content of its broadcasting. Article 23 indicates that the programming that spreads across the networks, in the frame of the freedom of expression and receipt of ideas and information, will have to contribute to family integration, to the harmonic development of childhood, to the improvement of educational systems, to the diffusion of our artistic, historical and cultural values, to a sustainable development, and to the propagation of ideas that affirm our national unit; for such effects, it will also apply Article 5 of the Federal Radio and Television Law. Article 24 specifies that at least 80% of the broadcasting must be in Spanish. *Satellite:* A DTH license is also regulated by the Regulation of the Services of Television and Audio Restricted; therefore the local content requirements are the same as for cable television. **Must-carry and electronic programme guide (EPG) must-list requirements** *Cable:* Must-carry regulations include federal government channels, *e.g.* Congress Channel. *Satellite:* Must-carry regulations include federal government channels, *e.g.* Congress Channel. The EPG services are not subject to must-list regulation.

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Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Netherlands	**Local content requirements** *For local PSB:* *Section 51f Media Act* A local broadcasting establishment shall use its broadcasting time to provide a programme service: a) of which at least 50% consists of programmes of an informative, cultural or educational nature which have a particular relevance to the municipality for which the programme service is intended; and b) of which a minimum percentage, to be determined by Order in Council, consists of programmes which are produced by or exclusively for that establishment. *Section 25 Media Decree* No less than 50% of the programme service of a regional or local broadcasting establishment shall consist of programmes produced by or exclusively for that establishment. **Must-carry and electronic programme guide (EPG) must-list requirements** Broadcasting network providers shall be required to transmit - in full, unaltered and at the same time as the original transmission - to all those connected to the broadcasting network, at least 15 television programme services for general broadcasting purposes and at least 25 radio programme services for general broadcasting purposes, including in any event: a) the programme services of the establishments which have obtained national broadcasting time; b) the programme services of the establishment which has obtained regional broadcasting time, aimed at the province in which the broadcasting network is located; c) the programme services of the establishment which has obtained local broadcasting time, aimed at the municipality in which the network broadcasting is located; d) the Dutch-language television programme services of the national Belgian public broadcasting service; e) two Dutch-language radio programme services of the national Belgian public broadcasting service. If different programme services for general broadcasting purposes are transmitted on the same broadcasting network channel at different times, these programme services shall be regarded as one programme service for the purposes of subsection 1: 1. Broadcasting network providers shall be permitted to transmit to those connected to the broadcasting network, at their request, fewer than fifteen television programme services for general broadcasting purposes and fewer than twenty-five radio programme services for general broadcasting purposes, provided that this includes the transmission of the programme services specified in subsection 1 (a) to (e) and provided that those connected are charged a rate which is proportionally lower than the fee normally charged for receiving the number of programme services transmitted under subsection 1. Subsection 2 shall apply mutatis mutandis. If requested, the Media Authority may grant the broadcasting network provider a full or partial exemption from the obligation referred to in subsection 1 with regard to the programmes specified in subsection 1 (d and e) if the performance of this obligation would involve disproportionately high costs for that provider.
New Zealand	**Local content requirements** None, although voluntary targets have been agreed by free-to-air television channels, and by private radio stations in relation to New Zealand music. **Must-carry and electronic programme guide (EPG) must-list requirements**: None.
Norway	**Local content requirements** NRK is obliged to provide regional television services. The Mass Media Authority shall, when reviewing applications for analogue terrestrial local television licences, especially consider to what degree the applicant will establish a local public service offering and the extent of co-operation with local organisations with respect to content. **Must-carry and electronic programme guide (EPG) must-list requirements** Cable companies are required to carry the NRKs television channels, TV 2 and local television channels subject to PSB obligations.

Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Poland	**Local content requirements** Some local content obligations could be included in the broadcasting licences. It also should be noted that public service media have some specific local obligations. **Must-carry and electronic programme guide (EPG) must-list requirements** Article 43 of the Broadcasting Act specifies the order according to which cable operator is obliged to introduce programme services into the cable network. This obligation is mainly focused on ensuring significant number of viewers receiving radio or television programmes by the means of cable networks, an adequate access to the programme services provided by public, than social broadcasters, and in further order programme services of other domestic broadcasters, receivable in the given area. *Broadcasting Act of 29 December 1992, Art. 43:* 1. The cable network operator shall introduce programme services into the cable network in the following sequence: 1) National programme services of public radio and television, 2) Regional programme services of public radio and television, received in the given area, 2a) Programme services of domestic social broadcasters, receivable in the given area, 3) Programme services of other domestic broadcasters, receivable in the given area, 4) Programme services of other domestic and foreign broadcasters. 2. In justified cases, the Chairman of the National Council may issue a decision permitting a different sequence of introducing programme services into a cable network as compared to that referred to in paragraph 1. The last major amendments were made in May 2001, when community broadcasting was introduced. The above-mentioned requirements apply to the cable operators only.
Portugal	**Local content requirements** No changes as of January 2008. *Public television service* The public television service may also integrate television programme services that aim in particular to provide specific information, having particular regard to matters with interest for specific regions or communities, whether or not in articulation with other television programme services, namely in the scope of joint management of rights. The public television service mission also includes two television programme services intended respectively to the Autonomous Region of the Azores and the Autonomous Region of Madeira. (Television Broadcasting Act No. 27/2007, of 30 July) *Network and distribution capacity to regional and local television programme services* Operators of electronic communications networks dealing with television programme services and distribution operators must provide network and distribution capacity to regional and local television programme services, given the characteristics of the composition of the offer and technical and market conditions assessed at a given time by the Regulatory Authority for the Media in the scope of authorisation procedures (for non use of spectrum), having heard, where it so deems necessary, the Competition Authority or the national communications regulatory authority (ANACOM). (Television Broadcsting Act No. 27/2007, of 30 July) *Radio broadcasting* Radio broadcaster operators shall broadcast a minimum of eight hours of their own programmes specifically directed at listeners in their geographical coverage area. (Radio Broadcasting Act No. 4/2001, of 23 February as amended by Act No.7/2006 of 3 March) **Must-carry and electronic programme guide (EPG) must-list requirements** No changes have occurred so far. However, the future Digital Terrestrial Television platform operator will have the following must-carry obligations on television broadcasting, according to the provision of article 25.º of Television Broadcasting Act No. 27/2007, of 30 July:

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Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Portugal *(continued)*	a) Operators of electronic communications networks used in the television activity must provide, following a decision of the national communications regulatory authority (ANACOM), issued according to paragraphs 1 and 2 of article 43 of Law no. 5/2004, of 10 February, the transport of television programme services specified by the Regulatory Authority for the Media (ERC) under point s) of paragraph 3 of article 24 of Law no. 53/2005, of 8 November; b) Concurrently television broadcasters responsible for the organisation of the television programme services referred hereinabove must provide the respective signal; c) The national communications regulatory authority (ANACOM), pursuant to paragraph 3 of article 43 of Law no. 5/2004, of 10 February, may determine an appropriate compensation for imposed transport obligations; d) The Regulatory Authority for the Media (ERC) may determine, in a proportionate, transparent and non-discriminatory way, an appropriate compensation for imposed signal provision obligations under paragraph 3. e) To reserve capacity for the transmission of television programme services broadcast in analogue mode via hertzian wave held by the licensed or concessionaire operators namely, RTP1, RTP2, SIC and TVI, as well as RTP Azores and RTP Madeira in the respective autonomous regions; f) To reserve capacity for the transmission of a television programme service with unconditional free access to be licensed under the television law; g) To reserve capacity for the broadcast, in non-simultaneous mode until the closure of analogue television broadcasting, of high definition transmissions of programme services mentioned in e) and f) above, except in the Autonomous Regions. When the interested television operators exercise the right to be transported, the holder of the right to use frequencies shall be bound to transmit the respective programme services without demanding compensation from end users and, in the case of programme services provided in analogue mode, in an integral and simultaneous manner and maintaining its current order. In the event that the holder of the usage right and the television operators do not reach agreement on the compensation due in respect of the transport obligations set out under the terms of the previous paragraph, ICP-ANACOM may determine a suitable remuneration. Remark: The obligations listed above do not apply to providers of video content over the Internet. *EPG access rules* Access rules to EPG of radio and/or television services shall be specified by the Regulatory Authority for the Media (ERC), under the terms of point r) of paragraph 3 of article 24 of Law no. 53/2005, of 8 November.
Slovak Republic	**Must-carry and electronic programme guide (EPG) must-list requirements** Cable operators are obliged to include for free in their basic package public service broadcasters and licensed broadcasters whose signal can be freely received by common telecommunications equipment. Cable operators are also obliged to provide that they include for free in the basic package one local broadcaster. On EPG there are no must-list requirements.
Spain	**Local content requirements** 1. Concession holders who render television public services across the state and autonomous spectrum, as set forth by the forty fourth additional provision of Act 66/1997, dated 30 December, on Fiscal, Administrative and Social Order Measures, and, across the local spectrum, as referred to by Act 41/1995, dated 22 December, on Terrestrial Local Television, shall be required to broadcast original television programmes during, at least, four hours per day and 32 per week. For these purposes, the following rules shall be observed:

Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Spain *(continued)*	a) Broadcasts comprising fixed images or the time devoted to advertising, telemarketing, games and promotional contests, including broadcasts comprising consultation and live long-distance games in which televiewers participate, shall not be considered television programmes. b) Those programmes which are mere relays of television programmes which have already been broadcast or are being broadcast by other means shall not be considered original programmes. c) In the case of national coverage broadcasting services, both programmes broadcast nationally and those whose coverage is limited to each of the territorial areas which can allow, if applicable, for disconnection, without being, in any case, the daily programming time with said limited coverage longer than the daily programming time with national coverage, shall be considered. 2. Concession holders rendering autonomous or local terrestrial public digital television services mentioned in Section 1 above can broadcast the same programmes simultaneously with the following restrictions: a) They can only connect their broadcasting services to broadcast a specific programme simultaneously, for, at most, five hours per day and twenty five per week. b) When there is overlapping in the broadcasting times of the same programme shall be determined pursuant to regulations. c) Four of the broadcasting hours of original programmes mentioned in Section 1 above shall be necessarily included between 1 and 4 pm. and between 8 and 11 pm. and their contents shall be related to the territorial spectrum of the broadcasting service coverage as set forth by their license without affecting other contents that, pursuant to rules, can be authorised to be broadcast during the aforementioned periods of time. **Must-carry and electronic programme guide (EPG) must-list requirements** *Cable:* The First Additional Provision of the Royal Decree 920/2006, dated July 28, through which the General Regulations to Render Radio and Cable Television Services are approved, sets the following rule: Up to the definite cancellation of television broadcasting with analog technology, authorisation holders who render radio and cable television broadcasting services, shall be required to include in their offer the following channels of the operators specified below: • TVE1 and TVE2, of TVE S.A. • Antena 3 TV, of Antena 3 TV S.A. • Telecinco, of Gestevision-Telecinco S.A. • Cuatro, of Sogecable S.A. • La Sexta, of Gestora de Inversiones Audiovisuales La Sexta S.A. Likewise, during the same period, autonomous cable television broadcasters must include in their offers the channels in analog managed directly by the Autonomous Community where the activity is developed. Moreover, Section 14 of the aforesaid General Regulations provides that those radio and cable television services operators who broadcast more than 30 TV channels, must ensure that, at least 30% of the channels broadcasted in one of the Spanish official languages, belong to owners of independent channels, provided that their offer is sufficient and of adequate quality, as established in the General Regulations and in the regulations that the Autonomous Communities may issue in their field of action. *Terrestrial television and cable television:* There are no requirements of this type.

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Table 6.11. **Local content requirements and must-carry regulations *(continued)***

Switzerland	**Local content requirements** In its programmes, SRG-SSR must take into account the country's specific characteristics and the needs of cantons. It must give consideration to Swiss production inasmuch as possible. Holders of licences with a performance contract that entitle them to a share of revenue from public licence fees must broadcast radio and television programmes that take regional characteristics into account while providing a broad range of information on political, economic and social realities and contributing to the cultural life of the service area concerned (cf. Art. 38, para. 1, LRTV). Holders of licences with a performance contract that do not entitle them to a share of revenue from public licence fees must take into account the specific area's local and regional characteristics while providing a broad range of information on political, economic and social realities and contributing to the cultural life of the service area concerned (cf. Art. 43, para. 1, LRTV). Since April 2006, Switzerland has been participating in European MEDIA programmes. The requirements have been transposed into Swiss legislation (Art. 7, paras. 1 and 2, LRTV; Art. 5, para. 1, ORTV). This means that broadcasters of national and regional language television programmes must take appropriate steps to ensure that at least 50% of transmission time is reserved for Swiss and European works and at least 10% of transmission time or programme costs is devoted to Swiss or European works made by independent producers. **Must-carry and electronic programme guide (EPG) must-list requirements** *Must-carry rules:* Service providers who provide on-line services are required to broadcast the SRG-SSR's programmes in their service area depending on the type of licence; programmes under a licence with a performance contract; programmes of foreign broadcasters designated as having priority by the Federal Council because of their special contribution to education, cultural development and the public's ability to freely form an opinion (*cf.* Art. 59, LRTV).
Turkey	**Must-carry and electronic programme guide (EPG) must-list requirements** There are no must-carry rules or EPG must-list requirements.
United States	**Local content requirements** No local content requirements. But note that stations are prohibited from broadcasting obscene or indecent programming; and, television stations must provide three hours of children's programming per week, with limits on the amount of advertising during such programming. **Must-carry and electronic programme guide (EPG) must-list requirements** US must-carry requirements are not content regulations, but obligations to provide carriage to local broadcast stations. Under the Communications Act, cable operators must set aside up to one third of their channel capacity for the carriage of local commercial television stations and additional channels for local noncommercial stations depending on the system's channel capacity. DBS operators may provide local-into-local broadcast television service. Unlike cable operators that are required to carry local television stations in every market they serve, a DBS operator must carry all stations in any market where it chooses to carry one local television station. In both the cable and DBS contexts, commercial broadcasters may elect to be carried pursuant to must-carry status or retransmission consent. Where a station elects must-carry it is generally guaranteed carriage without compensation for this carriage; under retransmission consent, the broadcaster and cable or DBS operator negotiate an agreement that may involve compensation in return for permission to retransmit the broadcast signal. The Satellite Home Viewer Improvement Act of 1999 requires that any DBS operator, who delivers local broadcast signals in any market, must deliver all available local broadcast signals. A DBS operator is not required to deliver any local broadcast station that substantially duplicates the signal of another local network affiliate. In 2008, the Commission amended its rules to require satellite carriers to carry digital-only stations upon request in markets in which they are providing any local-into-local service pursuant to the statutory copyright license. The revised rules also require carriage of all high-definition ("HD") signals in a market in which any station's signals are carried in HD. This requirement will be phased in over a four-year period.

StatLink http://dx.doi.org/10.1787/626002832402

Table 6.12. Public service obligations of broadcasters

Australia	*Commercial broadcasters* • Broadcasters are required to develop, in conjunction with ACMA, codes of practice for each broadcasting sector (section 123 of BSA). • Section 1.26 of the Commercial Television Industry Code of Practice requires licensees to have in place adequate procedures to enable the timely and accurate broadcast of emergency information. • Broadcasters will, if the Minister so requires by notice in writing given to the licensee, broadcast, without charge, such items of national interest as are specified in the notice (Schedule 2, Part 3, Clause 7 (d) of the BSA). • The licensee will, if the Minister notifies the licensee in writing that an emergency has arisen which makes it important in the public interest that persons authorised by the Minister have control over matter broadcast using the licensee's broadcasting facilities, allow those persons access to and control over those facilities (Schedule 2, Part 3, Clause 7 (e) of the BSA). *Subscription broadcasters* The licensee will, if the Minister notifies the licensee in writing that an emergency has arisen which makes it important in the public interest that persons authorised by the Minister have control over matter broadcast using the licensee's broadcasting facilities, allow those persons access to and control over those facilities (Schedule 2, Part 6, Clause 10 (d) of the BSA). *Public broadcasters* • The ABC and SBS Charters require the national broadcasters to provide Australians with broadcasting services of a high standard that informed educate and entertain. The SBS has specific obligations in relation to multi-cultural and ethnic programming, while the ABC has obligations to provide broadcasting of an educational nature and to transmit services to countries outside of Australia, among other things. • The ABC must broadcast daily from each broadcasting location regular news services (section 27 of the ABC Act). • The ABC may be directed by the Minister to broadcast a particular matter if it would be in the national interest (section 78 of the ABC Act). *Internet* Nil.
Canada	*Cultural diversity* Programming services are required to describe their plans and activities with respect to the equitable employment and on-air representation of the following four designated groups: visible minorities, Aboriginal persons, women and persons with disabilities. Programming services are further required to implement initiatives to improve the on-screen presence and portrayal of ethno-cultural minorities, Aboriginal peoples and persons with disabilities. These requirements were expanded to include radio in late 2006. *Closed captioning* • As of May 2007 English- and French-language broadcasters will be required to caption 100% of their programmes over the broadcast day, with the exception of advertising and promos. This requirement will be subject to exceptions that take into account instances, but not patterns, of equipment/technical malfunctions and human errors that are beyond the broadcaster's control, or circumstances beyond the broadcaster's control where captioning may not be available. However, in light of the specific challenges associated with the captioning of French-language programming, the Commission is prepared to consider requests to tailor the 100% requirement, as necessary. In such cases, the onus will be on broadcasters to demonstrate that it is impossible to meet the 100% captioning requirement. Since 1999, the CRTC expects the French broadcasters to move towards the levels achieved by English-language broadcasters. The CRTC is exploring this with individual broadcasters at licence renewal time. • Specialty services are generally required to caption 90% of their programming including 100% of news. This requirement is currently under review.

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Table 6.12. Public service obligations of broadcasters *(continued)*

Canada *(continued)*	*Described video* • Terrestrial television stations are generally required to describe 2-3 hours per week of Canadian programming and expected to broadcast described versions of programming wherever available. • Pay and specialty services renewed since 2004 are generally required to describe 2 to 3 hours per week of Canadian programming, as appropriate to the nature of their service. *Codes* Radio, terrestrial television and specialty services must adhere to the following codes: Equitable Portrayal Code Broadcast code for advertising to children • Code for broadcast advertising of alcoholic beverages • Journalistic Independence Code Terrestrial television and specialty services must also adhere to the Code regarding violence in television programming Pay television, pay-per-view (PPV) and video-on-demand (VOD) services must adhere to the following codes: • Equitable Portrayal Code • Industry code of programming standards and practices governing pay, pay-per-view and video-on-demand services • Pay Television and Pay-Per-View Programming Code Regarding Violence All private radio and television services (including terrestrial, specialty, pay, PPV and VOD services) that are members of the Canadian Broadcast Standards Council (a self-regulatory body approved by the CRTC), also adhere to the following codes: • the Canadian Association of Broadcasters' Code of Ethics • the Radio and Television News Directors' Association (RTNDA) Code of Journalistic Ethics *Contributions to support Canadian talent and production* • Radio – must contribute funds to support Canadian content development (CCD) (previous called Canadian talent development). Effective 1 September 2008, commercial radio operators must make basic minimum annual contributions to CCD initiatives. The contribution amount is graduated and based on the station's previous year's revenues. • PPV, VOD and most pay and specialty analog and digital category 1 services must contribution a % of their total revenues to the creation of Canadian programming. • Cable distributors – must contribute 5% of revenues to the creation of Canadian programming • DBS – must contribute 5% of revenues to the creation of Canadian programming, including the 0.4% of revenues to support the production of small market, local television programming These obligations do not apply to video content over the Internet.
Czech Republic	According to the Act No. 235/2006 Coll., Act No. 127/2005 Coll., and according to other enactments each broadcaster operating in the Czech Republic has to obtain a programme license from the RRTV Council at first. This state has not been fundamentally changed from 1991 for private license content broadcasters. Two amendments of the Act on broadcasting in 2001 and 2006 should optimize a complicated process of licensing of "private license content broadcasters" towards new technologies. A difference between channels broadcast by means of T, C, S subsists in "technical license" which is granted by the CTO: • for T as "individual license for radio frequencies using" (according to ZEK, § 17), • for C and S the licensing is solved en bloc in the form of so called "general authorisation" (how is established in ZEK, §9 and §10). This procedure is similar to that one being used in legislation before ZEK. For retransmission channels broadcast a subject sends in an "application for registration" having a legal claim to do it. "Technical license" is also a mere registration (according to paragraphs of ZEK mentioned above).

Table 6.12. Public service obligations of broadcasters *(continued)*

Czech Republic *(continued)*	Public service obligations of the Czech Television (CTV) broadcaster are the following: 1. the CTV shall provide a service to the public by creating and distributing television channels or other multimedia content and accessory services on the whole territory of the Czech Republic (hereinafter referred to as "public service remit in the field of television broadcasting"). 2. The main public service tasks in the field of television broadcasting include in particular: • providing objective, verified and diverse information, balanced as a whole, providing a balanced offer of programmes that is targeted at all groups of the population; • fostering general legal awareness among the population of the Czech Republic; • producing and broadcasting programmes, especially news, current affairs, documentaries, art programmes, drama, sports, entertainment and educational programmes as well as programmes for children and youth; • creating archive collections and files and maintaining them; • providing teletext services. Similar duties also belong to Czech Radio. The ZEK has been amended by Act No. 304/2007(which modifies some acts in connection with the transition to digital TV broadcasting). Act No. 304/2007 has been in force since 1 January 2008 and adjusts procedures. For example, it: • brings liberalisation of TV market as to granting of licences for digital terrestrial TV broadcasting so that it will be based on the same principles as for CATV and Sat broadcasting (registration); • includes a possibility for current analogue terrestrial TV broadcasters to obtain a bonus licence in a case of their agreement with the TPP; • modifies the possibility how to include an adopted broadcasting within digital terrestrial TV broadcasting networks; • determines a payment method for digital TV and R operators (according to a data stream usage share); • determines obligations for multiplex operator; • determines values of basic characteristics which must be included into TPP (switch-off deadline of 31 December 2012 and minimum coverage provided at this time).
Denmark	DR's obligations are more detailed in the new 2007-2010 contract consultable at: *www.mediesekretariatet.dk/drpscontract.htm* Also, a public service value test is now included. TV 2 now has fewer obligations than DR, and TV 2 receives no state aid. Cable and DBS have no public service obligations.
Finland	Public service obligations are enacted in the Act on *Yleisradio Oy*. The company (Yleisradio) shall be responsible for the provision of comprehensive television and radio programming with the related additional and extra services for all citizens under equal conditions. These and other content services related to public service may be provided in all telecommunications networks. The public service programming shall in particular: 1. support democracy and everyone's opportunity to participate by providing a wide variety of information, opinions and debates as well as opportunities to interact; 2. produce, create and develop Finnish culture, art and inspiring entertainment; 3. take educational and equality aspects into consideration in the programmes, provide an opportunity to learn and study, give focus on programming for children, and offer devotional programmes; 4. treat in its broadcasting Finnish-speaking and Swedish-speaking citizens on equal grounds and produce services in the Sami, Romany, and sign languages as well as, where applicable, in the languages of other language groups in the country; 5. support tolerance and multiculturalism and provide programming for minority and special groups; 6. promote cultural interaction and provide programming directed abroad; and 7. broadcast official announcements, for which further provisions shall be issued by decree, and make provision for television and radio broadcasting in exceptional circumstances

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Table 6.12. Public service obligations of broadcasters *(continued)*

France	The missions of the television services managed by the public audiovisual communication sector are enumerated in Article 43-11 of the Act of 30 September 1986 amended on freedom of communication. National programme providers "(…) shall carry out public service missions in the general interest. They shall provide all sections of the public with a range of programmes and services characterised by diversity and pluralism, the pursuit of quality and innovation, and respect for human rights and the democratic principles defined in the Constitution. They shall provide a varied selection of analogue and digital programmes in the fields of information, culture, education, entertainment and sport. They shall foster democratic debate, exchanges between different sections of the population, social inclusion and citizenship. They shall promote the French language and showcase the regional and local diversity of the cultural and linguistic heritage of France. They shall take initiatives to promote social cohesion, cultural diversity and the fight against discrimination and shall provide programming that reflects the diversity of French society. They shall contribute to the development and broadcasting of intellectual and artistic works and civic, economic, social, scientific and technical knowledge, and to educating the public on audiovisual and media issues. They shall make appropriate arrangements to facilitate access to their programmes by deaf and hearing-impaired persons. They shall ensure the integrity, independence and pluralism of news provision and the pluralist expression of various currents of thought and opinion in accordance with the principle of equal treatment and with the recommendations of the *Conseil supérieur de l'audiovisuel*. The public-sector audiovisual operators, in carrying out their missions, shall contribute to audiovisual activity outside France, to the prestige of the French-speaking world and to the spread of French culture and the French language throughout the world. They shall seek to develop new services to enrich or extend their programmes, and new technology for the production and broadcasting of audiovisual programmes and services". For each public service programme, these obligations are then laid down in specifications issued by decree.
Germany	In its services and programme streams public service broadcasting must provide a comprehensive overview of international, European, national and regional affairs in all significant areas of life. Its service must provide information, education, advice and entertainment. In particular, it must provide contributions about culture. Public service broadcasting is liable to the principles of objectivity of reporting and diversity of opinions. The different elements of programmes and services have to be provided in a balanced way. Private broadcasters should basically give expression to the diversity of opinions. Cultural elements of the programme should be taken account of in the licensing procedure. RTL and Sat1 have to broadcast information on political, economic, social and cultural life in the Länder as well. The transmission of major events of significant importance for society must be freely receivable. There have not been any changes in the last two years. These obligations also apply to providers of video content over the internet, as far as it is defined as broadcasting. Telemedia have to comply with general legal obligations (*i.e.* constitutional law, criminal law) only. Major changes are expected in the public service broadcasting sector, as soon as the 12th amendment of the Interstate Agreement on Broadcasting will enter into force.

Table 6.12. Public service obligations of broadcasters *(continued)*

Italy	Law 112/04 introduced a reform of public service broadcasters that provides for new provisions in three main areas: 1. Obligation to have accounting separation between public service activities and commercial activities (RAI is funded both through advertising revenues and licence fees). The contents of public service obligations are defined specifically by the law and will have to be further detailed by a joint decision by the Ministry and the AGCOM (§ art. 17 of law 112/04) 2. The PBS is given a specific "universal service" mission in the transition to DTT: RAI has to set up two multiplexes (one of which specifically devoted to public service content) with a coverage of 70% of the population. 3. A redefinition of the governance structure: RAI will be turned into a public company with stocks offered on the market. Privatisation timetable will be decided by a government committee. The board (9 members) will be elected by the shareholders assembly. No subject will be allowed to hold more than 1% of the shares. Legislative decree no. 177 of 31 July 2005 (Consolidated Act on Broadcasting) has confirmed such obligations. No modifications for the PBS obligations have taken place since then. Since no broadcaster has any PBS obligation over the Internet, the aforementioned obligations do not apply in that environment. Moreover, the RAI's Service Contract details the obligations established by Italian law and, in certain cases, establishes additional responsibilities. The 2007-2009 Service Contract signed by Rai and the Italian Ministry of Communications on 5 April 2007 includes: • Multimedia offering (Article 6): the contract governs Rai's commitments in terms of defining a strategy for the development of programming production and broadcast rights on the various platforms (digital terrestrial broadcasting, satellite, IPTV, mobile TV, Internet etc.) in line with its market position and its role as general public service broadcaster. • Digital terrestrial broadcasting (Articles 21-27): the Contract defines the path that Rai – based on the provisions of EU and Italian legislation and in observance of the provisions approved by the various competent authorities – is required to follow in the broader transition from analogue to digital technologies both directly and by participating in appropriate associations, consortiums, or companies with the other market players.
Japan	The purpose of NHK is to conduct high-quality domestic broadcasting and programming for the public welfare or to entrust its programs to broadcasters in such a manner that they may be received all over Japan, and to conduct business necessary for the development of broadcasts and reception and at the same time to conduct international broadcasting and NHK's international broadcast programming operations. (Broadcasting Law Article 7) These obligatins do not apply to providers of video-on-demand over the Internet.
Korea	1. Broadcasting must respect the dignity and worth of the human being and democratic order. 2. Broadcasting must contribute to social harmony, harmonious national development and the formation of democratic public opinion. Broadcasting must not incite discord by region, generation, social stratum or sex. 3. Broadcasting must not damage the honour of others or violate human rights. 4. Broadcasting must not incite crime, immoral acts or speculation. 5. Broadcasting must not incite lewd behaviour, corruption or violence that have adverse effects on families or youth. There are no changes since January 2006. These obligations do not apply to providers of video content over the Internet.
Luxembourg	The public service obligation of the CLT-UFA consists in providing a daily television schedule mainly in the Luxembourgish language. The public service obligation convention was re-endorsed in 2007 until 2020. The diffusion of daily news programmes and cultural programmes are included among other obligations.

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Table 6.12. Public service obligations of broadcasters *(continued)*

Mexico	*Terrestrial television* Public service obligations of broadcasters have not been affected or modified by the reform of the Federal Laws on Telecommunications and Broadcasting that were published in the Official Gazette on 11 April 2006. According to Article 59 of the Federal Radio and Television Law, television stations must broadcast free daily transmissions of a length up to 30 continuous or discontinuous minutes on educative, cultural and socially oriented topics. The Federal Executive will indicate the government area that will provide the material for such broadcasts, and the emissions will be co-ordinated by the National Radio and Television Council. Article 60 of the cited Law establishes that private licences and permits are obligated to broadcast freely and preferably: 1. Bulletins of any authority related to national security or territorial defense, preservation of public order, or measures to foresee any public calamity; 2. Messages or any advice related to ships or aircraft in danger and requesting help. Article 62 of the same law says that every radio and television station is obliged to carry emergency reports when necessary, by judgment of the Secretary of Government. Those obligations do not apply to providers of video content over the internet.
Netherlands	These obligations apply to public service broadcasters, regardless of the platform used for transmission of the programmes. *Section 13c* 1. The tasks of public broadcasting shall be: a) to provide a varied and high-quality range of programme services for general broadcasting purposes at national, regional and local level in the fields of information, culture, education and entertainment and to transmit them, or cause them to be transmitted, on open networks; b) to perform all the activities relating to programme service provision and transmission required for that purpose; c) to provide and transmit programme services intended for countries and regions outside the Netherlands and for Dutch people residing outside the territory of the Netherlands. 2. Public broadcasting programme services shall provide a balanced picture of society and of people's current interests and views pertaining to society, culture, religion and belief, and: a) shall be accessible to the entire population in the area for which the programmes are intended; b) shall contribute to the development and dissemination of the socio-cultural diversity of the Netherlands; c) shall be independent of commercial influences and, subject to the provisions laid down by or pursuant to the law, of government influence; and d) shall be aimed at a broad audience and at population and age groups of varying size and composition. 3. Public broadcasting may perform the tasks referred to in subsection 1, inter alia, by providing and disseminating programme material in ways other than those referred to in subsection 1 (a). *Section 50* 1. The total television broadcasting time of all the broadcasting associations together shall be used to provide a complete programme service, which must at least include programmes of a cultural, informative, educational and entertaining nature. 2. Without prejudice to subsection 1, at least 25% of the broadcasting time referred to in subsection 1 shall be used each year cultural programmes and at least 35% for programmes of an informative or educational nature. Some of the programmes of a cultural nature, equivalent to at least 12½% of the total television broadcasting time used by all the broadcasting associations together, shall consist of or relate to the arts. 3. If more than half the content of a programme of an informative, educational or entertaining nature is also of a cultural nature, this programme may be included when calculating the percentage of programming of a cultural nature referred to in the preceding subsection.

Table 6.12. Public service obligations of broadcasters *(continued)*

Netherlands *(continued)*	4. The educational broadcasting establishment shall use all its broadcasting time to provide an educational programme service. 5. Religious organisations shall use all their broadcasting time to provide a religious programme service. 6. Spiritual organisations shall use all their broadcasting time to provide a programme service dealing with spiritual matters. 7. Political parties shall use all their broadcasting time to provide a programme service dealing with political matters. *Section 51* 1. On each television programme service network, no more than 25% of the total broadcasting time on that network of broadcasting establishments which have obtained national broadcasting time shall be devoted to entertainment programmes. 2. Subject to the co-ordination regulation referred to in section 19a, subsection 1 (f), the board of directors shall ensure that the broadcasting time on the television programme service networks is used in accordance with subsection 1. *Section 52* 1. The programmes of establishments which have obtained broadcasting time shall not include any advertising messages unless this is expressly permitted by this Act. 2. Furthermore, the programmes referred to in subsection 1 shall not include any other advertising expressions except where this is unavoidable. Provisions regarding the cases in which an advertising expression in a programme service is to be regarded as unavoidable as well as provisions as to when the presence of advertising expressions in a programme service is permitted may be laid down by Order in Council. 3. In special cases, Our Minister may waive application of the provisions of the first sentence in subsection 2. He may decide to delegate this power to the Media Authority. 4. Without the consent of the Media Authority, programmes of establishments which have obtained broadcasting time shall not include any messages in connection with attracting new members, association activities or any sideline activities. *Section 52a* 1. Programmes of establishments which have obtained broadcasting time shall not be sponsored. 2. Subsection 1 shall not apply to: a) programmes of a cultural nature; b) programmes consisting of a report on or coverage of one or more sporting events or sporting competitions; c) programmes consisting of a report on or coverage of events for charity purposes. 3. Programmes as referred to in subsection 2 shall not be sponsored if: a) they consist wholly or in part of news, current affairs or political information; or b) are specifically aimed at minors under the age of twelve. *Section 54* 1. At least 50% of the total broadcasting time on each television programme service network of broadcasting establishments which have obtained national broadcasting time shall be devoted to programmes which may be qualified as European works within the meaning of article 6 of the European Directive. 2. At least 25% of the total broadcasting time of broadcasting establishments which have obtained national broadcasting time shall be devoted to programmes of the kind referred to in subsection 1 which may be considered independent works. At least 17½% of the total broadcasting time on each television programme service network shall be devoted to programmes as referred to in the previous sentence. Programmes shall be considered independent works if they have not been produced by: a) an establishment which has obtained national broadcasting time, or another establishment which provides a programme service; b) a legal person in which an establishment which provides a programme service holds either directly or through one or more of its subsidiaries an interest of at least 25%;

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Table 6.12. Public service obligations of broadcasters *(continued)*

Netherlands *(continued)*	c) a legal person in which two or more establishments which provide a programme service hold either directly or through one or more of their respective subsidiaries a joint interest of more than 50%; or d) a company in which an establishment which provides a programme service, or one or more of its subsidiaries, is as a partner fully liable towards the company's creditors for its debts. 3. Further rules may be laid down by Order in Council concerning the application of subsection 2 and rules may be laid down on the basis of which, in cases other than those referred to in subsection 2 (a to d), programmes shall be considered independent works. 4. For the purposes of this section, the following television programmes shall be disregarded: a) programmes consisting of news; b) programmes relating to sport; c) programmes which have the character of a game, with the exception of programmes of a cultural or educational nature which also have the character of a game; d) the nationally broadcast teletext programme service. 5. This section shall not apply to the broadcasting time of the Radio and Television Advertising Foundation, government agencies, religious and other spiritual organisations and political parties. 6. Establishments which have obtained regional broadcasting time shall devote at least 50% of their broadcasting time to programmes which may be considered European works within the meaning of article 6 of the European Directive. Establishments which have obtained regional broadcasting time shall devote at least 10% of their broadcasting time to programmes as referred to in the previous sentence which may be considered independent works. Subsection 2, third sentence and (a) to (d), and subsections 3 to 5 shall apply mutatis mutandis. 7. Subject to the co-ordination regulation referred to in section 19a, subsection 1 (f), the board of directors shall ensure that the use of the broadcasting time satisfies the provisions laid down by or pursuant to subsections 1 to 5. *Section 54a* 1. Establishments which have obtained broadcasting time shall devote at least 50% of their television broadcasting time to programmes originally produced in the Dutch or Frisian language. 2. Subsection 1 shall not apply to the Radio and Television Advertising Foundation, government agencies, religious or other spiritual organisations and political parties. 3. It may be laid down by Order in Council what percentage of the total broadcasting time of broadcasting establishments which have obtained national broadcasting time, with the exception of the Radio and Television Advertising Foundation, should consist of programmes as referred to in subsection 1, which are provided with subtitles for people who are hard of hearing. 4. Subject to the co-ordination regulation referred to in section 19a, subsection 1 (f), the board of directors shall ensure that the broadcasting time is used in accordance with the provisions laid down by or pursuant to subsection 3. *Section 55* 1. Without prejudice to the provisions of sections 26, 43a, 52 and 52b, establishments which have obtained broadcasting time shall not use any of their activities in the service of realising profits for third parties. If so requested, they shall prove this is the case to the satisfaction of the Media Authority. 2. If an establishment intends to enter into an agreement with an employee, a member of the board of the establishment or someone who shares a home with such a person, or with a legal person in which one or more of said persons have a (joint) financial interest of at least 10% or have rights to bonus distribution or a share in the profit, and the said agreement does not relate to the relationship between that establishment and the person in question in his or her capacity as an employee or a member of the board, the establishment shall report this in writing to the Media Authority and submit the draft agreement. Agreements of this kind shall be concluded in writing. 3. In the case of the educational broadcasting establishment, government agencies, religious or other spiritual organisations and political parties, the provisions of the preceding subsections shall apply exclusively to those of their activities which are related to the provision of their radio and television programmes.

Table 6.12. Public service obligations of broadcasters *(continued)*

New Zealand	Public service obligations apply only to Public broadcasters (not to private broadcasters). Television New Zealand is required to implement the public service Charter as described in the Television New Zealand Act 2003. The Charter (as follows) applies to all those parts of TVNZ's operations that contribute to its broadcast content. It shall be predominantly fulfilled through free-to-air broadcasting. In programming for particular audiences, TVNZ is to consider all relevant provisions of the Charter. a) TVNZ will— i) feature programming across all genres that informs, entertains, and educates New Zealand audiences; ii) strive always to set and maintain the highest standards of programme quality and editorial integrity; iii) provide shared experiences that contribute to a sense of citizenship and national identity; iv) ensure in its programmes and programme planning the participation of Māori and the presence of a significant Māori voice; v) feature programming that serves the varied interests and informational needs and age groups within New Zealand society, including tastes and interests not generally catered for by other national television broadcasters; vi) maintain a balance between programmes of general appeal and programmes of interest to smaller audiences; vii) seek to extend the range of ideas and experiences available to New Zealanders; viii) play a leading role in New Zealand television by setting standards of programme quality and encouraging creative risk-taking and experiment; ix) play a leading role in New Zealand television by complying with free-to-air codes of broadcasting practice, in particular any code with provisions on violence; x) support and promote the talents and creative resources of New Zealanders and of the independent New Zealand film and television industry. b) In fulfilment of these objectives, TVNZ will— i) provide independent, comprehensive, impartial, and in-depth coverage and analysis of news and current affairs in New Zealand and throughout the world and of the activities of public and private institutions; ii) feature programming that contributes towards intellectual, scientific, cultural, and spiritual and ethical development that reflects the diverse beliefs of New Zealanders, promotes informed and many-sided debate, and stimulates critical thought, thereby enhancing opportunities for citizens to participate in community, national, and international life; iii) in its programming enable all New Zealanders to have access to material that promotes Māori language and culture; iv) feature programmes that reflect the regions to the nation as a whole; v) promote understanding of the diversity of cultures making up the New Zealand population; vi) feature New Zealand films, drama, comedy, and documentary programmes; vii) feature programmes about New Zealand's history and heritage, and natural environment; viii) feature programmes that serve the interests and informational needs of Māori audiences, including programmes promoting the Māori language and programmes addressing Māori history, culture, and current issues; ix) include in programming intended for a mass audience material that deals with minority interests; x) feature New Zealand and international programmes that provide for the informational, entertainment, and educational needs of children and young people and programmes that allow for the participation of children and young people;

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Table 6.12. Public service obligations of broadcasters *(continued)*

New Zealand *(continued)*	xi) maintain and observe a code of ethics that addresses the level and nature of advertising to which children are exposed; xii) feature programmes that encourage and support the arts, including programmes featuring New Zealand and international artists and arts companies; xiii) reflect the role that sporting and other leisure interests play in New Zealand life and culture; and xiv) feature programming of an educational nature that supports learning and the personal development of New Zealanders." TVNZ also has the following further objective in carrying out its functions: to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates and by endeavouring to accommodate or encourage those interests when able to do so. Radio New Zealand is required to implement the public service Charter as described in the Radio New Zealand Act 1995. The Charter establishes that the functions of the public radio company shall be to provide innovative, comprehensive, and independent broadcasting services of a high standard and, without limiting the generality of the foregoing, to provide— a) Programmes which contribute towards intellectual, scientific, and cultural[, spiritual, and ethical] development, promote informed debate, and stimulate critical thought; and b) A range of New Zealand programmes, including information, special interest, and entertainment programmes, and programmes which reflect New Zealand's cultural diversity, including Māori language and culture; and c) Programmes which provide for varied interests [and a full range of age groups] within the community, including information, educational, special interest, and entertainment programmes; and d) Programmes which encourage and promote the musical, dramatic, and other performing arts, including programmes featuring New Zealand and international composers, performers, and artists; and e) A nationwide service providing programming of the highest quality to as many New Zealanders as possible, thereby engendering a sense of citizenship and national identity; and f) Comprehensive, independent, impartial, and balanced national news services and current affairs, including items with a regional perspective; and g) Comprehensive, independent, impartial and balanced international news services and current affairs; and g(a) an international radio service to the South Pacific (``Radio New Zealand International''), which may include a range of programmes in English and Pacific languages; and] h) Archiving of programmes which are likely to be of historical interest in New Zealand. In providing broadcasting services, the public radio company shall take account of— a) Recognised standards of excellence; and b) Its responsibility as the provider of an independent national broadcasting service to provide a balance between programmes of wide appeal and programmes of interest to minority audiences; and c) The broadcasting services provided by other broadcasters; and d) surveys, commissioned annually, of persons who are members of its current audiences to establish whether those members consider that the quality and quantity of its services are being maintained in accordance with subsection (1); and] e) surveys, commissioned from time to time, of persons who are not members of its current audiences. The public service obligations of the Māori Television Service are outlined in the Māori Television Service Act 2003 (Te Aratuku Whakaata Irirangi Māori). The principal function of the Service is to promote te reo Māori me ngā tikanga Māori through the provision of a high quality, cost-effective Māori television service, in both Māori and English, that informs, educates, and, in doing so, enriches New Zealand's society, culture, and heritage. The Service must also:

Table 6.12. Public service obligations of broadcasters *(continued)*

New Zealand *(continued)*	a) ensure that during prime time it broadcasts mainly in te reo Māori; and b) ensure that at other times it broadcasts a substantial proportion of its programmes in te reo Māori; and c) ensure that, in its programming, the Service has regard to the needs and preferences of – (i) children participating in te reo Māori immersion education; and (ii) all persons learning te reo Māori; and d) provide broadcast services that are technically available throughout New Zealand and practicably accessible to as many people as is reasonably possible. NiuFM, is operated by the National Pacific Radio Trust. The Trust's Deed incorporates a number of public broadcasting objectives. Both the Television New Zealand and Radio New Zealand charters have been reviewed in the past year but await legislative amendment.
Norway	The NRK and TV 2 are subject to PSB obligations. The NRK's PSB obligations were summed up as follows in a recent green paper to the Storting. The obligations will be integrated into the NRK's articles of association: 1. Supporting and strengthening democracy a) The purpose of the NRK's overall public media services is to meet democratic, social and cultural needs in society. b) The NRK should promote public debate and play its part in ensuring that the entire population receives sufficient information to enable it to actively participate in democratic processes. c) A task of the NRK is to uncover censurable circumstances and help to protect individuals and groups against abuse or neglect on the part of public authorities and institutions, private undertakings or others. d) The NRK should be editorially independent. The NRK should safeguard its integrity and credibility in order to act freely and independently in relation to persons or groups who for political, ideological, economic or other reasons wish to influence its editorial content. The NRK should be characterised by a high ethical standard and show balance over time. Objectivity, an analytical approach and neutrality should be striven for; see inter alia the Guiding Principles for Editors, the Code of Ethics of the Norwegian Press and the Code of Ethics for Printed Advertising and Sponsoring. 2. Ensuring universal availability a) The NRK's three main channels for respectively radio and television should be universally available. The NRK should strive for the broadest possible distribution of its other programme services. b) Payment should not as a rule be required for the NRK's public media services. The NRK's three main channels for respectively radio and television should be available free of charge to all licence payers on at least one delivery platform. c) In the designing of the NRK's services, consideration must be given to disabled persons, for example by subtitling television programmes. d) The Corporation should be present, and develop new services, on all important media platforms so as to achieve the broadest possible outreach for its overall programme services. e) The NRK should as far as possible use open standards, unless economic or qualitative considerations militate against this. 3. Strengthening Norwegian language, identity and culture a) The NRK should reflect the geographical diversity of Norway and maintain a good local service offering and local presence. b) The NRK should help to strengthen Norwegian and Sami language, identity and culture. A large portion of its offering should be anchored in and reflect Norwegian realities. The NRK should cater for minorities. c) The NRK should disseminate knowledge and information about Norwegian society and mirror its diversity. The NRK should create arenas for debate and information about Norway as a multi-cultural society.

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Table 6.12. Public service obligations of broadcasters *(continued)*

Norway *(continued)*	d) The NRK's services should have mainly Norwegian-language content. Both official language forms should be used. At least 25% of the programme content should be in 'New Norwegian'. e) The NRK has an obligation to disseminate content which is either produced in, or whose subject matter has a basis in, Norway's regions. f) The NRK should disseminate Norwegian culture and a broad variation of Norwegian artistic idioms from many different artists, independent providers and public cultural institutions. g) The NRK should disseminate and produce Norwegian music and drama. The NRK should disseminate Norwegian films and stimulate the Norwegian film industry. At least 35% of the music played should be Norwegian. The NRK should have a resident orchestra. h) The NRK should disseminate Norway's cultural heritage. The NRK's archive is a part of this heritage. The Corporation should aim to digitalise the archive and make it available to the population. Access to the archive should be largely free of charge. i) The NRK should reflect Norway's religious heritage and the diversity of belief systems and religions in Norway. 4. Striving for high quality, diversity and innovation a) The NRK should offer services which can be a source of inspiration, reflection, experience and knowledge through programmes of high quality. b) The NRK should be innovative and promote quality development. c) The NRK should be able to disseminate the same type of services as are provided by commercial actors, but should strive to impart to its services an element of public value beyond that provided by commercial services. d) The NRK's services should display a breadth of themes and genres. e) The NRK should offer news, current affairs and cultural programmes for niche groups and broad audiences alike. The services should reflect the diversity present in the population. The NRK's overall offering should appeal to all age groups. f) The NRK should promote knowledge and understanding of international affairs. g) The NRK should disseminate content from the Nordic region and promote knowledge and understanding of Nordic social conditions, culture and languages. h) The NRK should contribute to public education and learning. i) The NRK should promote children's right to freedom of expression and to information, and protect children from harmful content. 5. Non-commercial public media services a) The NRK's editorial decisions should not be governed by commercial considerations. b) The NRK's public media services on radio, television and teletext should be advertisement free and should not contain promotional references to the Corporation's commercial services and products. c) The NRK's web pages can contain advertisements, except pages whose target group is children. The NRK should strive for the clearest possible distinction between public media services and commercial services offered on the internet. Downloading services offered in public service media should not contain advertisements. d) Licence receipts and other public revenues should not subsidise commercial activities. There must be a clear separation between the accounts and operations of the NRK's commercial activities and its public service media activities. e) The NRK's public media services, both its traditional programming and new media services, should be mainly financed by licence fees. f) The NRK may further develop profit-generating commercial services to help finance its public media services. The NRK's business activity should be consistent with the requirements of quality and integrity that apply to the Corporation. The NRK's PSB obligations apply regardless of delivery platform (terrestrial television, cable and DBS). The above clarifies what obligations pertain to content over the Internet etc. The private public broadcaster TV2's licence includes PSB obligations (licence expires 31 December 2009) *inter alia* on:

Table 6.12. Public service obligations of broadcasters *(continued)*

Norway *(continued)*	- editorial independence; - general language requirement (minimum 50% in Norwegian); - general requirement as to variety in programming; - daily news offering (in-house production); - regular current affairs programmes and documentaries; - daily children's (ages <12) programmes in Norwegian; - regular programmes for youth (> 12) in Norwegian; - the offering should also include some Norwegian-language drama, Cultural programming, programmes for the Sami population (primarily in Sami), ethnic minorities and religious programmes; - subtitling for the hard of hearing between 18:00-22:00. TV 2's PSB obligations apply regardless of delivery platform (terrestrial television, cable and DBS).
Poland	Public service obligations are imposed on public service broadcasters. According to the Broadcasting Act public radio and television are obliged to carry out the public mission. The definition of "public mission", complies with guidelines included in the "Protocol on the System of Public Broadcasting in the Member States" as well as in the "Communication from the Commission on the Application of State Aid Rules to Public Service Broadcasting". Art 21 of the Broadcasting Act specifies obligation of public broadcasters: 1. Public radio and television shall carry out their public mission by providing, on terms laid down in this Act, the entire society and its individual groups with diversified programme services and other services in the area of information, journalism, culture, entertainment, education and sports which shall be pluralistic, impartial, well-balanced, independent and innovative, marked by high quality and integrity of broadcast. 1a.The tasks of public radio and television arising out of the implementation of the mission referred to in paragraph 1 shall include in particular: 1) production and transmission of national and regional programme services, programme services for reception abroad in the Polish language and in other languages as well as other programme services meeting the democratic, social and cultural needs of local societies, 2) production and transmission of thematic programme services, if a broadcasting licence has been granted for transmission of the said programme service, 3) construction and operation of radio and television transmitters and relay stations, 4) transmission of teletext services, 5) work on new technologies of production and transmission of radio and television programme services, 6) production, provision of services and carrying out commercial activities related to audiovisual production, including exports and imports, 7) encouraging artistic, literary, scientific and educational activities, 8) dissemination of knowledge of Polish language, 8a) paying due regard to the needs of national and ethnic minorities and communities speaking regional languages, including broadcasting news programmes in the languages of national and ethnic minorities and in regional languages; 9) production of educational programmes and ensuring access by people of Polish descent and Poles living abroad to such programmes.

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Table 6.12. Public service obligations of broadcasters *(continued)*

Portugal	*General obligations of public and commercial television broadcasters (article 34 of the Television Broadcasting Act), applicable to terrestrial, cable and DBS channels:* All television operators shall guarantee in their programming, namely by means of self-regulatory practices, the respect for broadcasting ethics, particularly with regard to respect for human dignity, for fundamental rights and other constitutional values, specially the personality development of children and adolescents. The following shall be deemed as general obligations for all television operators that operate general television programme services of a national coverage: a) To ensure a varied and plural programming, including during time periods of a major audience; b) To guarantee information that observes pluralism, accurateness and independence; c) To guarantee programming and information that is independent from political and economic powers; d) To issue announcements the disclosure of which is requested by the President of the Republic, the President of the Assembly of the Republic and the Prime Minister, in case a state of siege or of emergency is declared; e) To ensure the right to broadcast time during electoral periods, as provided for in the Constitution and in the law; f) To guarantee the right to reply and to rectification as provided for in the Constitution and in the law; g) To broadcast creative European works, namely in Portuguese language, and to participate in the development of their production, as provided for in the law. The Regulatory Entity for the Media shall define, having heard television operators, the set of obligations that shall enable people with special needs to follow broadcasts, namely by means of subtitling, sign language, audio-description and other techniques deemed appropriate, based on a multiannual plan providing for their gradual implementation, taking into account technical and market conditions assessed by that regulatory entity at any given time. *Specific obligations for the public service television broadcaster (Article 51)* The concessionaire of the public television service shall present programmes that promote the cultural and civic education of viewers, allowing access of all to information, culture, education and quality entertainment. In particular, the concessionaire is responsible for: a) Providing varied and comprehensive programmes that promote cultural diversity and take into account the interests of minority groups; b) Promoting public access to Portuguese cultural events and guaranteeing an appropriate informative coverage thereof; c) Providing independent, accurate, pluralist and context related information, that ensures news coverage of the main national and international events; d) Ensuring the production and transmission of educational and entertainment programmes intended for young people and children, in order to contribute towards their education; e) Ensuring the broadcast of cultural, educational and informative programmes for specific audiences, including those of the different immigrant communities in Portugal; f) Taking part in educational activities for the media, namely ensuring the broadcast of programmes targeted at this objective; g) Promoting the broadcast of programmes in Portuguese, of varied types, and reserving to European production a considerable time of its transmission time, dedicating thereto rates that are higher than those required herein from all television operators, given the purpose of each programme service; h) Supporting national production of cinematographic and audiovisual works, in line with international commitments binding on the Portuguese State, and co-production with other countries, especially European and Portuguese-speaking countries; i) Broadcasting programmes intended especially for Portuguese people resident outside Portugal and for nationals of other Portuguese-speaking countries also resident outside Portugal;

Table 6.12. Public service obligations of broadcasters *(continued)*

Portugal *(continued)*	j) Ensuring that people with special needs are able to follow transmissions, namely through subtitling, sign language, audio-description and other techniques deemed appropriate, and that programmes specifically aimed at this audience are transmitted, according to the schedule defined in the multi-annual plan, which shall take into account the specific responsibilities of the public service, provided for in the respective concession contract; k) Guaranteeing the right to broadcast time and to political reply, under the Constitution and the law; l) Broadcasting any announcements requested by the President of the Republic, the President of the Assembly of the Republic or the Prime Minister; m) Allowing viewing time for the Public Administration, in order to disseminate information of general interest, particularly in matters of public health and safety. *The concession of the public television service must include:* a) A general programme service distributed simultaneously throughout the national territory, including the Autonomous Regions, which aims to meet the educational, informative, cultural and entertainment needs of the general public; b) A second general programme service distributed simultaneously throughout the national territory, including the Autonomous Regions, open to the participation of the civil society, which aims to meet the informative and entertainment needs, and specially the education and cultural needs of various public sections, including the minorities; c) Two television programme services intended respectively to the Autonomous Region of the Azores and the Autonomous Region of Madeira; d) One or more programme services aimed at Portuguese-speaking viewers resident abroad or in countries where Portuguese is an official language, promoting the affirmation, enhancement and defence of Portugal's image in the world. The obligations listed above do not apply to providers of video content over the Internet.
Spain	Pursuant to the enactment of Act 17/2006, dated 5 June on state-owned radio and television, the General Courts passed in December 2007 the first Framework Order for RTVE Corporation, with a nine-year duration, and which establishes the objectives regarding public service of the said corporation. In the exercise of its public service function, RTVE Corporation must: a) Foster knowledge and diffusion of constitutional principles and civic values. b) Ensure that information is objective, veracious and plural, that it meets the criteria of professional independence and political, social and ideological pluralism existent in our society, as well as the rule of making a distinction and separating, in a noticeable manner, information from opinion. c) Facilitate democratic debate and free expression of opinions. d) Promote democratic participation through the exercise of the right of access. e) Foster territorial cohesion, plurality and Spain's linguistic and cultural diversity. f) Impulse information exchange and mutual knowledge between the citizens of the EU Member States, regarded as a common space for coexistence. g) Edit and broadcast radio and television channels with international coverage which contribute to the overseas projection of Spanish languages and cultures and to the appropriate attention of Spanish citizens living overseas. h) Offer access to different genres of programmes and to institutional, social, cultural and sports events, addressed to all segments of the audience, paying special attention to topics of significant public interest. i) Promote knowledge and diffusion of Spanish cultural productions, and, in particular, audiovisual productions. j) Support social integration of minorities and attend to those social groups with specific necessities. k) Foster the protection and safeguard of equality between men and women, avoiding any form of discrimination between them. l) Promote knowledge of arts, science, history and culture.

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Table 6.12. Public service obligations of broadcasters *(continued)*

Spain *(continued)*	m) Spread knowledge of consumers' and end-users' rights, as well as develop procedures which ensure the right to answer. n) Foster the production of European audiovisual contents, as well as contents in languages original from Spain, as a contribution to the development of Spanish and European cultural industries. o) Watch over the conservation of historical audiovisual records. p) Seek the goal of attending to the widest audience, ensuring the maximum continuity and geographical and social coverage, with the commitment of offering quality, diversity, innovation and ethical exigency. q) Promote peace values. r) Promote knowledge, safeguard and respect of ecological and protection of the environment values. s) Preserve minors' rights. The function of RTVE Corporation regarding public service also includes contributing to the development of the Information Society. For this purpose, it shall participate in technological progress, using the various technologies and channels of diffusion. It shall also develop new related or interactive services, capable of enriching or completing its programmes offer and of bringing the different public Administrations closer to the citizens. Likewise, it shall foster measures in order to avoid any form of discrimination based on disability.
Switzerland	In its range of programmes, the public service broadcaster (SRG-SSR) must broadcast specific radio and television programmes in German, French and Italian. There is a radio programme in Rhaeto-Romanic (Switzerland's fourth national language) and several television programmes are produced in this language and broadcast on German-speaking channels. In carrying out its mandate, SRG-SSR must ensure the following: • to provide the entire population with a full range of radio and television programmes of equal value in the three official languages; • to promote understanding, cohesion and exchanges between different parts of the country, linguistic communities, cultures and social groups, and take into account the specific characteristics of the country and the needs of the cantons; • to strengthen the ties of Swiss.
Turkey	The public service obligations of broadcasters are set in Article 4 of Law no. 3984 (Broadcasting Standards). No amendments have been made since 2006. There are currently no differences in requirements for DTT, cable and DBS. Providers of video content over the Internet are not subject to these obligations.
United States	For terrestrial radio and television, rules regarding political broadcasting and programming for children apply: Political Broadcasting: Candidates for Public Office. In recognition of the particular importance of the free flow of information to the public during the electoral process, the Communications Act and the Commission's rules impose specific obligations on broadcasters regarding political speech. *1) Reasonable access.* The Communications Act requires that broadcast stations provide "reasonable access" to candidates for federal elective office. Such access must be made available during all of a station's normal broadcast schedule, including television prime time and radio drive time. In addition, federal candidates are entitled to purchase all classes of time offered by stations to commercial advertisers, such as preemptible and non-preemptible time. The only exception to the access requirement is for bona fide news programming (as defined below), during which broadcasters may choose not to sell airtime to federal candidates. Broadcast stations have discretion as to whether to sell time to candidates in state and local elections.

Table 6.12. Public service obligations of broadcasters *(continued)*

United States *(continued)*	*2) Equal opportunities.* The Communications Act requires that, when a station provides airtime to a legally qualified candidate for any public office (federal, state, or local), the station must "afford equal opportunities to all other such candidates for that office." The equal opportunities provision of the Communications Act also provides that the station "shall have no power of censorship over the material broadcast" by the candidate. The law exempts from the equal opportunities requirement appearances by candidates during bona fide news programming, defined as an appearance by a legally qualified candidate on a bona fide newscast, interview, or documentary (if the appearance of the candidate is incidental to the presentation of the subject covered by the documentary) or on-the-spot coverage of a bona fide news event (including debates, political conventions and related incidental activities). In addition, a station must sell political advertising time to certain candidates during specified periods before a primary or general election at the lowest rate charged for the station's most favored commercial advertiser. *Children's television programming.* Throughout its license term, every TV station must serve the educational and informational needs of children both by means of its overall programming and through programming that is specifically designed to serve those needs. Licensees are eligible for routine staff-level approval of the Children's Television Act portion of their renewal applications if they air at least three hours of "core" children's television programming, per week, or proportionally more if they provide additional free digital programming streams. The Commission clarified its children's programming rules in September 2006, to ensure an adequate supply of children's educational and informational programming as the Nation transitions to digital television technology, and to protect children from excessive and inappropriate commercial messages in broadcast and cable programming, without unduly impairing the scheduling flexibility of broadcasters and cable operators. In 2007, the Commission adopted a Report and Notice of Proposed Rulemaking on *Broadcast Localism* which set forth proposals to help ensure that broadcast stations offer programming responsive to the needs and interests of the communities that they are licensed to serve. Among other issues, the report proposes the establishment of advisory boards (including representatives of underserved community segments) in each station's community of license with which to consult periodically on community needs and issues; and revised processing guidelines for renewal applications that will ensure that all broadcasters provide some locally oriented programming.

StatLink http://dx.doi.org/10.1787/626024857438

ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Chapter 7

Main Trends in Pricing

Over the previous 18 years, residential users saw the real price of residential fixed-line phone service fall roughly 1% per year while business prices fell 2.5% per year. Mobile subscribers also benefitted from declining prices between 2006 and 2008. Broadband prices have fallen as well over the same time. OECD broadband prices declined significantly between 2005 and 2008 at an average rate of 14% per year for DSL and 15% for cable.

Introduction: prices overall

Prices for telecommunications services in competitive markets have tended to fall from year to year in real (and often nominal) terms. This trend continued through 2008 in OECD markets with mobile, fixed and broadband prices. Prices fell while services expanded.

In the past, consumers purchased single services from single providers so it was much easier to measure changes over time for a single service. The recent trend toward bundled services makes it increasingly difficult to separate out individual prices from service bundles increasingly offered by operators.

The commoditisation of certain telecommunication services (such as fixed-line voice) led operators to bundle these calls along with higher-margin services such as broadband and television. Bundling over fixed-line networks has been underway for several years but now operators increasingly include mobile services.

Competition in the fixed voice market from VoIP providers helped usher in an era of flat-rate fixed calling and lower call tariffs for consumers. But this significant drop in call prices has also hurt VoIP providers themselves. Vonage, one of the leading stand-alone VoIP services with 2.5 million subscribers, has incurred losses since its inception and the net losses tend to grow each quarter.[1] VoIP markets shifted over the last several years with most new growth coming from subscriptions where voice is bundled with broadband Internet access from cable and DSL providers.

Mobile prices also fell between 2006 and 2008. The average prices of the OECD mobile baskets fell by 21% for low usage, 28% for medium usage and 32% for the highest consumption level over the two-year period.

It is not only voice markets where prices have fallen. OECD broadband prices declined significantly over the previous three years. The OECD selected a "standard" broadband subscription from the incumbent DSL provider and one cable company and followed it between 2005 and 2008. The results show that prices declined an average of 14% per year for DSL and 15% for cable over the time period.

Package bundles

The bundling of services has helped boost the revenues of operators but the net welfare effect for consumers is more difficult to judge. The consumer publication *Consumer Reports* in the United States analysed triple-play offers and concluded that purchasing bundles could save users money if they did sufficient research and understood what they were signing up for. Specifically they found that consumers needed to take into account taxes, franchise fees, monthly rental charges, activation fees and termination penalties when considering offers.[2]

While prices are falling for individual services, the industry's move towards bundled pricing is making it more difficult for consumers to determine the prices of individual

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telecommunication services. Typical bundles offer fixed-voice, data, and video services and are commonly referred to as "triple play" packages. Now a number of operators are strengthening their packages by including mobile voice as a fourth component for what is called a "quadruple play" offer.

The addition of mobile to voice, video and data packages came slowly, possibly because of the different way households subscribed to each service. A typical household may only have one broadband, fixed telephone and television subscription. However, the same household could have multiple mobile subscriptions, one for each member of the household. In the past, triple-play offers were marketed to households and mobile offers more to individuals.

Mobile marketing, in particular, has changed over the previous few years and now focuses on families/households with packages designed with multiple users in mind. In some cases, subscribers in the same household can share a "bucket" of minutes, paying only a small fee for each additional telephone added to the plan. In other cases, mobile operators offer unlimited calling to a limited number of preselected lines each month. These new mobile family/household plans fit better with triple-play marketing already directed at entire households.

Quadruple play offers are commonly available from incumbent DSL providers since the majority of incumbent operators in the OECD also have mobile networks. Notable exceptions would be BT in the United Kingdom and Qwest in the United States. The lack of a mobile network can make quadruple play plans more difficult for operators to introduce into markets.

Competitive fixed-line and cable providers are beginning to make use of MVNOs to offer quadruple play services as a way to stay competitive. In the French market, the merger of SFR (a mobile provider) and Neuf (DSL/Fibre) has helped strengthen the position of the provider in relation to the incumbent, France Telecom. At the same time, the French cable provider Numericable partnered with the mobile operator Bouygues Telecom to offer quadruple play services. Other cable operators such as Cox in the United States announced plans to offer quadruple play services using Sprint's network while at the same time building out their own mobile network.[3]

Flat rate vs. usage charging

A key pricing trend is the shift to flat-rate, national calling plans on fixed networks. There are likely two factors at play which have pushed the fixed market in this direction. First, mobile operators typically employ a single tariff structure for outgoing domestic calls. Users often receive a limited amount of minutes included in a monthly subscription and then pay a set per-minute charge for any other domestic calls to fixed and mobile numbers. Prepaid plans typically have a single "per-minute" rate for calling fixed and mobile phones. In contrast, most PSTN operators still differentiate prices between local and domestic long-distance calls.

Second, pressure from VoIP has also led to more flat-rate calling plans from traditional providers as a way to retain customers. For example, incumbents such as Telia in Sweden recently introduced a new flat-rate tariff for calls to fixed lines. Operators such as Belgacom and Telefonica have made flat-rate calling much more prominent components of their triple play packages (Table 7.1).

Broadband also remains largely a flat-rate subscription in most countries. Chapter 4 showed that 36% of the 631 offers surveyed in September 2008 had an explicit data limit or bit cap each month, down from 38% a year before.

Another area where flat-rate pricing is becoming more common is on 3G mobile networks. Operators in OECD countries continue struggling to move subscribers on to new networks with the potential for higher margins from mobile data. In 2007, very few countries had unlimited data traffic on GPRS networks, with some exceptions such as T-Mobile in the United States. Now, flat-rate data plans are becoming more common as providers package new handsets such as the Apple iPhone with unlimited mobile data plans. Unlimited data plans are typically tied to handset use and not to modem use.

Price basket methodologies

Measuring the prices of voice services is complex. The amount consumers pay each month is determined by a mixture of monthly subscription fees, per-call and per-text charges. Adding to the complexity is the fact that many subscriptions include a certain number of included calls, minutes or texts. On the fixed telephony side, monthly subscriptions in some countries are flat-rate for local calls (United States, Canada and New Zealand), untimed for a set price per call (Australia) or charged on a per-minute basis. Mobile subscriptions may come with a certain number of SMS messages per month or a limited amount of free calling to other subscribers on the same network.

One solution for comparing prices amid this complexity is building a standard "basket" of monthly consumption and then comparing how much it would cost to purchase this basket in each OECD country. The OECD has a methodology for building representative baskets which was developed with input from member countries and telecommunications operators. The baskets are routinely updated as usage patterns change.

Each OECD basket represents one standard level of consumption and is not intended to reflect specific calling patterns in a particular country. National calling patterns often vary considerably between countries. Instead, the baskets compare the price of buying a set amount of telecommunication services across countries. The breakdown of baskets is decided in discussion with operators and policy makers from across the OECD.

The OECD fixed line baskets examine the price of making a set basket of calls over the period of one year. The baskets include a set number of calls which vary according to duration, distance, destination (fixed, mobile and international), and time of day. The distribution of calls is based on data from operators across the OECD who provide information on actual calling patterns. Once the breakdown is set and agreed upon, the same calling pattern is used to compare prices of different plans across the OECD. Operators submit their best offers considering the demands of the basket.

The mobile call baskets include a pre-determined number of SMS and MMS messages each year. The ratio of on-network and off-network minutes is determined through discussions with operators. Operators also provide the OECD with data on SMS and MMS patterns.

Box 7.1 provides a breakdown of each of the baskets (five for fixed and three for mobile). Tables 7.3 through 7.10 provide prices for each of the eight OECD baskets. All baskets include subscription and consumption charges. It is worth noting that in certain

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countries the prices may appear more competitive in one basket than in another. This is commonly the result of offers tailored to specific national calling patterns that may mimic the composition of a certain basket more closely than others.

Box 7.1. **OECD price baskets**

Fixed-line baskets (calls per year)				
Business		Residential		
SoHo	SME	Low	Medium	High
1 800	84 000	600	1 200	2 400

The fixed-line baskets are broken down into two main categories: business and residential subscriptions. The first business basket examines small office/home office use of 1 800 calls per year while the small/medium enterprise (~30 employees) basket includes 84 000 calls per year (or 2 800 per employee).

There are three residential baskets which include a different number of minutes over the period of one year, 600 for low, 1 200 for medium and 2 400 for high use.

Mobile baskets (call per year)			
Residential/Business			
	Low	Medium	High
Minutes	360	780	1 680
SMS	396	600	660
MMS	8	8	12

The mobile baskets comprise a certain number of voice calls, SMS and MMS messages in a given year. The composition of the baskets will be reviewed and revised in 2009 to take account of evolving usage patterns and tariff structures in OECD markets.

Residential fixed lines

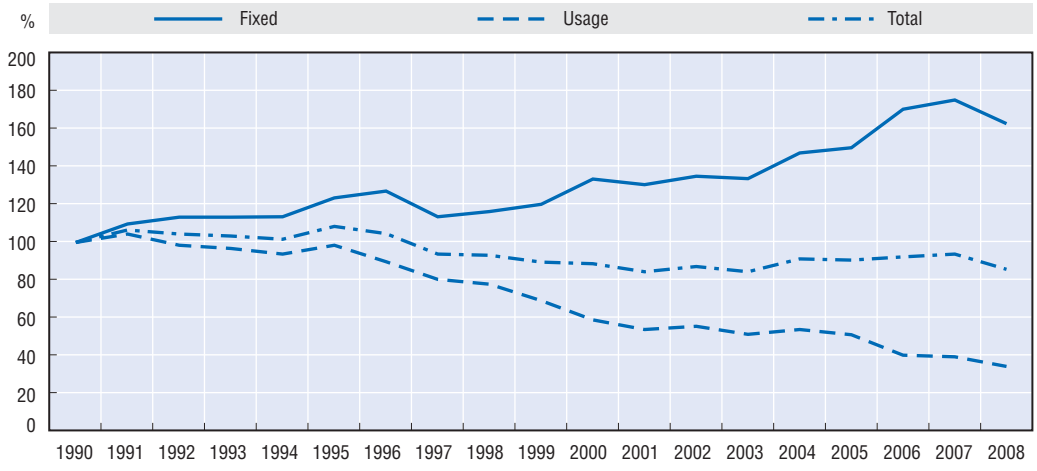
The composition of residential fixed-line telephony has evolved over the previous 18 years (Table 7.2). Consumers pay more for subscriptions but less for calls (Figure 7.1). Monthly subscription charges *grew* by 60% between 1990 and 2008, or 3% per year. By contrast, usage charges *fell* 63% over the same time period. Combined, the price of fixed line telephony (subscription plus usage) fell 14% over 18 years, equivalent to a decline of just under 1% per year.

After increasing for most of the previous 18 years, the price of subscriptions began falling in 2007. There are some questions as to whether operators will be able to maintain high subscription prices given bundling developments in broadband markets. The inclusion of VoIP calling plans in broadband offers may have a significant impact on the ability of incumbent operators to continue charging current prices for stand-alone telephone subscriptions. Tables 7.3, 7.4 and 7.5 provide data on the three residential fixed baskets.

Table 7.5 provides data from the OECD low-usage basket of residential telephone charges across countries. The low-usage basket compares the price of residential fixed-line service and 600 calls (of varying length and distance) spread over a year.

Figure 7.1. **Time series for residential phone charges, 1990-2008**

Index 1990 = 100, OECD average



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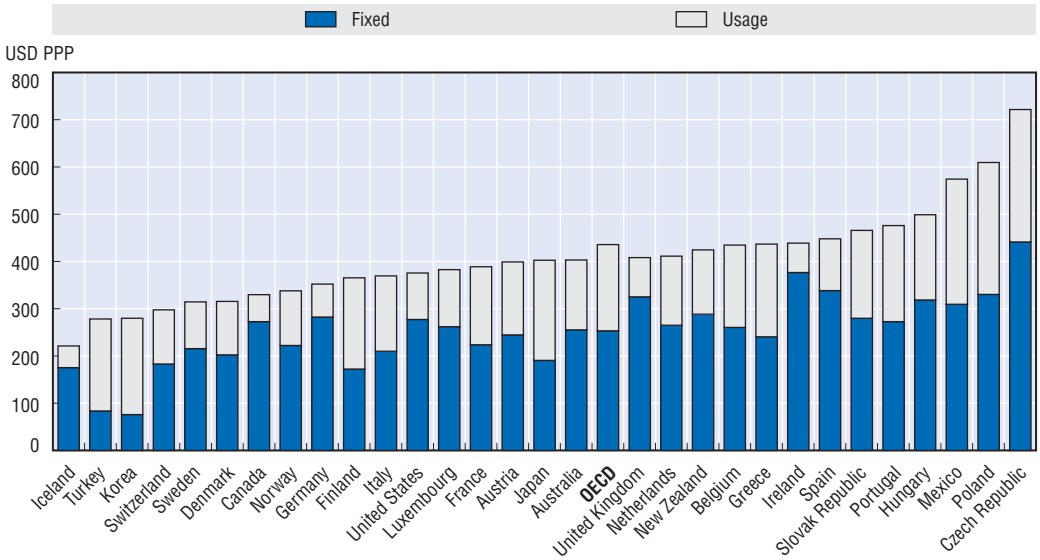
The average yearly price of the low-use, residential fixed-line basket is USD 404.76 PPP, (or USD 33.12/month). The baskets in Iceland, Korea and Turkey are the least expensive while the most expensive are in the Czech Republic, Poland and Mexico (Figure 7.2). The basket price in the Czech Republic is more than three times the price in Iceland. The average price per call in the basket is USD 0.67.

Figure 7.2. **OECD residential fixed-line basket: low use, August 2008**



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On average, the fixed subscription comprises 62% of the total cost of the low use basket. In Ireland, Canada and Germany the fixed portion is at least 80% of the total price. In Korea and Turkey, the monthly subscription is 30% or less.

Table 7.4 provides data on the medium-use residential basket for fixed-line service. The medium-use basket includes fixed telephone service for one year and 1 200 calls of varying length and distance. This is double the number of calls in the low-use basket of 600.

The average price for the medium-usage basket across the OECD is USD 541 PPP for one year of service (USD 45 per month). The difference in yearly average prices between the low- and medium-use baskets is relatively small (USD 136) and reflects lower marginal prices per call after the subscription fee is paid. Moving from the lower- to medium-use basket doubles the number of calls and the average price per additional call averages USD 0.23. The least expensive medium-use baskets are in Iceland, Korea and Canada. The Czech Republic, Poland, Hungary and Mexico have the most expensive prices (Figure 7.3). The most expensive basket is found in the Czech Republic and is over three times more expensive than the same basket of calls in Iceland. The fixed subscription fee accounts for an average of 52% of the total price of the baskets and ranges from 14% of the price in Turkey to 89% in Canada.

Figure 7.3. **OECD residential fixed-line basket: medium use, August 2008**

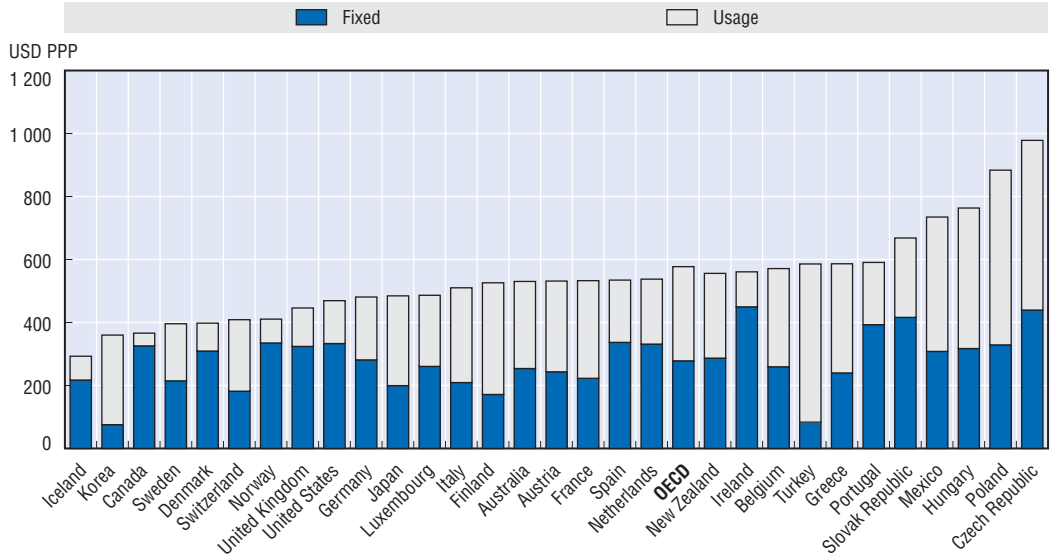

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Table 7.5 provides information on the high-use basket which measures the price of a yearly subscription and 2 400 calls per year. The amount of calls is twice as large as the medium-usage basket and four times larger than the low-usage basket.

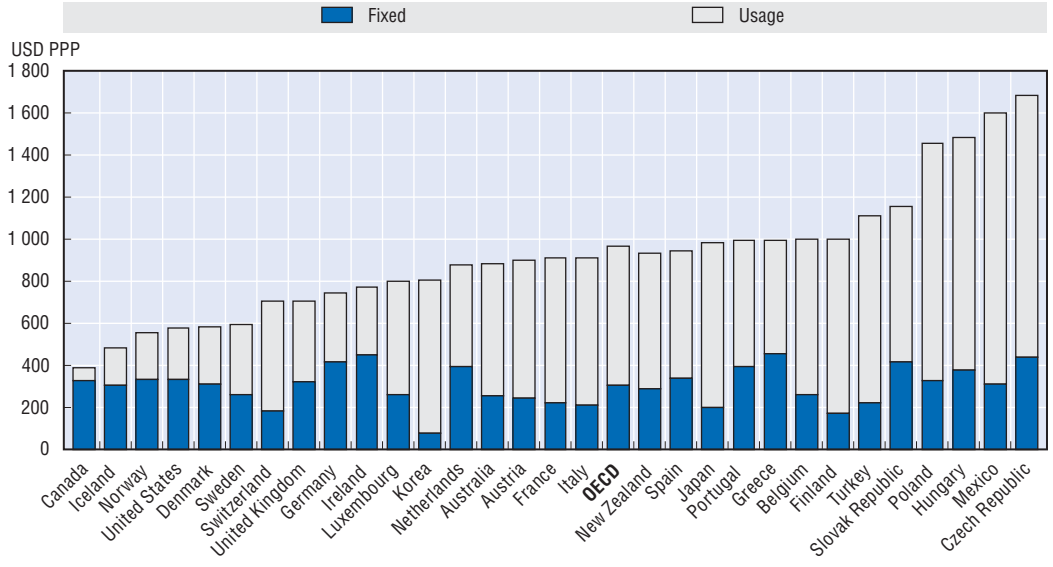
The average price for the high-use basket is USD 917 PPP per year of residential fixed-line service or USD 76 per month (Figure 7.4). The average price for the high-use basket is 70% higher than for the medium-use basket, which has half the number of calls. The average price per additional call is USD 0.63.

The fixed-line subscription comprises an average 33% of the total basket price. The fixed-line price is proportionately smaller in Korea (9%) and Finland (17%). It accounts for the majority of the price in Canada (83%), Iceland (63%), Norway (60%) and Ireland (58%).

The range of prices among countries is greater in the high-usage basket than low or medium usage. The most expensive basket, which is in the Czech Republic, is more than four times as expensive as the same basket in Canada.

Averaging the rankings of the low-, medium- and high-use baskets can help provide a picture of which countries have the lowest prices for fixed-line telephone across a range of usage patterns. Iceland, Canada and Sweden perform the best with the least expensive

Figure 7.4. **OECD residential fixed-line basket: high use, August 2008**



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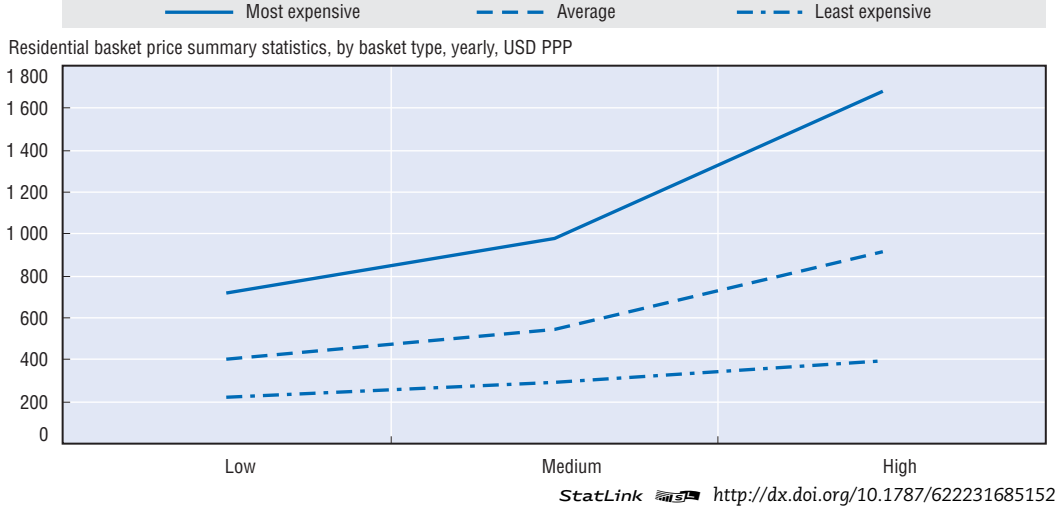
fixed-line calling plans. Mexico, Poland and the Czech Republic are the most expensive across the three residential use baskets.

Figure 7.5 shows summary statistics for the three residential, fixed-line baskets. The top line in the figure represents the most expensive offer across the OECD and the bottom line the least expensive. The range of prices is particularly pronounced in the high-use basket.

Figure 7.5. **Residential fixed-line baskets: price spread, August 2008**

By basket type, yearly



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Business fixed-line basket

The decline in prices for fixed telephony is more pronounced for businesses than for residences. The price of business line subscriptions grew by 65% from 1980 while at the same time per-minute prices declined by 61% (Figure 7.6). The total effect is a decline of 35% in the overall price of business telephony. Businesses benefit more from the per-

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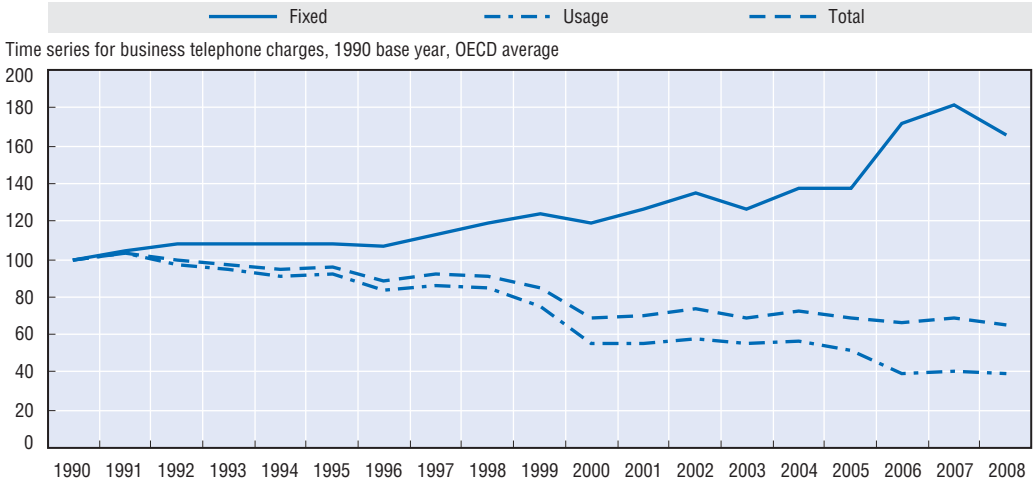
Figure 7.6. **Time series for business phone charges, OECD average, 1990-2008**



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minute price decline than residential subscribers because businesses typically complete more calls per subscription than residences. The price of business subscriptions began falling in 2008 just as it did in the residential market. The price of voice calls continued decreasing, but at a slower rate than in previous years.

The OECD has two business basket methodologies, each of which focuses on a different business segment. The first basket mimics calling patterns in a small/home office (Table 7.6). The second basket looks at larger companies, particularly small/medium-sized enterprises assumed to have 30 employees and 30 lines (Table 7.7).

The small/home office (SoHo) basket includes 1 800 calls per year (150 calls per month). This is slightly larger than the high-use residential basket. The average price across the OECD for the SoHo basket is USD 591 PPP or USD 49 PPP per month (Table 7.6). The least expensive baskets are in Iceland, Denmark and Korea. By contrast, Mexico, the Czech Republic and the Slovak Republic have the most expensive baskets for small/home office use (Figure 7.7).

Again, the range of prices between the lowest and highest priced baskets is large. A small/home office in Mexico purchasing the calls in the basket would pay USD 96 PPP per month, which is more than three times higher than in Iceland (USD 27 PPP). Even in nominal dollar terms, the Mexican price is more than one-and-a-half times more expensive than in Iceland.

The second business basket geared towards small and medium-sized enterprises (SME) examines the price of 30 channels (64 kbit equivalents) over one year in each country (Table 7.7). The basket includes 84 000 calls per year, equivalent to 233 calls per month per employee.

The average price per year for the SME basket is USD 23 336 PPP. The fixed-line rental accounts for 37% on average of the total price with the remainder attributed to call charges. Norway has the least expensive SME basket in PPP terms at USD 12 197 for the year (Figure 7.8). Prices in Iceland and Denmark are also relatively low. The most expensive SME basket prices are in Mexico, the United Kingdom and the Czech Republic.

The range of prices is large again between the least expensive and most expensive offers in the OECD for the SME basket. In PPP terms, the yearly price facing an SME in Mexico is more than four times higher than in Norway.

Figure 7.7. **OECD business fixed-line basket: small office/home office, August 2008**

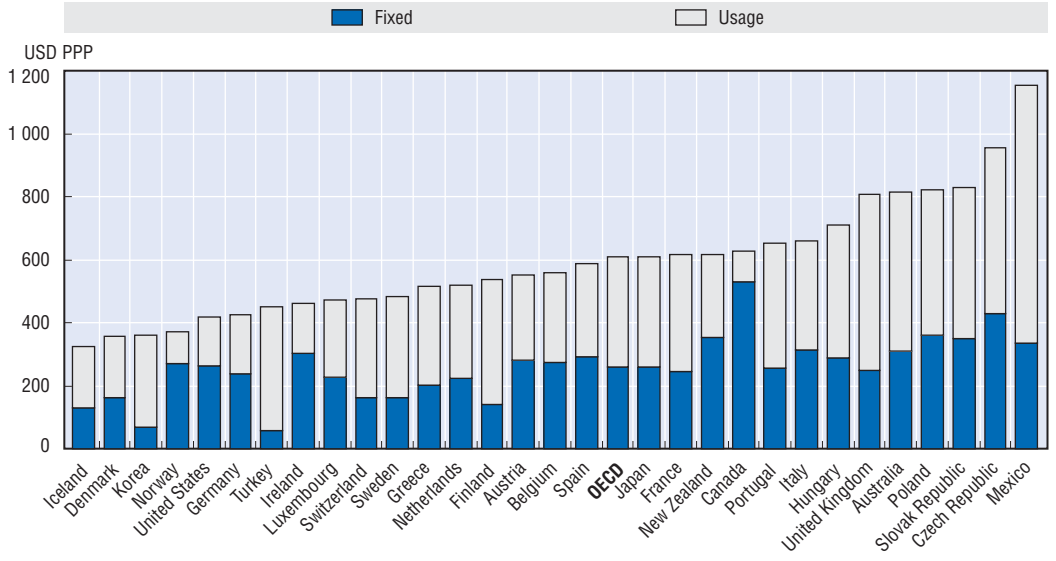

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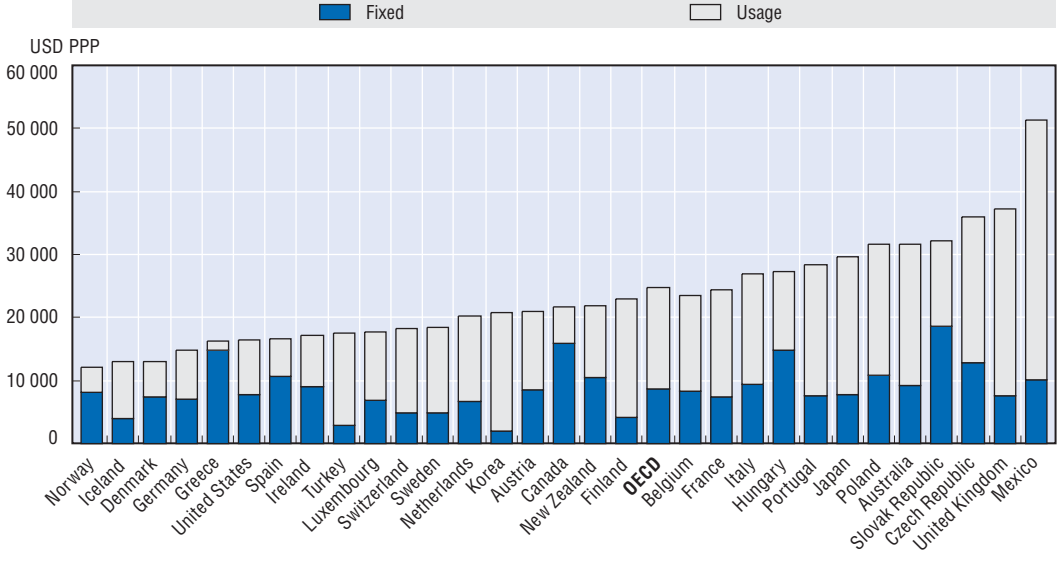
Figure 7.8. **OECD business fixed-line basket: small and medium-sized enterprises, August 2008**



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Mobile pricing trends

Mobile markets in the OECD are largely competitive and operators shifted their marketing over the past two years to attract new customers. One way operators have found to boost revenues is by keeping as many calls "on-net" as possible to avoid termination charges on other networks. A number of operators introduced "friends and family" offers which allow unlimited calls to certain numbers. In some cases, subscribers can choose a certain number of phone numbers to which they can make calls without using minutes in their subscriptions. In other cases, operators allow users unlimited calling among mobiles on the same network. This provides an incentive to friends and family to use the same mobile operator.

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For example, Vodafone in the UK offers unlimited calling among up to four people in a "family group" and all calls between them are unlimited after a monthly USD 9 (GBP 5) fee. All four phones must be Vodafone subscribers. For a slightly larger fee of USD 12.50 (GBP 7), one person can have unlimited calls among six subscribers on the Vodafone network.[4] Another development that continued over the past two years in a number of OECD mobile markets is the carrying-over of unused minutes from one month to the next. In the past, mobile subscriptions often included a bundle of minutes that had to be used within a 30-day period. Subscribers who are fearful of paying excess fees by going over their allocated minutes often do not consume all the minutes in their subscription. Any unused minutes are lost at the end of the month.

Operators are adjusting their marketing to those who may use fewer minutes than their subscription basket by providing options to carry over minutes from month to month. For example, AT&T allows minutes in some of its plans to be carried over for up to 12 months.[5] The pan-European operator Tele2 allows subscribers to carry over minutes one month for a small monthly fee.

Some of the pricing developments have been on the text messaging side. SMS continues to be lucrative market in the OECD and operators offer more SMS-centric plans than before. Operators target younger subscribers with the marketing of SMS-heavy plans. Mobile virtual network operators are particularly active in this market segment.

Rogers Wireless in Canada now offers Canadian text messaging plans with very high numbers of SMS texts included per month. For CAD 10, subscribers can send 2 500 text messages throughout the month. For CAD 20, the number of SMS messages increases to 10 000 allowed per month, equivalent to 333 messages per day.

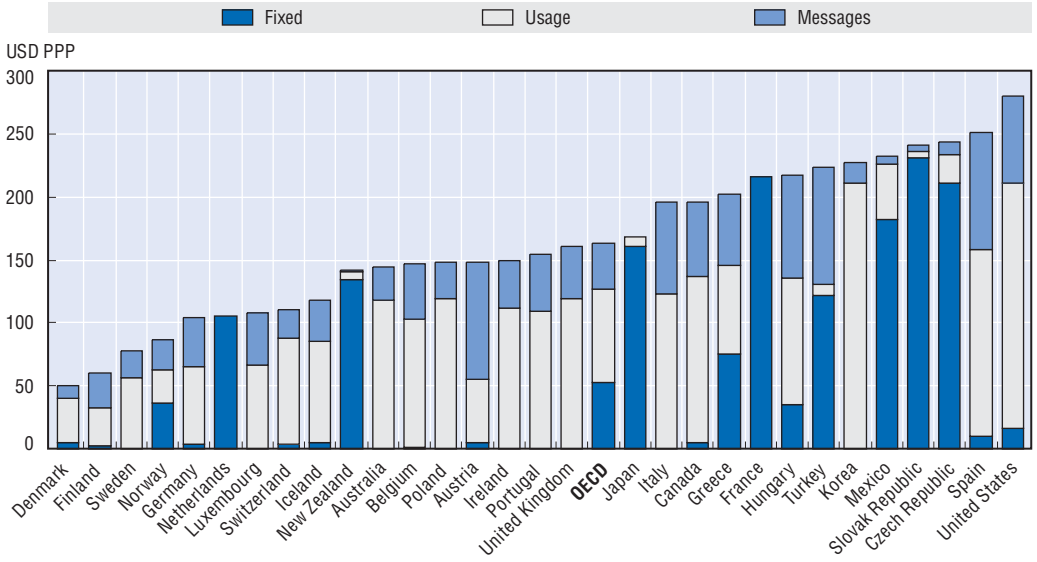
Capturing new developments in the mobile sector can be complicated given the large number of offers available in a single market. There are three mobile price baskets that can be used to follow pricing trends and each corresponds to different levels of usage (Box 7.1).

The OECD methodology distributes calls between peak and off-peak hours and uses an average call duration to make the price calculations. The calling patterns used to formulate the baskets are contributed to the OECD by mobile operators. It is important to note again that the OECD calling patterns in the basket can be significantly different than common calling profiles in a specific country. For example, the high-usage OECD basket includes 1 680 outgoing voice calls per year while users in the United States average 9 600 minutes of voice calls (combined incoming and outgoing) per year. In this case the basket provides the cost of buying exactly the calls and messages in the OECD basket rather than what may be considered a "typical" bundle in the market.

The first basket looks at a low-use profile and includes 360 minutes of voice calls, 396 SMS messages and eight MMS over one year (Table 7.8). The average yearly price for the mobile basket is USD 164 PPP per year or USD 14 per month across the OECD (Figure 7.9). The least expensive low-usage offers are in Denmark, Finland and Sweden at prices ranging from USD 4.19 to USD 6.47 per month. At the other end, the highest monthly price for the baskets are found in the United States (USD 23), Spain and the Czech Republic (USD 20).

The average price per SMS/MMS sent in the low use basket is USD 0.09. The most expensive SMS/MMS price per message was in Austria at USD 0.24. SMS and MMS accounted for an average of 22% of the total basket price. Usage was the largest component of the total price at 46% and the subscription at 32%.

Figure 7.9. **OECD mobile low-use basket, August 2008, tax included**



Note: The existing mobile basket methodology does not include discounted or free calls to pre-selected phone numbers as part of "friends and family" or "preferred numbers" plans. The inclusion of these calls will be considered as part of a future update of the mobile basket methodology.

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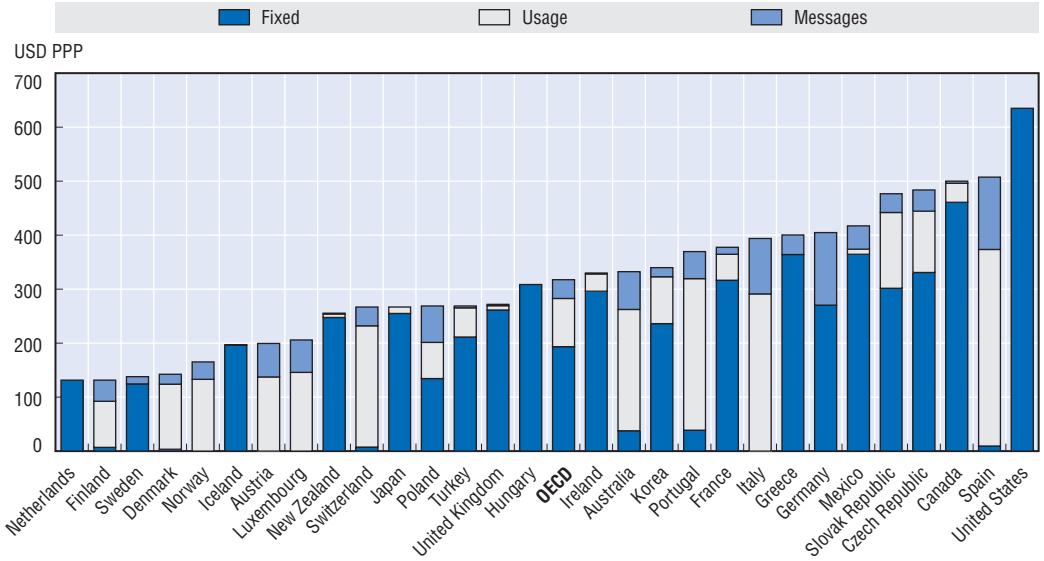
The medium-use basket includes 780 minutes of voice calls, 600 SMS messages and eight MMS messages (Table 7.9). The average price for the basket across the OECD is USD 317 PPP, or USD 26 per month (Figure 7.10). Finland, the Netherlands and Sweden have the lowest prices for the basket ranging between USD 11 and USD 12 per month. On the other end of the spectrum, the most expensive baskets are in Canada, Spain and the United States where monthly prices range from USD 42 to USD 53 per month for the identical basket of calls.

Figure 7.10. **OECD mobile medium-use basket, August 2008, tax included**



Note: The existing mobile basket methodology does not include discounted or free calls to pre-selected phone numbers as part of "friends and family" or "preferred numbers" plans. The inclusion of these calls will be considered as part of a future update of the mobile basket methodology. Pre-paid plans are excluded.

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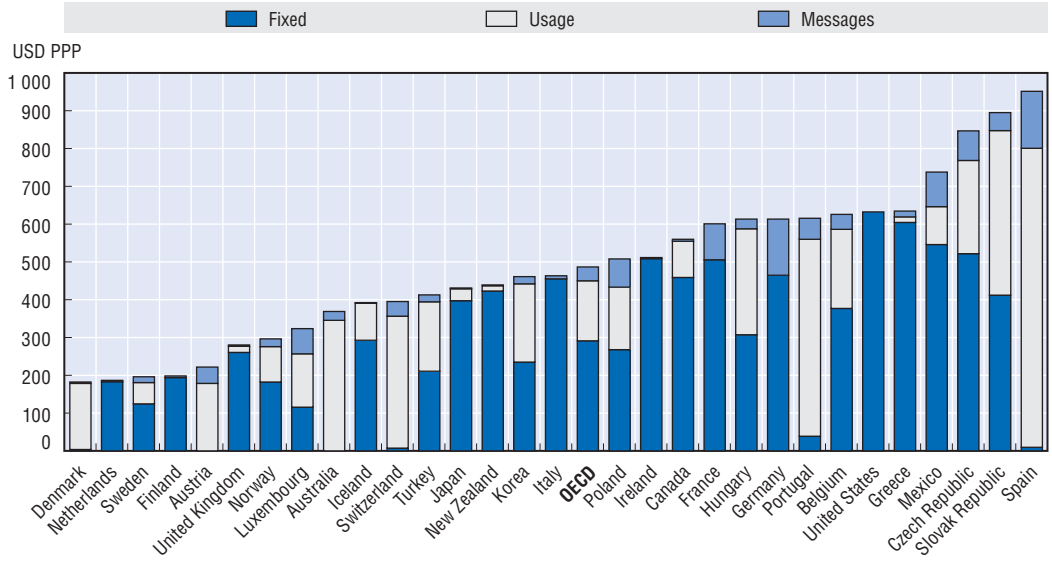
Figure 7.11. **OECD mobile high-use basket, August 2008, tax included**



Note: The existing mobile basket methodology does not include discounted or free calls to pre-selected phone numbers as part of "friends and family" or "preferred numbers" plans. The inclusion of these calls will be considered as part of a future update of the mobile basket methodology. Pre-paid plans are excluded.

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The average price of an SMS/MMS in the medium-use basket dropped 37% between the low- and medium-use basket to USD 0.06. The most expensive countries in terms of the SMS/MMS component were Spain and Germany where the SMS/MMS price was USD 0.22 per message. The fixed subscription accounted for the largest percentage of the total basket price for medium usage at 61%. Voice use accounted for 28% and SMS/MMS for the remaining 11% of the price on average.

Finally, the high-use basket increases to 1 680 minutes of voice calls, 660 SMS messages and 12 MMS messages per year (Table 7.10). The average price of the high-use basket across the OECD is USD 489 PPP per year or USD 41 per month (Figure 7.11). The countries with the least expensive high-use baskets are Denmark, the Netherlands and Sweden with prices between USD 15 and USD 16 PPP per month. In contrast, the most expensive countries for the high-use basket are the Czech Republic, the Slovak Republic and Spain. The same high-use basket in these countries is between USD 71 and USD 80 PPP.

The average price for an SMS/MMS was USD 0.06 in the high-use basket although the price ranged between free to USD 0.23 per message across countries. The monthly subscription again accounts for the largest portion of the total price (60%). Usage comprises 33% and messaging 8% of the total price of the basket on average.

International pricing trends

There is still significant variation among countries in prices for international telephony over the PSTN. Table 7.11 provides the average price of an international call using an OECD basket methodology. The price of the average call is determined by evaluating the price for calling all other OECD member countries during peak and off-peak times. For the business basket, 75% of calls are allocated during peak times and 25% off-peak. The ratios are reversed for the residential international call basket. The charges to

different destinations are weighted according to ITU call volume statistics for each country and as a result, the destinations used for the calculations vary by country.

The average price of an international business call used in the basket is USD 0.77 PPP across the OECD. The least expensive business calls are available in Germany (USD 0.10 PPP), Turkey (USD 0.18 PPP) and Norway (USD 0.21). The most expensive business calls are in Mexico at USD 2.43 in PPP terms or USD 1.77 using nominal exchange rates.

On the residential side, the average cost of an international call was USD 1.02. The price is more expensive than business calls but residential prices include value added tax while the business prices do not. The least expensive international calls from residences are found in Germany (USD 0.16 PPP), Canada (USD 0.21 PPP) and Norway (USD 0.32 PPP) while the most expensive are in Mexico (USD 3.52 PPP), Korea (USD 2.79 PPP) and Japan (USD 2.45 PPP). The range of prices is large with the international call costing over 22 times more in Mexico than Germany in PPP terms. Even in nominal terms, the price in Mexico is over 12 times higher than in Germany.

Broadband pricing trends

Broadband prices continue to decline in most markets across the OECD as connection speeds improve. As mentioned earlier, one important broadband pricing trend is operators are selling broadband as a bundle to consumers rather than as a stand-alone service. In some cases operators offer significant discounts if subscribers take all three or four services on offer. In other cases, operators do not offer stand-alone offers for any particular service so subscribers must pay for the entire bundle to receive any of the services.

Korea continues to have one of the leading broadband markets in the OECD and operators there now make no price distinction between last-kilometre technologies for delivering connectivity. KT now sells FTTH, VDSL and ADSL for the same monthly subscription price. The speed available to consumers depends on the technology but the monthly fee is the same regardless. The competitive operator Free in France operates the same way with a one-offer pricing structure. Subscribers pay the same monthly fee whether they are on DSL or fibre.

Another new broadband pricing trend is for users to pay additional fees for faster uploads. Broadband utilisation has evolved over the previous several years as consumers now require faster upload speeds for putting pictures online, uploading video to sharing sites or for teleworking. The average advertised upload speed across the OECD is 5 Mbit/s in September 2008 while the average download speeds are much higher at 17 Mbit/s.

The cable operator GET in Norway doubles the upload speed on any of their plans for an additional USD 9 (NOK 49) per month. France Telecom allows fibre subscribers to move from 10 Mbit/s upstream to 100 Mbit/s for an additional USD 29 (EUR 20) per month.

Operators also continued offering lower prices to subscribers who signed up for longer-term contracts. Longer contract durations protect operators in markets where prices are under competitive pressure each year. Korean operators had the longest-observed contracts at four years for broadband while a lock-in period of one to two years is typical for operators in other countries.

Longer-term contracts help operators maintain revenues even as the price for stand-alone broadband service falls. Tables 7.12 and 7.13 follow the prices of a DSL and cable subscription over time for each OECD country. Between September 2005 and 2008, the price of a DSL connection fell an average of 14% each year while the advertised speeds of the

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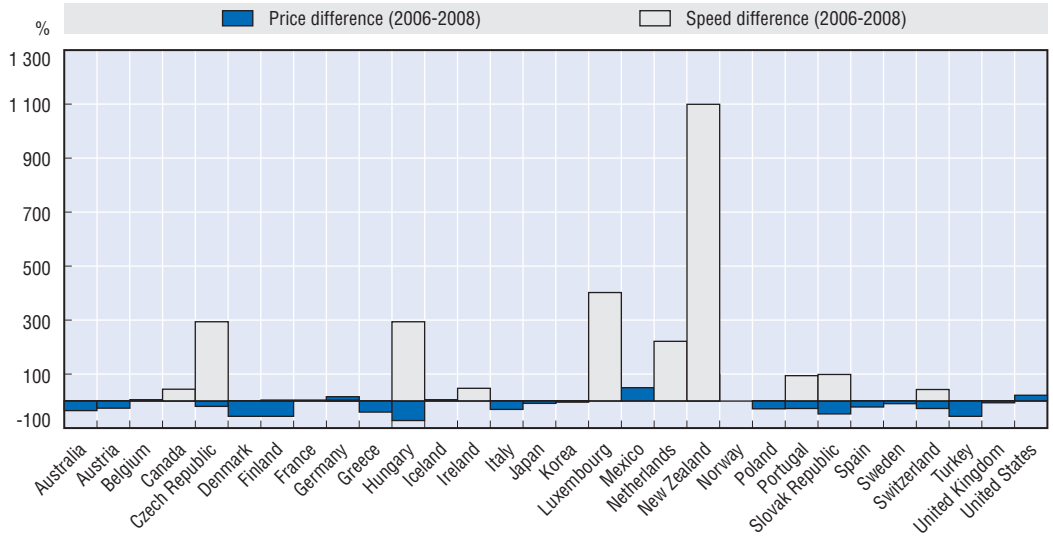
lines increased an average of 22% per year (Table 7.12). OECD cable markets saw similar changes. Cable prices fell an average of 15% per year while speeds grew much faster, at 30% per year across surveyed offers (Table 7.13).

DSL prices fell the most over three years in the Czech Republic, Hungary and the Slovak Republic at more than 37% per year (Figure 7.12 and Table 7.12). There were a number of countries where prices for the service fell over two years and then started increasing again in 2008. For example, the price in Mexico fell between 2005 and 2007, only to revert back to the original 2005 price in 2008. In other countries such as Germany, DSL prices for the same advertised speeds increased slightly over time.

Figure 7.12. **Incumbent broadband price and speed changes, ADSL or fibre, September 2006-September 2008**

% change



StatLink http://dx.doi.org/10.1787/622341165731

The large speed increases in Figure 7.12 are the result of operators upgrading to ADSL 2+ connections. Telecom New Zealand's offers went from a maximum of 8 Mbit/s to 24 Mbit/s in areas with upgraded exchanges. EPT in Luxembourg raised speeds from 3 Mbit/s to 15 Mbit/s in 2007 while leaving the monthly price the same at EUR 79 per month.

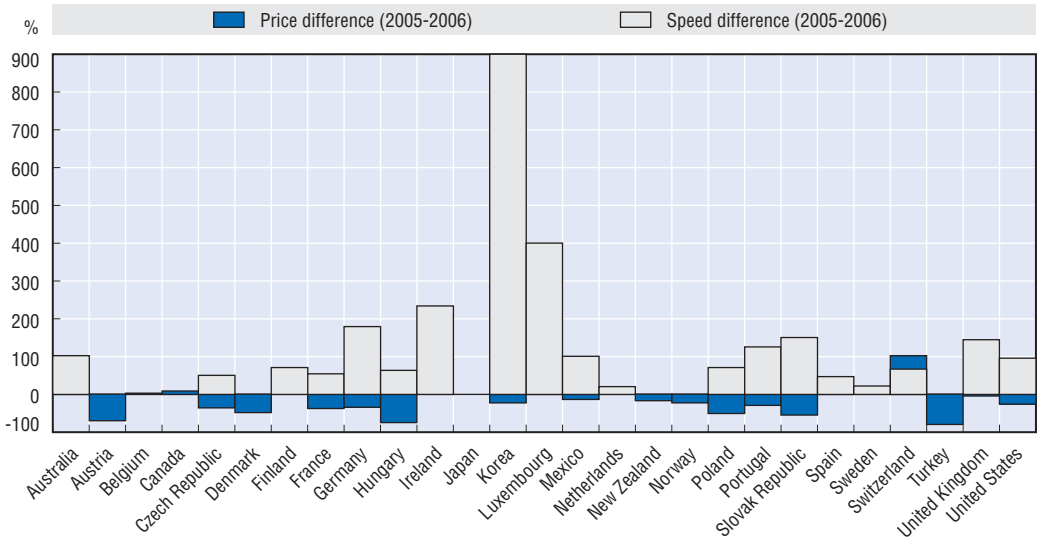
Cable prices declined the most in countries with traditionally high prices such as Hungary, Turkey and the Slovak Republic (Table 7.13). Prices in all three countries fell by more than 35% per year. This is more than double the average decline of 15% per year over the time period (Figure 7.13). The price of the surveyed cable offer in Australia rose the most over the three years at roughly 14% per year, although speeds and data caps increased at the same time.

The increase in cable speeds is partially due to upgrades to DOCSIS 3.0. The price of the Korean cable offer declined slightly between 2007 and 2008 despite advertised speeds growing from 10 to 100 Mbit/s.

Table 7.14 provides a list of the offers used to calculate broadband prices in September 2008. Figure 7.14 shows the range of surveyed subscription prices for each country in PPP terms. The offers are solely for broadband services and do not take into account potential savings from bundling services. The least-expensive entry offer was in Turkey for USD 8 PPP

Figure 7.13. **Cable broadband price and speed changes, September 2006-September 2008**

% change



StatLink http://dx.doi.org/10.1787/622410084763

per month. The range of Turkish prices increased from there to USD 125 per month. Korea had the most expensive entry offer for broadband at USD 31 per month but this is somewhat misleading because Korea's most expensive offer was only slightly more at USD 39 PPP per month. All surveyed Korean offers fell within this price range for advertised speeds between 8 and 100 Mbit/s. In 2009, the lowest advertised speeds in Korea moved up to 10 Mbit/s.

Another way to examine broadband prices is as a range of prices per advertised Mbit/s. Japan had the lowest price per advertised Mbit/s at USD 0.07 (Figure 7.15). Other countries with inexpensive advertised bandwidth per Mbit/s include France (USD 0.22), Korea (USD 0.31), Sweden (USD 0.32) and Finland (USD 0.38). All of the least-expensive prices per Mbit/s are over fibre networks. The highest-priced offers per Mbit/s are typically for entry-level offers with lower bandwidth. Mexico has the most expensive advertised bandwidth per Mbit/s, beginning at USD 18 PPP per month.

Broadband providers commonly segment the market with different speed offers. Entry-level plans are less expensive than plans with higher bandwidth. The collection of 631 offers surveyed in September 2008 provides a good base for looking at price differences among certain speed ranges. One logical way to develop these ranges is by examining what activities are possible at certain bandwidth levels.

The first category of connections is for "low speeds", those which are good for web surfing and e-mail but cannot support IPTV or other higher-bandwidth applications (Figure 7.16). Standard television over DSL requires at least 2 Mbit/s of dedicated bandwidth so the cutoff for the low-speed connections is set at 2 Mbit/s. The average price of a low-speed connection in the OECD in September 2008 was USD 32 PPP per month. Prices of connections in this speed range typically fall between USD 20 and USD 40 per month.

The second category of broadband speeds analysed is "medium speed" and includes advertised connection speeds between 2.5 and 10 Mbit/s (Figure 7.17). Connections at these speeds should be able to support IP-based television at standard definition.

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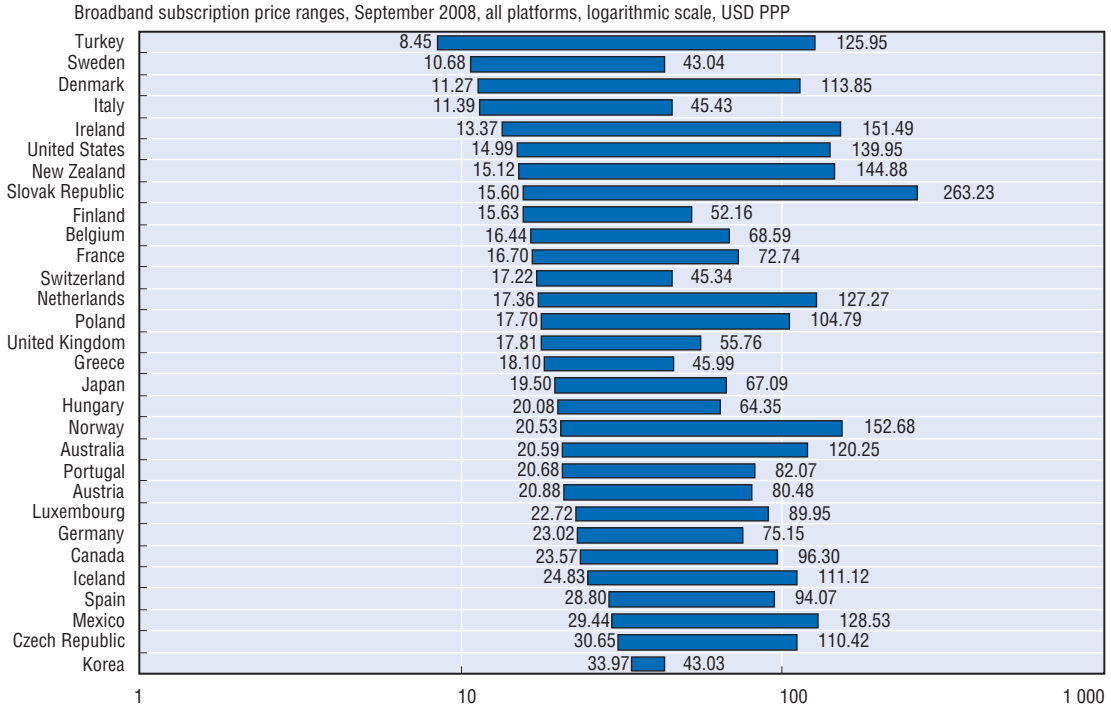
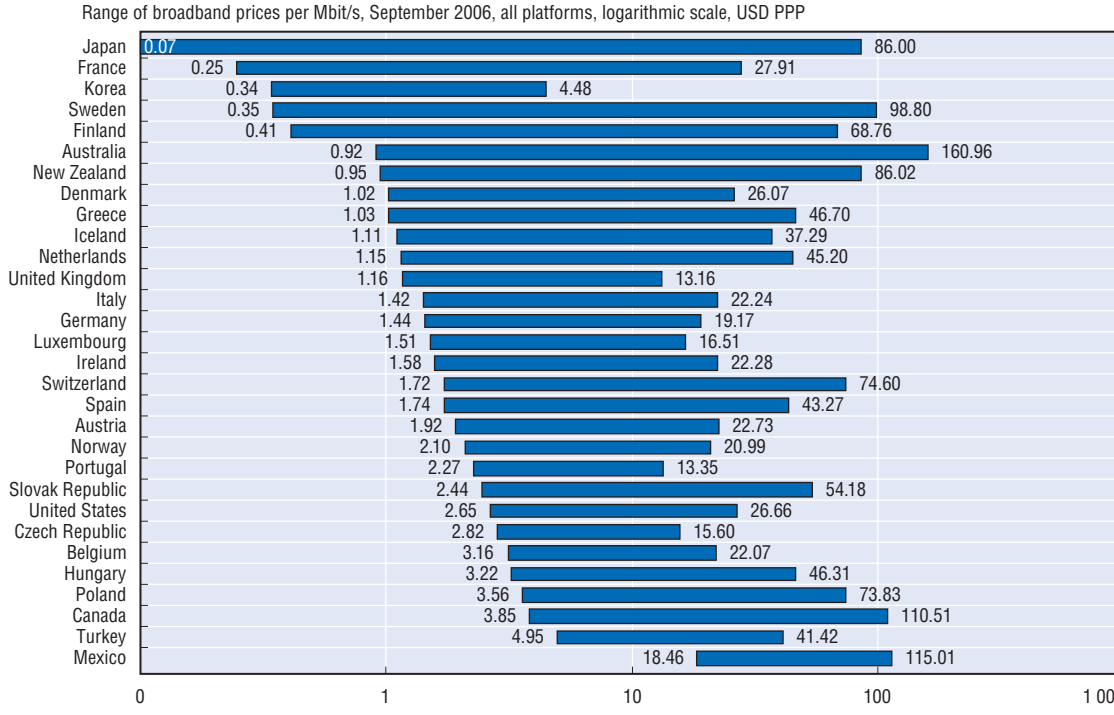
Figure 7.14. **Range of broadband prices for a monthly subscription, September 2008**



StatLink http://dx.doi.org/10.1787/622417168441

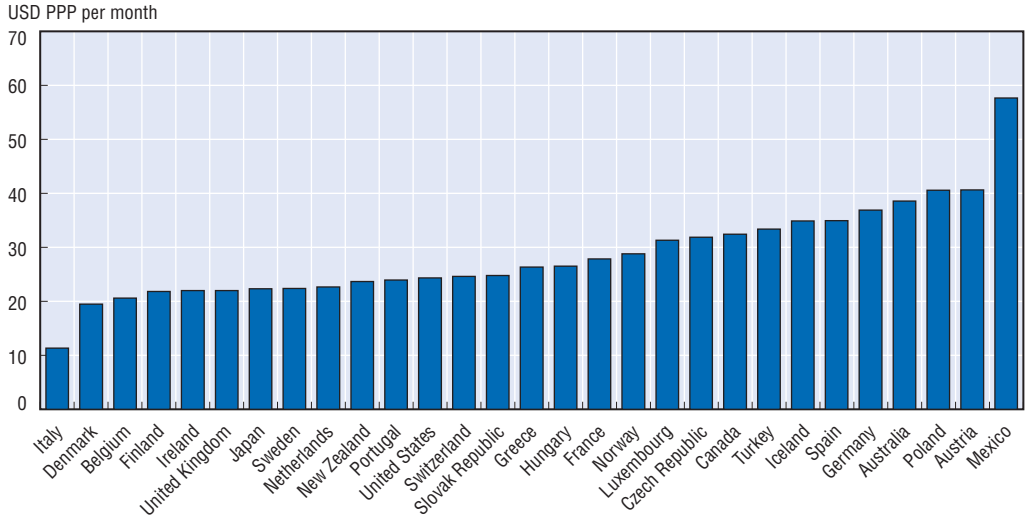
Figure 7.15. **Range of broadband prices per megabits per second of advertised speed, September 2008**



StatLink http://dx.doi.org/10.1787/622487576451

Figure 7.16. **Average monthly subscription price for very low-speed connections, September 2008**

256 to 2 048 kbit/s advertised

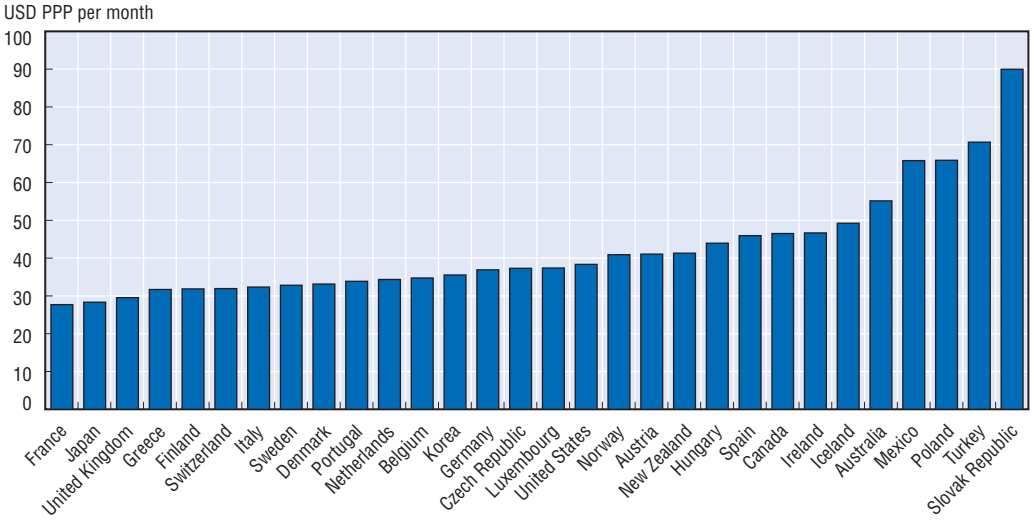


Note: The data used to compile Table 7.16, Table 7.17, Table 7.18 and Table 7.19 can be found in Table 7.14.

StatLink http://dx.doi.org/10.1787/622511284583

Figure 7.17. **Average monthly subscription price for medium-speed connections, September 2008**

2 500 to 10 000 kbit/s advertised



StatLink http://dx.doi.org/10.1787/622513817281

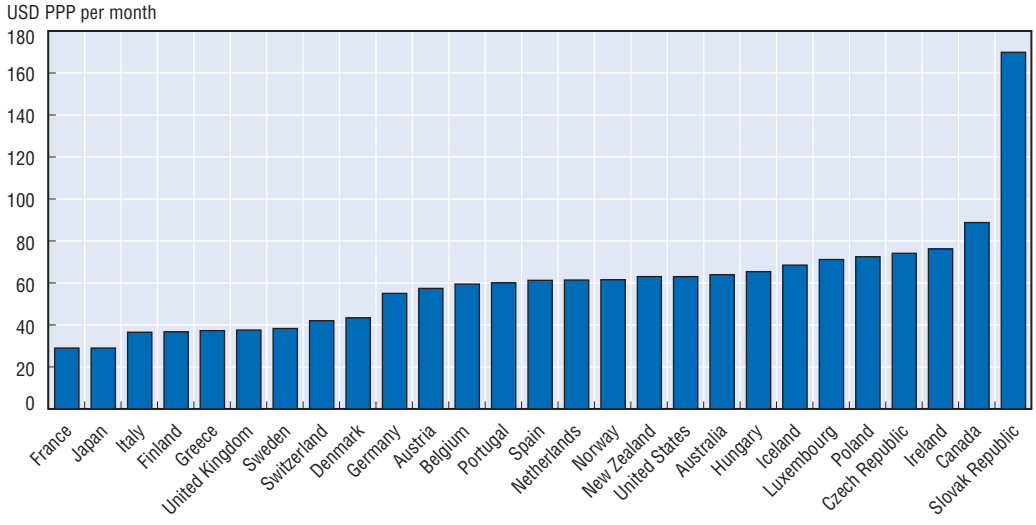
The average broadband price across countries for medium speeds is USD 43 PPP per month. Connections at medium speeds are typically priced between USD 25 PPP and USD 50 PPP, just slightly more expensive than the low-speed categories. Connections in the medium speed range are considerably more expensive in PPP terms in the Slovak Republic, Turkey, Mexico and Poland.

The next group of connections can be classified as "high speed" because they have sufficient advertised bandwidth to accommodate at least one high-definition video

channel. These connections are advertised with bandwidth between 12 and 32 Mbit/s. The average price for subscriptions in each country for this speed range is given in Figure 7.18. Overall, the average high-speed price between 12 and 32 Mbit/s is USD 53 PPP across OECD countries. Most countries fall between the USD 25-60 PPP range. France, Japan and Italy have the lowest priced offers while the Slovak Republic and Canada have the most expensive connections in this category.

Figure 7.18. **Average monthly subscription price for high-speed connections, September 2008**

12 000 to 32 000 Mbit/s advertised



StatLink http://dx.doi.org/10.1787/622547273311

The final speed category examined is for "very high-speed" or connections advertised as faster than 35 Mbit/s (Figure 7.19). These connections can accommodate multiple HDTV connections as well as other high-bandwidth applications. The majority of these connections are delivered over fibre networks, although some of the connections are over VDSL or cable networks.

Interestingly, the average price for the "very high-speed" category is actually less than for the slower "high-speed" category. The highest speeds over ADSL are included in the previous category and some operators charge a premium for these connections as a way to segment the market. It appears, however, that the offers at the top end of the speed range are more affordable when they are available. Often the fastest offers available in a country are limited to a small geographic area. The average price per month for a very high-speed connection in the OECD is USD 45 PPP.

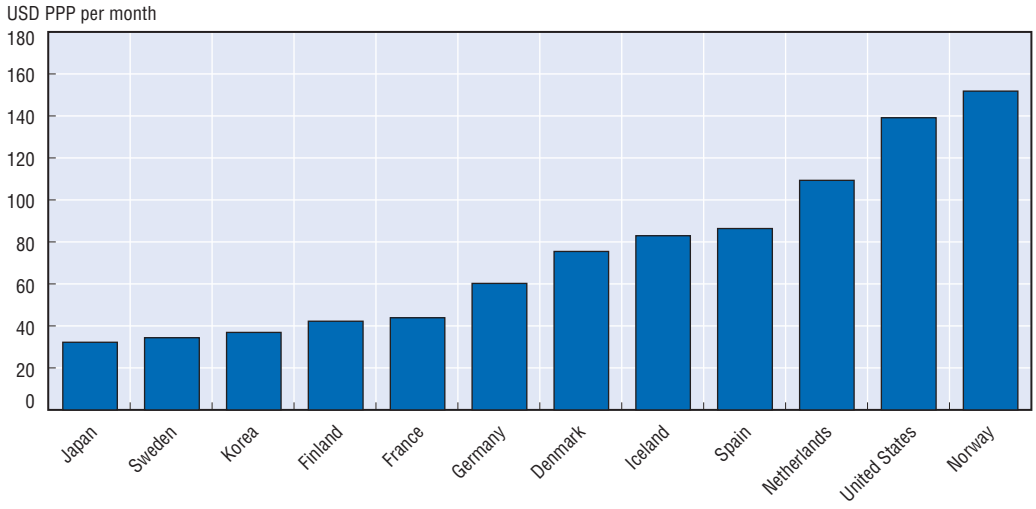
Sweden, Japan and Finland have the least expensive offers for the top-speed category at prices ranging between USD 31 and USD 33 PPP per month. The average price for all offers in this advertised speed range is USD 45 PPP per month. The availability of these offers varies among countries. Japan and Korea have the largest footprints while countries such as Germany, France and Spain have lower availability. The most expensive very high-speed offers are in the United States and Norway at USD 140 PPP per month.

Mobile broadband

In 2007, mobile broadband was too expensive for widespread consumer use in most OECD markets. This has changed recently as mobile operators drop prices to promote usage

Figure 7.19. **Average monthly subscription price for very high-speed connections, September 2008**

Greater than 35 000 kbit/s advertised



StatLink http://dx.doi.org/10.1787/622558886514

by existing subscribers on 3G networks and to encourage the remaining 2G subscriber base to upgrade. Mobile broadband remains relatively expensive compared to fixed-line broadband in most markets. There are some markets, particularly those where fixed-line connections have low data caps, where mobile broadband is growing very quickly.

Unlike fixed broadband which is sold based on speed, mobile broadband is typically marketed by data allowance. Some operators such as Telenor, Telecom New Zealand and Vodafone do not actively market theoretical speeds of their connections. Instead, most mobile operators segment subscriber groups by the amount of data included in the subscription each month.

Typically mobile operators include a limited amount of traffic per month with the subscription and then charge users for each additional megabyte of traffic transmitted. Data caps are commonly much lower on mobile broadband than on fixed networks due to the inherent scarcity of spectral capacity.

A survey of 82 offers from 16 operators in September 2008 provides some information on trends in mobile broadband pricing. The 82 mobile broadband offers are those that were marketed by operators alongside fixed-broadband and provide access via a modem, not a mobile handset. This subset of offers is not exhaustive but can be used to compare wireless connections which are marketed as substitutes for fixed-broadband connections.

O2 in the Czech Republic was one of the only surveyed operators to offer mobile broadband service without data caps. Instead, O2 states clearly that they traffic shape peer-to-peer traffic as a way to control network usage but allow an unlimited amount of other traffic types.

The average monthly data cap among surveyed offers was 4.5 gigabytes per month, compared to an average of 27 GB per month in the fixed broadband data collection. Ireland had the largest average data cap of over 11 GB per month across 11 different offers. The lowest average mobile broadband data caps was in New Zealand at 286 MB per month of traffic calculated from nine offers (Figure 7.20).

The data collection also provides information on the average price of mobile broadband subscriptions in the sample. The data caps varied considerably across countries

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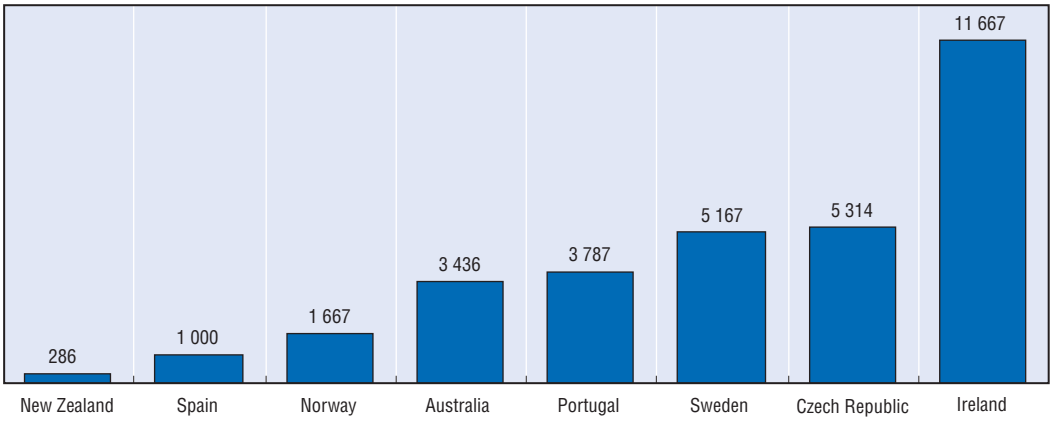
Figure 7.20. **Average data caps on mobile broadband offers by country, September 2008**

Megabytes per month



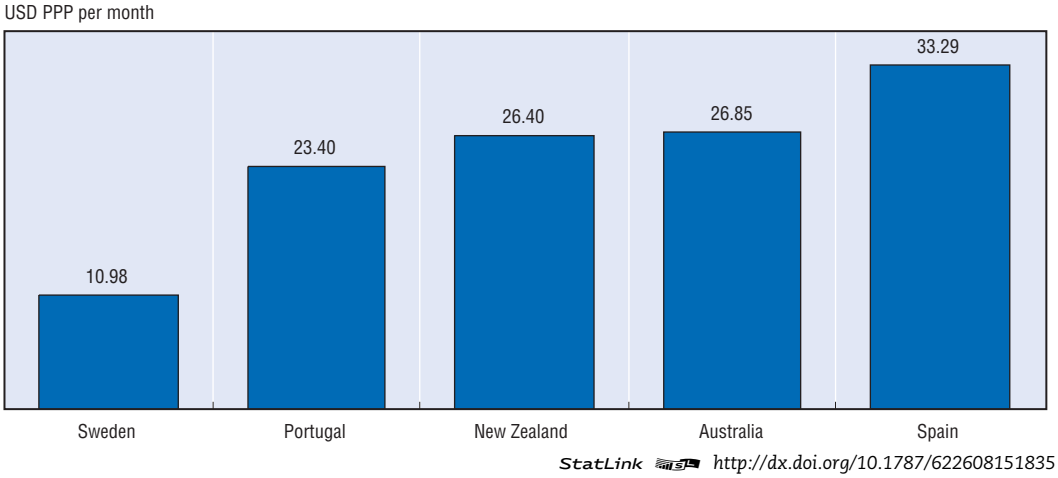
StatLink http://dx.doi.org/10.1787/622586127487

and offers, so looking at bands of data allowances can provide a more direct comparison across offers in OECD countries.

Figure 7.21 shows average prices across countries for a low-use mobile broadband subscription. These offers are limited to between 20 and 1 000 megabytes of traffic each month. Given the limited data volumes, these connections would likely be limited to e-mail and web browsing. The average price per month for a low-use subscription is USD 25 PPP across the 17 offers in the category. The least expensive connections are in Sweden and the most expensive in Spain.

Figure 7.21. **Average monthly price for low-usage mobile broadband, September 2008**

20 to 1 000 megabytes of traffic per month

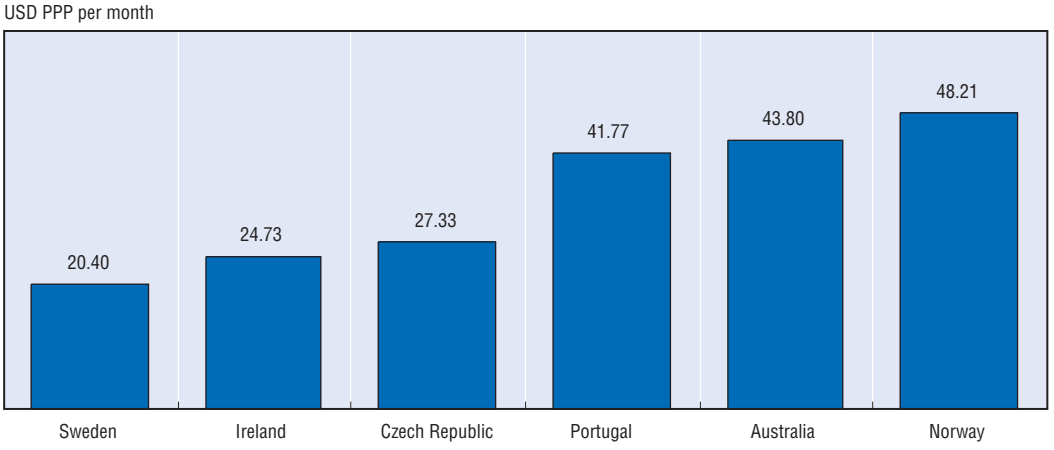


StatLink http://dx.doi.org/10.1787/622608151835

The second range of data caps is between 2 000 and 6 000 megabytes per month. These data limits allow users more downloads each month and would be more appropriate for purchasing music, multimedia browsing and light teleworking. Among the 15 offers in the group, the average monthly subscription price is USD 33 PPP per month. Again, Sweden has the least expensive offer at USD 11 PPP while Australia and Norway were the most expensive at over USD 43 PPP per month.

Figure 7.22. **Average monthly price for medium-usage mobile broadband, September 2008**

2 000 to 5 000 megabytes of traffic per month

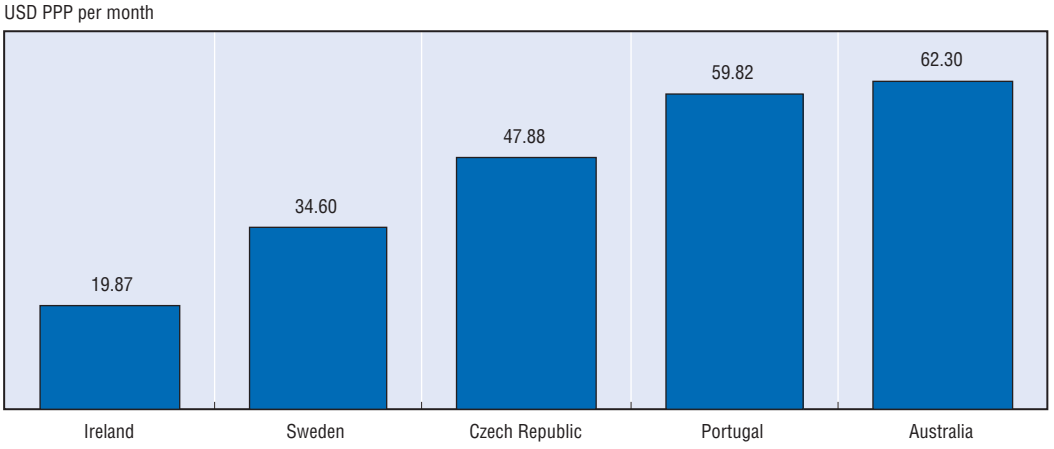


StatLink http://dx.doi.org/10.1787/622620825542

Finally, the higher usage band provides between 8 and 20 gigabytes of data traffic each month (Figure 7.23). The highest cap of 20 GB is still lower than the average *fixed* data cap but would provide mobile users with more flexibility on how they use their connections each month.

Figure 7.23. **Average monthly price for higher-usage mobile broadband, September 2008**

6 000 to 20 000 megabytes of traffic per month



StatLink http://dx.doi.org/10.1787/622653307560

The average mobile broadband price across the 20 offers in the group is USD 44 PPP per month. Ireland has the least expensive subscriptions at the higher data caps than other countries in the OECD at USD 20 PPP per month. The price in the most expensive surveyed market, Australia, has an average price of USD 62 for this data range and is more than three times the price of similar connections in Ireland.

Leased lines

Leased lines are symmetrical transmission channels provided permanently for the duration of a contract. They are often used by businesses as a way to connect offices and

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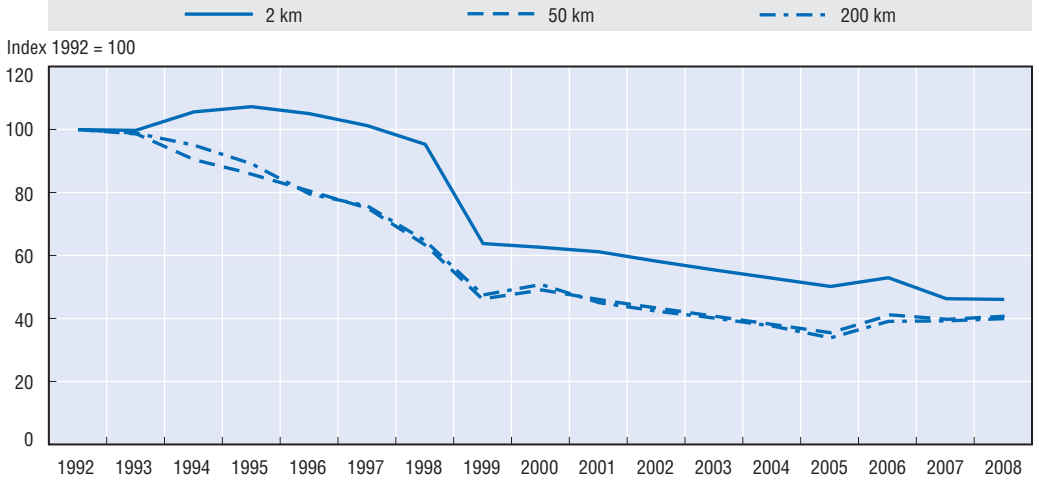
branches to each other or link back to a telecommunications provider. Businesses commonly use a network of leased lines as a way to effectively manage their own telecommunication services. DSL connections are increasingly replacing leased lines for businesses and this is part of the explanation for falling prices over the previous decade.

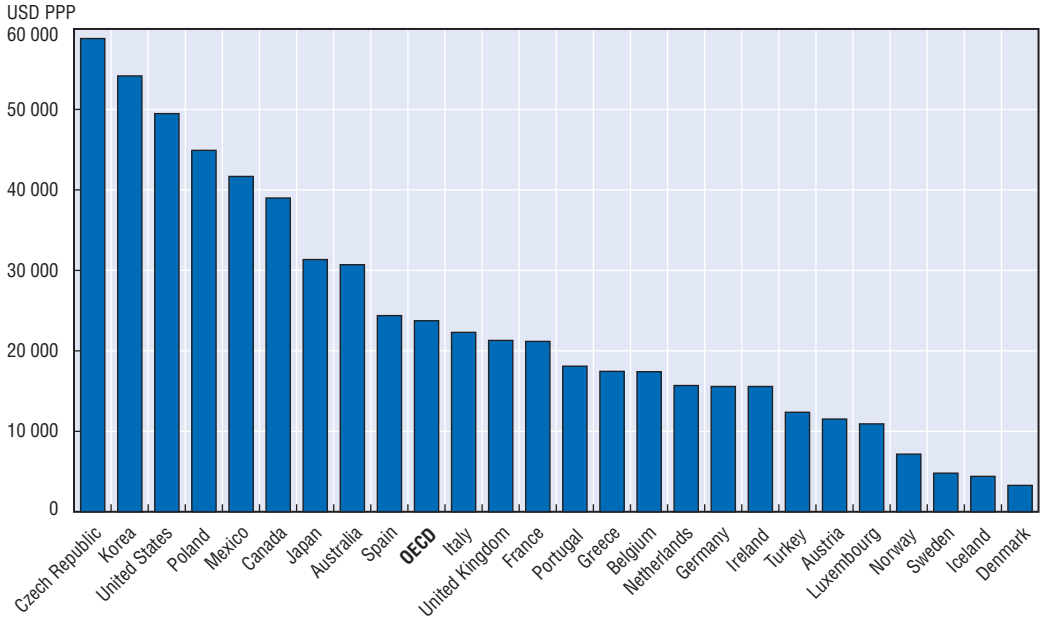
Figure 7.24 shows the decline in leased line prices since 1992. Prices in August 2008 for a two-kilometre line at 2 Mbit/s are 60% less expensive than 16 years earlier (Table 7.15). The prices of longer distance lines have fallen more dramatically to roughly 33% of their original price in 1992.

Figure 7.24. **Trends in leased line pricing over different distances, 2 Mbit/s line, 1992-2008**



StatLink http://dx.doi.org/10.1787/622715884146

Figure 7.25. **Leased line pricing, 2 Mbit/s line, August 2008**



Note: The basket uses intrastate tariffs for the United States. These tariffs are often significantly higher than the interstate tariffs which firms commonly purchase.

StatLink http://dx.doi.org/10.1787/622726033133

Prices of the OECD leased line basket are available in Table 7.16. The leased line basket represents the weighted price of one circuit over the distances of 2, 20, 50, 100, 200 and 500 kilometres. The least expensive 2 Mbit/s circuits are in Iceland, Sweden and Norway (Figure 7.25).

Notes

1. Form 10K/Annual Report, Vonage Holding Corporation, 31 December 2007, *at: http://ir.vonage.com/secfiling.cfm?filingID=1193125-08-59036*.
2. "Internet, TV, phone: bundling can cut bills", Consumer Reports, February 2008 at: *www.consumerreports.org/cro/electronics-computers/tvs-services/bundled-services-2-08/overview/bundled-services-ov.htm*.
3. Press Release, "Cox to launch next generation bundle with wireless in 2009", Cox Communications, 27 October 2008, at: *http://media.corporate-ir.net/media_files/irol/76/76341/release102708.pdf*.
4. Vodafone website, last accessed on 8 November 2008, at: *http://online.vodafone.co.uk/dispatch/Portal/appmanager/vodafone/wrp?_nfpb=true&_pageLabel=template10&pageID=PPP_0037*.
5. AT&T website, last accessed on 8 November 2008, at: *www.wireless.att.com/learn/why/rollover.jsp*.

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Table 7.1. **Pricing structures for residential users in the OECD, 2008**

	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)	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	No
Austria	Metered (options for unmetered weekends and evenings)	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	No
Belgium	Metered, unmetered	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	Yes
Canada	Unmetered	Flat rate	Flat rate, data controlled	Yes	Yes	Yes
Czech Republic	Metered (options for unmetered weekends and offpeak)	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	No
Denmark	Metered	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	Yes
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	Flat rate	No	Yes	No
Iceland	Metered	Data controlled	NA	Yes	NA	No
Ireland	Metered	Data metered, timed	Data metered	Yes	Yes	Yes
Italy	Metered	Flat rate, data controlled, 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	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	Flat rate, data controlled	Flat rate, 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	Flat rate, data controlled	Yes	Yes	No
Slovak Republic	Metered	Flat rate, data controlled	Flat rate, data controlled	Yes	Yes	No
Spain	Metered	Flat rate	Flat rate	No	Yes	Yes
Sweden	Metered	Flat rate	Flat rate	No	Yes	No
Switzerland	Metered	Flat rate	Flat rate	No	Yes	Yes
Turkey	Metered	Flat rate	Flat rate	No	No	No
United Kingdom	Metered	Flat rate, data controlled	Flat rate	Yes	Yes	Yes
United States	Metered/flat rate/unmetered	Flat rate	Flat rate	Yes	Yes	Yes

Note: The pricing structure for local telephony is for the incumbent telecommunications operator.

StatLink http://dx.doi.org/10.1787/626055010482

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
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	147.9	167.2	172.1	160.0
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	42.7	42.0	37.1
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	91.1	92.5	94.0	86.3
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	137.7	137.2	171.8	181.1	165.3
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	56.6	51.6	39.7	40.4	39.3
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	72.8	68.8	66.1	68.5	64.5

StatLink http://dx.doi.org/10.1787/626163021513

Table 7.3. **OECD basket of residential telephone charges, low usage, August 2008**

Including tax

	Fixed		Usage		Discount		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	341.45	254.82	198.07	147.81			539.52	402.63
Austria	312.81	244.38	197.50	154.30			510.31	398.68
Belgium	348.27	259.90	233.19	174.02			581.46	433.93
Canada	332.43	272.49	69.21	56.73			401.64	329.22
Czech Republic	400.90	440.55	271.05	297.86	- 16.15	- 17.75	655.80	720.66
Denmark	355.64	202.07	199.02	113.08			554.67	315.15
Finland	268.39	172.05	300.72	192.77			569.11	364.81
France	299.45	223.47	220.57	164.61			520.02	388.07
Germany	366.40	281.85	152.58	117.37	- 61.60	- 47.38	457.38	351.83
Greece	271.50	240.26	221.25	195.80			492.75	436.06
Hungary	267.16	318.05	273.98	326.16	- 122.53	- 145.86	418.61	498.35
Iceland	297.19	174.82	179.38	105.52	- 101.43	- 59.66	375.14	220.67
Ireland	624.50	376.21	241.16	145.28	- 138.09	- 83.19	727.57	438.30
Italy	274.94	209.87	231.00	176.34	- 22.76	- 17.37	483.18	368.84
Japan	236.29	190.56	261.92	211.23			498.22	401.79
Korea	69.66	75.72	187.34	203.64			257.01	279.36
Luxembourg	342.67	261.58	157.75	120.42			500.41	381.99
Mexico	225.42	308.79	368.63	504.97	- 175.28	- 240.11	418.77	573.65
Netherlands	341.15	264.45	188.50	146.13			529.65	410.58
New Zealand	365.53	287.82	172.93	136.16			538.46	423.98
Norway	392.77	221.90	204.21	115.37			596.98	337.28
Poland	290.35	329.94	245.09	278.51			535.44	608.46
Portugal	294.31	272.51	218.85	202.64			513.16	475.15
Slovak Republic	240.47	279.61	252.48	293.59	- 92.94	- 108.07	400.01	465.13
Spain	401.88	337.72	246.18	206.88	- 115.82	- 97.33	532.24	447.26
Sweden	314.17	215.19	144.00	98.63			458.17	313.81
Switzerland	295.64	182.49	185.48	114.49			481.12	296.99
Turkey	81.97	83.64	288.85	294.75	- 98.73	- 100.74	272.09	277.65
United Kingdom	412.54	324.84	104.85	82.56			517.39	407.39
United States	276.79	276.79	98.37	98.37			375.16	375.16
OECD	311.42	252.81	210.47	182.53			490.38	404.76

Note: The OECD low usage basket of residential telephone charges includes fixed access and 600 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-year period.

USD purchasing power parities (PPP) are used to aid in international comparisons.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626205821622

Table 7.4. **OECD basket of residential telephone charges, medium usage, August 2008**

Including tax

	Fixed		Usage		Discount		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	341.45	254.82	371.46	277.21			712.92	532.03
Austria	312.81	244.38	369.12	288.38			681.93	532.76
Belgium	348.27	259.90	419.10	312.76	0.00	0.00	767.37	572.66
Canada	398.35	326.52	49.61	40.66			447.96	367.18
Czech Republic	400.90	440.55	507.69	557.90	- 16.15	- 17.75	892.44	980.70
Denmark	545.53	309.96	156.71	89.04			702.24	399.00
Finland	268.39	172.05	554.43	355.40			822.83	527.45
France	299.45	223.47	416.20	310.59			715.64	534.06
Germany	366.40	281.85	322.22	247.86	- 61.60	- 47.38	627.02	482.32
Greece	271.50	240.26	393.04	347.83			664.54	588.09
Hungary	267.16	318.05	498.22	593.11	- 122.53	- 145.86	642.85	765.30
Iceland	370.09	217.70	322.37	189.63	- 193.08	- 113.58	499.38	293.75
Ireland	748.52	450.91	184.93	111.40			933.45	562.32
Italy	274.94	209.87	418.23	319.26	- 23.00	- 17.56	670.16	511.57
Japan	247.82	199.85	355.04	286.33			602.86	486.18
Korea	69.66	75.72	262.51	285.34			332.18	361.06
Luxembourg	342.67	261.58	296.35	226.22			639.02	487.80
Mexico	225.42	308.79	614.06	841.18	- 301.81	- 413.44	537.66	736.52
Netherlands	428.77	332.38	359.29	278.52	- 92.31	- 71.56	695.75	539.34
New Zealand	365.53	287.82	342.81	269.93			708.35	557.75
Norway	594.19	335.70	135.12	76.34			729.30	412.04
Poland	290.35	329.94	489.34	556.07			779.69	886.01
Portugal	425.83	394.29	213.87	198.03			639.70	592.32
Slovak Republic	358.74	417.14	217.77	253.23			576.52	670.37
Spain	401.88	337.72	488.60	410.59	- 252.35	- 212.06	638.14	536.25
Sweden	314.17	215.19	265.39	181.77			579.56	396.96
Switzerland	295.64	182.49	368.24	227.31			663.88	409.80
Turkey	81.97	83.64	592.42	604.51	- 98.73	- 100.74	575.66	587.41
United Kingdom	412.54	324.84	155.55	122.48			568.09	447.31
United States	333.99	333.99	136.80	136.80			470.79	470.79
OECD	346.76	279.05	342.55	299.86			650.60	540.90

Note: The OECD medium usage basket of residential telephone charges includes fixed access and 1 200 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-year period.

USD purchasing power parities (PPP) are used to aid in international comparisons.
Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626242644331

Table 7.5. **OECD basket of residential telephone charges, high usage, August 2008**

Including tax

	Fixed		Usage		Discount		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	341.45	254.82	841.16	627.73			1 182.61	882.54
Austria	312.81	244.38	837.00	653.91			1 149.81	898.29
Belgium	348.27	259.90	988.63	737.79	0.00	0.00	1 336.90	997.69
Canada	398.35	326.52	78.94	64.70			477.29	391.22
Czech Republic	400.90	440.55	1 145.18	1 258.44	- 16.15	- 17.75	1 529.93	1 681.24
Denmark	545.53	309.96	480.02	272.74			1 025.56	582.70
Finland	268.39	172.05	1 290.21	827.06			1 558.60	999.10
France	299.45	223.47	918.80	685.67			1 218.25	909.14
Germany	543.41	418.01	421.56	324.28			964.97	742.29
Greece	515.85	456.50	891.33	788.79	- 284.82	- 252.05	1 122.35	993.23
Hungary	319.30	380.12	925.50	1 101.79			1 244.80	1 481.91
Iceland	515.89	303.46	522.68	307.46	- 217.24	- 127.79	821.33	483.14
Ireland	748.52	450.91	531.53	320.20			1 280.05	771.11
Italy	274.94	209.87	940.04	717.59	- 22.73	- 17.35	1 192.24	910.11
Japan	247.82	199.85	969.27	781.67			1 217.09	981.52
Korea	69.66	75.72	670.31	728.60			739.98	804.32
Luxembourg	342.67	261.58	704.87	538.07			1 047.54	799.65
Mexico	225.42	308.79	1 415.19	1 938.61	- 473.72	- 648.93	1 166.88	1 598.47
Netherlands	509.31	394.81	806.28	625.02	- 184.64	- 143.14	1 130.94	876.70
New Zealand	365.53	287.82	818.43	644.43			1 183.96	932.25
Norway	594.19	335.70	388.10	219.26			982.29	554.96
Poland	290.35	329.94	991.32	1 126.50			1 281.67	1 456.45
Portugal	425.83	394.29	645.26	597.47			1 071.10	991.76
Slovak Republic	358.74	417.14	635.24	738.65			993.98	1 155.79
Spain	401.88	337.72	1 078.55	906.34	- 356.22	- 299.35	1 124.21	944.71
Sweden	379.90	260.21	488.41	334.53			868.31	594.74
Switzerland	295.64	182.49	845.79	522.10			1 141.43	704.59
Turkey	217.37	221.80	871.39	889.17			1 088.76	1 110.98
United Kingdom	412.54	324.84	482.92	380.25			895.46	705.09
United States	333.99	333.99	244.56	244.56			578.55	578.55
OECD	376.80	303.91	762.28	663.45			1 087.23	917.14

Note: The OECD high usage basket of residential telephone charges includes fixed access and 2 400 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-year period.

USD purchasing power parities (PPP) are used to aid in international comparisons.
Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626324288722

Table 7.6. **OECD business fixed-line basket: small office/home office, August 2008**

Excluding tax

	Fixed		Usage		Discount		Total	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	413.84	308.83	678.01	505.97			1 091.84	814.81
Austria	359.51	280.86	344.39	269.05			703.90	549.92
Belgium	368.29	274.84	510.10	380.67	- 132.30	- 98.73	746.09	556.78
Canada	644.25	528.08	119.83	98.22			764.08	626.30
Czech Republic	391.21	429.90	478.13	525.42			869.34	955.32
Denmark	284.52	161.66	342.60	194.66			627.11	356.31
Finland	220.00	141.02	620.41	397.70			840.41	538.72
France	328.65	245.26	494.80	369.25			823.45	614.52
Germany	307.90	236.84	297.09	228.53	- 51.76	- 39.82	553.22	425.55
Greece	228.15	201.90	353.22	312.59			581.37	514.49
Hungary	242.85	289.11	353.27	420.55			596.11	709.66
Iceland	221.73	130.43	332.05	195.32			553.77	325.75
Ireland	501.43	302.06	375.20	226.02	- 108.82	- 65.56	767.80	462.53
Italy	412.47	314.86	453.31	346.04			865.78	660.90
Japan	323.84	261.16	431.29	347.81			755.13	608.97
Korea	63.33	68.84	267.86	291.15			331.19	359.99
Luxembourg	297.97	227.46	319.53	243.92			617.50	471.38
Mexico	244.97	335.57	597.41	818.36			842.37	1 153.94
Netherlands	286.68	222.23	380.99	295.34			667.66	517.57
New Zealand	446.62	351.67	334.98	263.76			781.60	615.43
Norway	475.35	268.56	182.41	103.06			657.76	371.62
Poland	317.66	360.98	406.86	462.34			724.52	823.32
Portugal	276.09	255.64	429.47	397.66			705.56	653.30
Slovak Republic	301.47	350.55	511.85	595.18	- 99.93	- 116.19	713.40	829.53
Spain	346.45	291.14	571.76	480.47	- 217.91	- 183.12	700.30	588.49
Sweden	238.66	163.47	464.36	318.05			703.02	481.52
Switzerland	264.57	163.32	506.48	312.64			771.05	475.96
Turkey	57.32	58.49	452.49	461.72	- 69.04	- 70.45	440.77	449.76
United Kingdom	317.97	250.37	707.26	556.90			1 025.24	807.27
United States	261.84	261.84	157.35	157.35			419.20	419.20
OECD	314.85	257.90	415.83	352.52			708.02	591.29

Note: The OECD small office / home office basket of telephone charges includes fixed access and 1 800 calls (broken down according to distance, destination [fixed, mobile and international], and time of day) over a one-year period.

USD purchasing power parities (PPP) are used to aid in international comparisons

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626344156103

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Table 7.7. **OECD business fixed-line basket: small & medium-sized enterprises, August 2008**

Excluding tax

	Fixed		Usage		Discount		Total (30 lines)		Total (for each line)	
	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia	12 415	9 265	30 012	22 397			42 427	31 662	1 414	1 055
Austria	10 785	8 426	16 021	12 516			26 806	20 942	894	698
Belgium	11 049	8 245	24 459	18 253	- 4 008	- 2 991	31 500	23 507	1 050	784
Canada	19 328	15 842	7 130	5 844			26 458	21 687	882	723
Czech Republic	11 736	12 897	20 944	23 016			32 680	35 913	1 089	1 197
Denmark	13 093	7 439	9 899	5 625			22 992	13 064	766	435
Finland	6 600	4 231	29 271	18 763			35 870	22 994	1 196	766
France	9 859	7 358	22 726	16 959			32 585	24 317	1 086	811
Germany	9 237	7 105	11 625	8 943	- 1 553	- 1 195	19 309	14 853	644	495
Greece	16 663	14 746	17 438	15 432	- 15 717	- 13 908	18 385	16 270	613	542
Hungary	12 430	14 797	18 482	22 002	- 8 026	- 9 555	22 885	27 244	763	908
Iceland	6 652	3 913	15 422	9 072			22 074	12 985	736	433
Ireland	15 043	9 062	16 843	10 146	- 3 255	- 1 961	28 630	17 247	954	575
Italy	12 374	9 446	22 857	17 448			35 231	26 894	1 174	896
Japan	9 715	7 835	27 102	21 856			36 817	29 691	1 227	990
Korea	1 900	2 065	17 274	18 776			19 173	20 841	639	695
Luxembourg	8 939	6 824	14 171	10 818			23 111	17 642	770	588
Mexico	7 349	10 067	30 118	41 257			37 467	51 324	1 249	1 711
Netherlands	8 600	6 667	17 395	13 485			25 995	20 151	867	672
New Zealand	13 399	10 550	14 397	11 336			27 795	21 886	927	730
Norway	14 261	8 057	7 329	4 141			21 589	12 197	720	407
Poland	9 530	10 829	18 300	20 796			27 830	31 625	928	1 054
Portugal	8 283	7 669	22 282	20 632			30 565	28 301	1 019	943
Slovak Republic	16 060	18 674	11 589	13 475			27 649	32 150	922	1 072
Spain	12 624	10 608	25 584	21 499	- 18 461	- 15 513	19 747	16 594	658	553
Sweden	7 160	4 904	19 872	13 611			27 032	18 515	901	617
Switzerland	7 937	4 899	21 572	13 316			29 509	18 215	984	607
Turkey	2 811	2 869	14 421	14 715			17 232	17 584	574	586
United Kingdom	9 539	7 511	37 814	29 775			47 354	37 286	1 578	1 243
United States	7 855	7 855	8 654	8 654			16 509	16 509	550	550
OECD	10 441	8 689	19 033	16 152			27 774	23 336	926	778

Notes: The OECD small and medium enterprises basket of telephone charges includes fixed access and 84 000 calls (2 800 calls for each of 30 employees broken down according to distance, destination [fixed, mobile and international], and time of day over a one-year period. USD purchasing power parities (PPP) are used to aid international comparisons.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626372104726

Table 7.8. **OECD basket of mobile telephone charges, low use, August 2008**

Including tax

		Fixed		Usage		Messages		Total		Contract type
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP	
Australia, Optus	$19 Cap Plan + Yes Time	0.00	0.00	162.25	118.43	34.74	25.36	196.99	143.79	
Austria, T-Mobile	Klax Start	7.33	5.51	65.95	49.59	123.91	93.16	197.19	148.26	Pre-paid
Belgium, Mobistar	Simply Prepaid	2.46	1.76	141.86	101.33	61.36	43.83	205.68	146.92	Pre-paid
Canada, Rogers	Pay As You Go 1¢ Evening & Weekend	6.59	5.54	156.62	131.62	69.65	58.53	232.86	195.68	Pre-paid
Czech Republic, O2	Simple 240	206.91	211.13	22.36	22.82	9.79	9.99	239.06	243.94	
Denmark, Sonofon	Selvhenter.dk	9.82	5.40	64.22	35.29	17.52	9.62	91.56	50.31	Pre-paid
Finland, Elisa	Kolombus Prepaid	4.92	3.02	48.95	30.03	44.44	27.26	98.30	60.31	Pre-paid
France, Orange	Zap 11-18 17 euro/24 months	300.92	216.49	0.00	0.00	0.00	0.00	300.92	216.49	
Germany, T-Mobile	Xtra Click Online	4.92	3.64	83.86	62.12	52.36	38.79	141.14	104.55	Pre-paid
Greece, Vodafone	A La Carte + 30 Vf/Fx	90.96	75.80	84.01	70.01	67.97	56.64	242.95	202.46	Pre-paid
Hungary, T-Mobile	Domino Aktív	33.52	35.66	93.39	99.35	77.15	82.08	204.05	217.08	Pre-paid
Iceland, Siminn	Frelsi	8.10	5.47	118.69	80.20	47.27	31.94	174.06	117.61	Pre-paid
Ireland, Vodafone	Advantage	0.00	0.00	192.20	111.10	67.21	38.85	259.41	149.95	Pre-paid
Italy, Vodafone	Tempo Libero Prepaid	0.00	0.00	148.57	123.14	94.70	72.10	243.27	195.23	Pre-paid
Japan, KDDI au	Plan S Simple with 24 Month Contract	196.61	161.16	8.85	7.26	0.00	0.00	205.47	168.41	
Korea, KTF	Prepaid	0.00	0.00	177.09	210.82	13.73	16.34	190.82	227.16	Pre-paid
Luxembourg, Tango	Knock-out	0.00	0.00	91.76	66.98	55.64	40.61	147.40	107.59	
Mexico, Telcel	Plan Adicional	134.46	181.70	32.46	43.86	4.59	6.20	171.51	231.77	
Netherlands, KPN	SIM-only €12.50	140.72	105.02	0.00	0.00	0.00	0.00	140.72	105.02	
New Zealand, Vodafone	Base 20 - 24 months	160.09	134.53	6.75	5.67	1.72	1.44	168.56	141.65	
Norway, Telenor	FriFiks	64.90	35.86	49.22	27.19	42.85	23.67	156.97	86.72	
Poland, Era	Zero	0.00	0.00	114.41	119.17	27.62	28.77	142.03	147.94	
Portugal, Vodafone	Vodafone Directo Sem Carregamentos	0.00	0.00	122.89	108.75	50.91	45.05	173.80	153.80	Pre-paid
Slovak Republic, Orange	Pausal 299 Sk	153.89	230.37	58.99	5.45	21.49	5.79	234.37	241.62	
Spain, MoviStar	Contrato Empresas Tramos Horarios	11.99	9.60	186.18	148.94	115.33	92.26	313.50	250.80	
Sweden, Tele 2 Comviq	Kontant Amigos	0.00	0.00	86.38	56.46	32.48	21.23	118.86	77.69	Pre-paid
Switzerland, Sunrise	Go	6.06	3.59	141.75	83.88	39.83	23.57	187.65	111.03	Pre-paid
Turkey, Turkcell	BizBize Hepimiz Alo 60	116.48	121.33	9.06	9.44	88.40	92.08	213.94	222.85	
United Kingdom, T-Mobile	Pay As You Go Mates Rates	0.00	0.00	150.13	119.15	51.97	41.24	202.10	160.40	Pre-paid
United States, AT&T	Pay As You Go 25¢ per minute	16.83	16.83	193.82	193.82	68.87	68.87	279.52	279.52	Pre-paid
OECD average		55.95	52.31	93.76	74.73	46.12	36.51	195.82	163.55	

Note: The OECD basket of mobile telephone charges (low use) includes subscription and usage (360 minutes of voice calls, 396 SMS messages and 8 MMS, distributed between peak and off-peak hours and based on an average call duration)over a one-year 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. The existing mobile basket methodology does not include discounted or free calls to pre-selected phone numbers as part of "friends and family" or "preferred numbers" plans. The inclusion of these calls will be considered as part of a future update of the mobile basket methodology.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626422603242

Table 7.9. **OECD basket of mobile telephone charges, medium use, August 2008**

Including tax

		Fixed		Usage		Messages		Grand total	
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia, Optus	'yes' Business Smart 39 SmartRate	51.84	37.84	308.22	224.98	96.13	70.17	456.19	332.99
Austria, Mobilkom	A1 Xcite Easy	0.00	0.00	183.30	137.82	82.21	61.82	265.52	199.64
Belgium, Proximus	Smile Bundle €20 + WE On-net	354.02	252.87	90.16	64.40	24.55	17.53	468.73	334.81
Canada, Bell Mobility	Text 25 + Message Centre Express	549.37	461.66	41.99	35.28	4.39	3.69	595.75	500.63
Czech Republic, O2	Neon M	324.62	331.24	111.78	114.06	38.25	39.03	474.65	484.34
Denmark, TDC Mobil	Simply	6.53	3.59	219.53	120.62	33.63	18.48	259.68	142.68
Finland, Elisa	Kolombus K1	11.68	7.17	139.25	85.43	63.31	38.84	214.24	131.44
France, Orange	Forfait M6 24.90€/24 months	440.76	317.09	66.94	48.16	17.75	12.77	525.44	378.02
Germany, Vodafone	Kombi Wochenende 120 SIM only	365.41	270.67	0.00	0.00	181.61	134.53	547.02	405.20
Greece, Cosmote	Cosmote 120 + SMS 30	437.87	364.90	0.00	0.00	43.11	35.93	480.99	400.82
Hungary, Pannon	djuice post-paid 10	290.49	309.03	0.00	0.00	0.00	0.00	290.49	309.03
Iceland, Siminn	Betri	290.14	196.04	0.00	0.00	1.46	0.99	291.60	197.03
Ireland, Vodafone	Perfect Choice 100	513.33	296.73	55.07	31.83	2.95	1.71	571.35	330.26
Italy, TIM	Affare Fatto	0.00	0.00	366.88	291.44	139.84	102.82	506.71	394.26
Japan, KDDI au	Plan M Simple with 24 Month Contract	311.65	255.45	14.68	12.04	0.00	0.00	326.33	267.49
Korea, KTF	Standard Tariff (1/2 discount on-net)	198.70	236.55	73.16	87.10	13.85	16.49	285.71	340.13
Luxembourg, Tango	Knock-out	0.00	0.00	199.86	145.88	82.72	60.38	282.58	206.26
Mexico, Telcel	GSM Virus	270.28	365.24	7.03	9.50	31.73	42.87	309.04	417.62
Netherlands, KPN	SIM-only €17.50	176.13	131.44	0.00	0.00	0.00	0.00	176.13	131.44
New Zealand, Vodafone	Base 60 - 24 months	295.26	248.12	7.69	6.46	1.72	1.44	304.66	256.02
Norway, Telenor	djuce zero	0.00	0.00	241.44	133.39	57.80	31.93	299.24	165.33
Poland, Era	New Biznes 20	129.18	134.57	64.37	67.05	64.94	67.65	258.50	269.27
Portugal, Vodafone	Plano Best Total 1 Aditivo SMS 30	43.90	38.85	317.63	281.09	56.97	50.42	418.50	370.35
Slovak Republic, Orange	Pausal 50 + SMS	293.03	302.10	136.53	140.76	33.57	34.61	463.14	477.46
Spain, MoviStar	Contrato Empresas Tramos Horarios	11.99	9.60	455.64	364.51	167.69	134.15	635.32	508.26
Sweden, Tele 2 Comviq	Snackis	191.09	124.89	0.00	0.00	19.96	13.04	211.04	137.94
Switzerland, Sunrise	Zero	12.18	7.21	380.71	225.27	58.47	34.60	451.36	267.08
Turkey, Turkcell	BizBize Hepimiz Alo 60 + SMS 50	203.28	211.75	51.85	54.01	3.43	3.58	258.57	269.34
United Kingdom, T-Mobile	Solo 15 - 30 day SIM only	330.19	262.06	9.62	7.63	2.94	2.33	342.74	272.02
United States, AT&T	Nation 450 Messaging 200	635.85	635.85	0.00	0.00	0.00	0.00	635.85	635.85
OECD average		224.63	193.75	118.11	89.62	44.17	34.39	386.90	317.77

Notes: The OECD basket of mobile telephone charges (medium use) includes subscription and usage (780 minutes of voice calls, 600 SMS messages and 8 MMS, distributed between peak and off-peak hours and based on an average call duration) over a one-year 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. The existing mobile basket methodology does not include discounted or free calls to pre-selected phone numbers as part of "friends and family" or "preferred numbers" plans. The inclusion of these calls will be considered as part of a future update of the mobile basket methodology. Prepaid plans are excluded.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626457771323

Table 7.10. **OECD basket of mobile telephone charges, high use, August 2008**

Including tax

		Fixed		Usage		Messages		Grand total	
		USD	USD PPP	USD	USD PPP	USD	USD PPP	USD	USD PPP
Australia, Optus	$49 Cap Plan + Yes Time	508.03	0.00	0.00	347.10	0.00	23.73	508.03	370.83
Austria, Mobilkom	A1 Xcite Easy	0.00	0.00	239.14	179.81	57.00	42.86	296.14	222.66
Belgium, Mobistar	FreeAllFriends	531.04	379.31	294.26	210.19	55.54	39.67	880.84	629.17
Canada, Bell Mobility	Text 25 + Message Centre Express	549.37	461.66	114.25	96.01	6.59	5.54	670.21	563.20
Czech Republic, O2	Business 150	514.43	524.93	242.75	247.70	77.14	78.71	834.32	851.34
Denmark, Sonofon	MobilDeal 99	6.53	3.59	320.51	176.10	5.93	3.26	332.97	182.95
Finland, Elisa	Elisa 250 + Tekstari 100	318.10	195.15	0.00	0.00	6.73	4.13	324.83	199.28
France, SFR	Essentiel 3H Maxi 24 months	706.28	508.11	0.00	0.00	133.47	96.02	839.74	604.13
Germany, Vodafone	Kombi Wochenende 240 SIM only	630.92	467.35	0.00	0.00	201.62	149.35	832.54	616.70
Greece, Vodafone	Vodafone 250 SMS 50	729.29	607.74	18.17	15.14	17.69	14.75	765.15	637.62
Hungary, Pannon	djuice post-paid 10	290.49	309.03	265.06	281.98	24.12	25.65	579.67	616.67
Iceland, Siminn	Bestur	435.94	294.56	145.96	98.62	2.19	1.48	584.09	394.66
Ireland, O2	Clear 350 18 month	885.06	511.60	0.00	0.00	4.43	2.56	889.49	514.15
Italy, TIM	Tutto Compreso 30 24 month	622.37	457.63	0.00	0.00	10.62	7.81	632.99	465.44
Japan, KDDI au	Plan L Simple with 24 Month Contract	487.08	399.25	39.28	32.20	2.77	2.27	529.13	433.71
Korea, KTF	Standard Tariff (1/2 discount on-net)	198.70	236.55	174.69	207.97	15.89	18.91	389.28	463.43
Luxembourg, Tango	Easy	159.31	116.29	194.04	141.64	92.22	67.32	445.57	325.24
Mexico, MoviStar	Plan 200	406.10	548.78	74.61	100.82	68.06	91.98	548.77	741.58
Netherlands, KPN	SIM-only €23.50	246.93	184.28	0.00	0.00	4.44	3.31	251.37	187.59
New Zealand, Vodafone	Base 150 - 24 months	506.46	425.59	16.56	13.91	2.58	2.17	525.59	441.67
Norway, Netcom	SmartTalk + Voicemail + Venner	331.22	183.00	171.05	94.50	37.36	20.64	539.64	298.14
Poland, Era	New Biznes 40	258.37	269.13	160.07	166.74	72.00	75.00	490.44	510.88
Portugal, Vodafone	Plano Best Total 2 Aditivo SMS 30	43.90	38.85	592.10	523.99	63.57	56.26	699.57	619.09
Slovak Republic, Orange	Pausal 90 + SMS	401.57	413.99	425.26	438.42	46.18	47.61	873.01	900.01
Spain, MoviStar	Contrato Empresas Tramos Horarios	11.99	9.60	994.15	795.32	189.93	151.95	1 196.08	956.86
Sweden, Tele 2 Comviq	Snackis	191.09	124.89	87.49	57.18	22.80	14.90	301.38	196.98
Switzerland, Sunrise	Zero Plus	12.18	7.21	593.47	351.17	65.78	38.92	671.44	397.30
Turkey, Turkcell	BizBize Hepimiz Alo 60 + SMS 50	203.28	211.75	177.29	184.67	18.02	18.77	398.59	415.20
United Kingdom, T-Mobile	Solo 15 - 30 day SIM only	330.19	262.06	20.71	16.44	4.40	3.49	355.30	281.99
United States, AT&T	Nation 450 Messaging 200	635.85	635.85	0.00	0.00	0.00	0.00	635.85	635.85
OECD average		371.74	292.92	178.70	159.25	43.64	36.97	594.07	489.14

Notes: The OECD basket of mobile telephone charges (high use) includes subscription and usage (1680 minutes of voice calls, 660 SMS messages and 12 MMS, distributed between peak and off-peak hours and based on an average call duration) over a one-year 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. The existing mobile basket methodology does not include discounted or free calls to pre-selected phone numbers as part of "friends and family" or "preferred numbers" plans. The inclusion of these calls will be considered as part of a future update of the mobile basket methodology. Prepaid plans are excluded.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626481615465

Table 7.11. **OECD basket of international telephone calling charges per call, August 2008**

	Business (excluding VAT)		Residential (including VAT)	
	USD PPP	USD	USD PPP	USD
Australia	0.71	0.95	1.00	1.34
Austria	0.44	0.56	0.70	0.90
Belgium	0.70	0.93	0.82	1.10
Canada	0.43	0.52	0.21	0.26
Czech Republic	0.73	0.66	1.22	1.11
Denmark	0.45	0.79	0.71	1.25
Finland	0.82	1.29	1.06	1.65
France	0.47	0.63	0.87	1.16
Germany	0.10	0.14	0.16	0.21
Greece	0.93	1.05	1.43	1.61
Hungary	0.76	0.64	1.30	1.10
Iceland	0.43	0.73	0.68	1.16
Ireland	0.33	0.54	0.42	0.70
Italy	0.93	1.22	1.34	1.75
Japan	2.33	2.89	2.45	3.04
Korea	2.08	1.91	2.79	2.57
Luxembourg	0.28	0.36	0.59	0.78
Mexico	2.43	1.77	3.52	2.57
Netherlands	0.47	0.60	0.57	0.74
New Zealand	0.34	0.44	1.21	1.54
Norway	0.21	0.37	0.32	0.56
Poland	0.88	0.77	0.92	0.81
Portugal	1.14	1.23	1.37	1.48
Slovak Republic	0.78	0.67	1.19	1.03
Spain	0.72	0.85	1.01	1.20
Sweden	0.41	0.60	0.45	0.66
Switzerland	0.25	0.41	0.32	0.52
Turkey	0.18	0.18	0.33	0.32
United Kingdom	1.89	2.40	1.05	1.33
United States	0.51	0.51	0.47	0.47
OECD	0.77	0.89	1.02	1.16

Note: Average call charge for one single call, weighted by traffic. USD purchasing power parities (PPP) are used to aid international comparisons.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626486033275

Table 7.12. **Changes in DSL/fibre offerings, September 2005 to 2008**

		Speed (kbit/s)				Price (local currency)				Bitcap (MB)				Speed change	Price change
Country	Operator	**2005**	**2006**	**2007**	**2008**	**2005**	**2006**	**2007**	**2008**	**2005**	**2006**	**2007**	**2008**	**CAGR 2005-08**	**CAGR 2005-08**
Australia	Bigpond	1 536	1 536	1 536	1 536	129	110	70	70	10 000	10 000	12 000	12 000	0.0	-18.5
Austria	AON	2 048	2 048	2 048	2 048	55	55	60	40	12 000	15 000	20 000	-	0.0	-10.1
Belgium	Belgacom	4 096	4 096	4 096	4 096	55	55	57	57	30 000	30 000	30 000	60 000	0.0	1.3
Canada	Bell Canada	5 000	5 000	7 168	7 168	50	47	50	48	-	-	60 000	60 000	12.8	-1.4
Czech Republic	O2	1 024	2 048	2 048	8 192	2 999	599	399	475	-	8 000	10 000	-	100.0	-45.9
Denmark	TDC	4 096	4 096	4 096	4 096	499	474	319	194	-	15 000	-	-	0.0	-27.0
Finland	Sonera	24 000	24 000	24 576	24 576	69	59	49	25	-	-	-	-	0.8	-29.2
France	France Telecom	18 000	18 000	18 432	18 432	40	35	35	35	-	-	-	-	0.8	-4.4
Germany	T-Com	6 016	6 016	6 144	6 144	35	35	29	40	-	-	-	-	0.7	4.6
Greece	OTE	1 024	1 024	1 024	1 024	33	29	22	17	-	-	-	-	0.0	-20.5
Hungary	T-Com	2 048	2 048	4 096	8 192	22 188	15 600	6 900	3 990	-	-	-	-	58.7	-43.6
Iceland	Simmin	6 000	8 192	8 192	8 192	5 790	5 990	5 990	6 190	-	-	-	80 000	10.9	2.3
Ireland	Eircom	2 048	2 048	2 048	3 000	54	30	40	30	16 000	20 000	20 000	30 000	13.6	-18.0
Italy	Alice	4 000	20 480	20 480	20 480	42	37	37	25	-	-	-	-	72.4	-15.9
Japan	NTT West	102 400	102 400	102 400	102 400	4 064	3 612	2 930	3 255	-	-	-	-	0.0	-7.1
Korea	KT	102 400	102 400	102 400	102 400	36 000	36 000	36 000	34 200	-	-	-	-	0.0	-1.7
Luxembourg	EPT	3 000	3 000	15 360	15 360	91	79	79	79	25 000	-	-	-	72.4	-4.4
Mexico	Telmex	1 024	1 024	1 024	1 024	599	401	399	599	-	-	-	-	0.0	0.0
Netherlands	KPN	8 000	6 144	6 144	20 000	75	50	50	50	-	-	-	-	35.7	-12.6
New Zealand	TCNZ	2 000	2 000	24 576	24 576	70	40	70	80	1 000	1 000	10 000	15 000	130.8	4.6
Norway	Telenor	4 000	6 144	6 144	6 144	549	499	499	499	-	-	-	-	15.4	-3.1
Poland	TP	6 144	6 144	6 144	6 144	292	156	156	109	50 000	-	-	-	0.0	-28.0
Portugal	Portugal Telecom	8 192	8 192	8 192	16 000	60	50	36	35	8 000	30 000	50 000	-	25.0	-16.2
Slovak Republic	Slovak Telecom	1 024	1 024	1 536	2 048	1 589	799	249	399	-	-	1 000	2 000	26.0	-36.9
Spain	Telefonica	1 024	1 024	1 024	1 024	39	39	39	30	-	-	-	-	0.0	-8.5
Sweden	TeliaSonera	24 576	24 576	24 576	24 576	419	399	379	359	-	-	-	-	0.0	-5.0
Switzerland	Bluewin	2 400	3 500	3 500	5 000	99	69	49	49	-	-	-	-	27.7	-20.9
Turkey	TTNet	2 048	2 048	2 048	2 048	238	167	69	69	-	-	-	-	0.0	-33.8
United Kingdom	BT	2 200	8 192	8 192	8 192	25	27	25	25	15 000	40 000	-	-	55.0	0.0
United States	AT&T	3 072	3 072	3 072	3 072	37	25	25	30	-	-	-	-	0.0	-6.7
OECD averages		11 815	12 717	14 077	15 239					18 556	18 778	23 667	37 000	22.0	-13.6

StatLink http://dx.doi.org/10.1787/626513027534

Table 7.13. **Changes in cable offerings, September 2005 to 2008**

		Speed (kbit/s)				Price (local currency)				Bitcap (MB)				Speed change	Price change
Country	Operator	**2005**	**2006**	**2007**	**2008**	**2005**	**2006**	**2007**	**2008**	**2005**	**2006**	**2007**	**2008**	**CAGR 2005-08**	**CAGR 2005-08**
Australia	Optus	2 880	9 900	9 900	20 000	75	80	110	110	12 000	20 000	30 000	30 000	90.8	13.6
Austria	UPC	16 384	16 384	16 384	16 384	89	89	69	27	-	-	-	-	0.0	-32.9
Belgium	Telenet	10 000	20 000	20 000	20 000	60	60	61	61	30 000	35 000	35 000	60 000	26.0	0.8
Canada	Shaw	10 240	10 240	10 240	10 240	70	47	51	51	30 000	100 000	100 000	100 000	0.0	-10.0
Czech Republic	UPC	4 096	4 096	5 120	6 144	1 678	1 224	655	794	-	50 000	40 000	-	14.5	-22.1
Denmark	Telia Stofa	4 096	4 096	4 096	4 096	499	459	339	239	-	-	-	-	0.0	-21.8
Finland	Welho	6 000	6 000	10 240	10 240	45	45	45	45	-	-	-	-	19.5	-0.1
France	Noos/Numericable	10 000	20 000	30 720	30 720	35	35	20	22	-	-	-	-	45.4	-14.4
Germany	Kabel Deutschland	6 200	2 200	6 144	6 144	30	30	20	20	-	-	-	-	-0.3	-12.7
Hungary	UPC	5 120	6 144	5 120	10 000	29 990	28 790	5 990	7 500	60 000	-	-	-	25.0	-37.0
Ireland	ntl / UPC Ireland	3 000	3 000	3 000	10 000	45	30	30	30	40 000	30 000	30 000	-	49.4	-12.6
Japan	J:COM	30 720	30 720	30 720	30 720	5 775	5 775	5 775	5 775	-	-	-	-	0.0	0.0
Korea	C&M	5 000	10 000	10 240	100 000	27 100	34 545	28 000	27 000	-	-	-	-	171.4	-0.1
Luxembourg	Coditel / Numericable	4 000	6 000	20 480	30 000	67	35	33	40	20 000	25 000	30 000	-	95.7	-15.9
Mexico	Megacable	1 024	1 024	2 048	2 048	1 093	345	299	299	-	-	-	-	26.0	-35.1
Netherlands	UPC	20 480	20 480	20 480	24 576	80	60	60	60	-	-	-	-	6.3	-9.1
New Zealand	TelstraClear	10 240	10 240	10 240	10 240	140	132	135	110	10 000	40 000	40 000	40 000	0.0	-7.7
Norway	Get	26 624	26 624	26 624	26 624	998	898	699	699	-	-	-	-	0.0	-11.2
Poland	UPC	12 000	12 000	20 480	20 480	299	299	249	149	-	-	-	-	19.5	-20.7
Portugal	TV Cabo	8 192	8 000	12 288	18 000	61	50	36	35	8 000	30 000	30 000	-	30.0	-16.7
Slovak Republic	UPC	3 072	4 096	4 096	10 240	2 399	1 428	1 099	650	-	-	-	-	49.4	-35.3
Spain	ono	2 048	4 096	4 096	6 000	42	35	35	40	-	-	-	-	43.1	-1.6
Sweden	Com Hem	8 000	8 192	8 192	10 000	389	299	319	299	-	-	-	-	7.7	-8.4
Switzerland	Cablecom	2 000	3 000	3 500	5 000	75	22	45	45	-	-	-	-	35.7	-15.7
Turkey	Topaz / Turksat	2 048	2 048	2 048	2 048	220	289	209	59	-	-	-	-	0.0	-35.5
United Kingdom	Telewest / Virigin	4 096	4 096	4 096	10 000	50	25	25	24	-	-	-	-	34.7	-21.7
United States	Comcast	6 144	6 144	6 144	12 000	68	58	60	43	-	-	-	-	25.0	-14.2
OECD averages		8 285	9 586	11 361	17 109	2 647	2 785	1 647	1 638					30.2	-14.7

StatLink http://dx.doi.org/10.1787/626516088501

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008**

Country	Company	Type	Plan	Down (Kbit/s)	Up (Kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
Australia	Bigpond	ADSL	Fast	256	64	200	24.50	20.59	95.69	80.41
Australia	Bigpond	ADSL	Fast	256	64	200	24.50	20.59	95.69	80.41
Australia	Bigpond	ADSL	Fast	256	64	12 000	49.03	41.21	191.54	160.96
Australia	Bigpond	ADSL	Fast	256	64	12 000	49.03	41.21	191.54	160.96
Australia	Bigpond	ADSL	Faster	1 500	256	400	32.68	27.46	21.78	18.31
Australia	Bigpond	ADSL	Faster	1 500	256	400	40.86	34.33	27.24	22.89
Australia	Bigpond	ADSL	Faster	1 500	256	12 000	57.21	48.08	38.14	32.05
Australia	Bigpond	ADSL	Faster	1 500	256	25 000	65.39	54.95	43.60	36.63
Australia	Bigpond	ADSL	Faster	1 500	256	12 000	65.39	54.95	43.60	36.63
Australia	Bigpond	ADSL	Faster	1 500	256	25 000	73.57	61.83	49.05	41.22
Australia	Bigpond	ADSL	Fastest	20 000		600	49.03	41.21	2.45	2.06
Australia	Bigpond	ADSL	Fastest	20 000		600	57.21	48.08	2.86	2.40
Australia	Bigpond	ADSL	Fastest	20 000		12 000	73.57	61.83	3.68	3.09
Australia	Bigpond	ADSL	Fastest	20 000		25 000	81.75	68.70	4.09	3.43
Australia	Bigpond	ADSL	Fastest	20 000		12 000	81.75	68.70	4.09	3.43
Australia	Bigpond	ADSL	Fastest	20 000		25 000	89.93	75.57	4.50	3.78
Australia	Bigpond	ADSL	Fastest	20 000		60 000	122.65	103.07	6.13	5.15
Australia	Bigpond	ADSL	Fastest	20 000		60 000	130.83	109.94	6.54	5.50
Australia	Bigpond	Cable	Fast	8 000	128	200	24.50	20.59	3.06	2.57
Australia	Bigpond	Cable	Fast	8 000	128	200	24.50	20.59	3.06	2.57
Australia	Bigpond	Cable	Fast	8 000	128	400	32.68	27.46	4.08	3.43
Australia	Bigpond	Cable	Fast	8 000	128	400	40.86	34.33	5.11	4.29
Australia	Bigpond	Cable	Fast	8 000	128	12 000	49.03	41.21	6.13	5.15
Australia	Bigpond	Cable	Fast	8 000	128	12 000	57.21	48.08	7.15	6.01
Australia	Bigpond	Cable	Fast	8 000	128	25 000	65.39	54.95	8.17	6.87
Australia	Bigpond	Cable	Fast	8 000	128	25 000	73.57	61.83	9.20	7.73
Australia	Bigpond	Cable	Fastest	30 000	1 000	200	32.68	27.46	1.09	0.92
Australia	Bigpond	Cable	Fastest	30 000	1 000	200	32.68	27.46	1.09	0.92
Australia	Bigpond	Cable	Fastest	30 000	1 000	400	40.86	34.33	1.36	1.14
Australia	Bigpond	Cable	Fastest	30 000	1 000	400	49.03	41.21	1.63	1.37
Australia	Bigpond	Cable	Fastest	30 000	1 000	12 000	57.21	48.08	1.91	1.60
Australia	Bigpond	Cable	Fastest	30 000	1 000	12 000	65.39	54.95	2.18	1.83
Australia	Bigpond	Cable	Fastest	30 000	1 000	25 000	73.57	61.83	2.45	2.06
Australia	Bigpond	Cable	Fastest	30 000	1 000	25 000	81.75	68.70	2.73	2.29
Australia	Bigpond	Cable	Fastest	30 000	1 000	60 000	106.29	89.32	3.54	2.98
Australia	Bigpond	Cable	Fastest	30 000	1 000	60 000	114.47	96.19	3.82	3.21
Australia	Internode	ADSL	Home-256-Express	256	64	5 000	28.59	24.02	111.67	93.84
Australia	Internode	ADSL	Home-512-Starter	512	128	5 000	32.68	27.46	63.82	53.63
Australia	Internode	ADSL	Home-1500-Explorer	1 500	256	10 000	40.86	34.33	27.24	22.89
Australia	Internode	ADSL	Home-1500-Advance	1 500	256	20 000	49.03	41.21	32.69	27.47
Australia	Internode	ADSL	Home-1500-Boost	1 500	256	40 000	57.21	48.08	38.14	32.05
Australia	Internode	ADSL	Home-Plus-5	8 000	384	5 000	57.21	48.08	7.15	6.01
Australia	Internode	ADSL	Home-Plus-10	8 000	384	10 000	61.30	51.52	7.66	6.44
Australia	Internode	ADSL	Home-Plus-25	8 000	384	25 000	69.48	58.39	8.69	7.30
Australia	Internode	ADSL	Home-Plus-40	8 000	384	40 000	81.75	68.70	10.22	8.59
Australia	Internode	ADSL	Home-Plus-55	8 000	384	55 000	94.02	79.01	11.75	9.88
Australia	Internode	ADSL	Home-Plus-80	8 000	384	80 000	118.56	99.63	14.82	12.45
Australia	Internode	ADSL	Home-Plus-100	8 000	384	100 000	143.10	120.25	17.89	15.03
Australia	Internode	ADSL	Home-Naked-5	20 000	820	5 000	49.03	41.21	2.45	2.06
Australia	Internode	ADSL	Home-Naked-10	20 000	820	10 000	53.12	44.64	2.66	2.23
Australia	Internode	ADSL	Home-Naked-25	20 000	820	25 000	61.30	51.52	3.07	2.58
Australia	Internode	ADSL	Home-Naked-40	20 000	820	40 000	73.57	61.83	3.68	3.09
Australia	Internode	ADSL	Home-Naked-55	20 000	820	55 000	85.84	72.14	4.29	3.61
Australia	Internode	ADSL	Home-Naked-80	20 000	820	80 000	110.38	92.76	5.52	4.64
Australia	Internode	ADSL	Home-Naked-100	20 000	820	100 000	134.92	113.38	6.75	5.67
Australia	Internode	ADSL	Home-Extreme-Starter	24 000	1 000	10 000	40.86	34.33	1.70	1.43
Australia	Internode	ADSL	Home-Extreme-Value	24 000	1 000	25 000	49.03	41.21	2.04	1.72
Australia	Internode	ADSL	Home-NakedExtreme-10	24 000	1 000	10 000	49.03	41.21	2.04	1.72
Australia	Internode	ADSL	Home-NakedExtreme-25	24 000	1 000	25 000	57.21	48.08	2.38	2.00
Australia	Internode	ADSL	Home-Extreme-Boost	24 000	1 000	40 000	61.30	51.52	2.55	2.15
Australia	Internode	ADSL	Home-NakedExtreme-40	24 000	1 000	40 000	69.48	58.39	2.90	2.43
Australia	Internode	ADSL	Home-Extreme-Pro	24 000	1 000	55 000	73.57	61.83	3.07	2.58
Australia	Internode	ADSL	Home-NakedExtreme-55	24 000	1 000	55 000	81.75	68.70	3.41	2.86
Australia	Internode	ADSL	Home-Extreme-Super	24 000	1 000	80 000	98.11	82.45	4.09	3.44
Australia	Internode	ADSL	Home-NakedExtreme-80	24 000	1 000	80 000	106.29	89.32	4.43	3.72
Australia	Internode	ADSL	Home-Extreme-Elite	24 000	1 000	100 000	122.65	103.07	5.11	4.29
Australia	Internode	ADSL	Home-NakedExtreme-100	24 000	1 000	100 000	130.83	109.94	5.45	4.58
Australia	Optus	Cable	MyHome Starter	20 000		400	28.62	24.05	1.43	1.20
Australia	Optus	Cable	MyHome Classic	20 000		2 000	40.89	34.36	2.04	1.72
Australia	Optus	Cable	MyHome Freedom	20 000		15 000	57.25	48.11	2.86	2.41
Australia	Optus	Cable	MyHome Professional	20 000		30 000	89.96	75.60	4.50	3.78
Australia				**15 539**	**580**	**27 355**	**66.89**	**56.21**	**18.73**	**15.74**

Note: The pricing methodology includes all available offers from the selected operators at the date of collection. In some cases offers had identical prices but were advertised separately based on whether the subscriber also purchased a basic phone service. In other cases duplicate pricing is the result of the same services being offered by different electricity providers.

StatLink http://dx.doi.org/10.1787/626516135685

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008** ***(cont.)***

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
Austria	AON	ADSL	aonPur Flat 2 Mbit	2 048	384		57.25	46.54	27.95	22.73
Austria	AON	ADSL	aonPur Flat 4 Mbit	4 096	512		85.94	69.87	20.98	17.06
Austria	AON	ADSL	aonKombi	8 192	768		28.55	23.21	3.49	2.83
Austria	AON	FTTx	aonBlizz Light	2 048	2 048		42.90	34.88	20.95	17.03
Austria	AON	FTTx	aonBlizz Pro	10 000	10 000		57.25	46.54	5.72	4.65
Austria	inode (UPC)	ADSL	xDSL Business silber 4096/1024	4 096	1 024		70.30	57.16	17.16	13.95
Austria	inode (UPC)	ADSL	xDSL Business silber 8192/1024	8 192	1 024		70.30	57.16	8.58	6.98
Austria	inode (UPC)	ADSL	xDSL Business silber 16384/1024	16 384	1 024		88.95	72.32	5.43	4.41
Austria	UPC	ADSL	aDSL Privat max 8192/768	8 192	768		25.68	20.88	3.13	2.55
Austria	UPC	ADSL	aDSL solo Privat max Aktion	8 192	768		37.16	30.21	4.54	3.69
Austria	UPC	ADSL	aDSL Privat max 16384/1024	16 384	1 024		38.59	31.38	2.36	1.92
Austria	UPC	Cable	chello fun	8 192	768		32.86	26.71	4.01	3.26
Austria	UPC	Cable	chello student	16 384	1 024		50.22	40.83	3.06	2.49
Austria	UPC	Cable	chello classic	16 384	1 024		70.30	57.16	4.29	3.49
Austria	UPC	Cable	chello plus	25 600	2 048		99.00	80.48	3.87	3.14
Austria				**10 292**	**1 614**		**57.02**	**46.35**	**9.03**	**7.35**
Belgium	Belgacom	ADSL	ADSL Budget	1 024	128	1 000	28.69	22.07	28.02	21.56
Belgium	Belgacom	ADSL	ADSL Light	4 000	256	4 000	45.27	34.82	11.32	8.70
Belgium	Belgacom	ADSL	ADSL Go	12 000	400	25 000	59.90	46.08	4.99	3.84
Belgium	Belgacom	ADSL	ADSL Plus	12 000	400	60 000	81.85	62.96	6.82	5.25
Belgium	Belgacom	VDSL	VDSL Boost	17 000	400	60 000	89.17	68.59	5.25	4.03
Belgium	Tele2	ADSL	ADSL 1Mb	1 024	256	250	21.38	16.44	20.88	16.06
Belgium	Tele2	ADSL	ADSL 1Mb	1 024	256	250	28.55	21.96	27.88	21.45
Belgium	Tele2	ADSL	ADSL 4Mb	4 000	256	15 000	42.90	33.00	10.72	8.25
Belgium	Tele2	ADSL	ADSL 4Mb sans ligne fixe	4 000	256	15 000	50.07	38.52	12.52	9.63
Belgium	Telenet	Cable	BasicNet	1 000	128	1 000	28.69	22.07	28.69	22.07
Belgium	Telenet	Cable	ComfortNet	6 000	256	4 000	43.96	33.82	7.33	5.64
Belgium	Telenet	Cable	ExpressNet	15 000	512	20 000	61.56	47.36	4.10	3.16
Belgium	Telenet	Cable	TurboNet	20 000	1 024	60 000	87.98	67.67	4.40	3.38
Belgium				**7 544**	**348**	**20 423**	**51.54**	**39.64**	**13.30**	**10.23**
Canada	Bell Canada	ADSL	Total Internet Essential	500	500	2 000	30.36	26.40	60.72	52.80
Canada	Bell Canada	ADSL	Total Internet Essential Plus	2 000	800	20 000	35.79	31.12	17.90	15.56
Canada	Bell Canada	ADSL	Total Internet Performance	7 000	1 000	60 000	52.09	45.29	7.44	6.47
Canada	Bell Canada	ADSL	Total Internet Max	10 000	1 000	100 000	57.52	50.01	5.75	5.00
Canada	Bell Canada	ADSL	Total Internet Max	16 000	1 000	100 000	90.10	78.35	5.63	4.90
Canada	Bell Canada	WiMAX	WiMAX Unplugged 512	512	128	2 000	43.45	37.78	84.86	73.79
Canada	Bell Canada	WiMAX	WiMAX In-home 2 Mbps	2 000	256	10 000	54.31	47.23	27.16	23.61
Canada	Bell Canada	WiMAX	WiMAX Unplugged 3 Mbps	3 000	384	10 000	59.74	51.95	19.91	17.32
Canada	Rogers	Cable	Ultra-lite	500	256	2 000	27.10	23.57	54.20	47.13
Canada	Rogers	Cable	Lite	1 000	256	25 000	37.96	33.01	37.96	33.01
Canada	Rogers	Cable	Express	7 000	512	60 000	48.83	42.46	6.98	6.07
Canada	Rogers	Cable	Extreme	10 000	1 000	95 000	59.69	51.90	5.97	5.19
Canada	Shaw	Cable	High speed lite	256	128	10 000	32.53	28.29	127.08	110.51
Canada	Shaw	Cable	High Speed	5 000	512	60 000	44.48	38.68	8.90	7.74
Canada	Shaw	Cable	Xtreme-I	10 000	1 000	100 000	55.34	48.13	5.53	4.81
Canada	Shaw	Cable	Nitro	25 000	1 000	150 000	110.74	96.30	4.43	3.85
Canada				**6 236**	**608**	**50 375**	**52.50**	**45.65**	**30.03**	**26.11**
Czech Republic	GTS Novera	ADSL	DSL Fun 8192/512 kBit/s	8 192	512		27.59	30.65	3.37	3.74
Czech Republic	GTS Novera	ADSL	DSL Fun 16384/768 kBit/s	16 384	768		41.56	46.18	2.54	2.82
Czech Republic	O2	ADSL	ADSL 8 M	8 192	512		27.88	30.98	3.40	3.78
Czech Republic	O2	ADSL	ADSL 16 M	16 384	768		48.84	54.26	2.98	3.31
Czech Republic	UPC	Cable	Starter	2 048	256		28.76	31.96	14.04	15.60
Czech Republic	UPC	Cable	Easy	4 096	256		33.46	37.18	8.17	9.08
Czech Republic	UPC	Cable	Light	6 144	512		46.61	51.78	7.59	8.43
Czech Republic	UPC	Cable	Classic	12 288	1 024		72.73	80.81	5.92	6.58
Czech Republic	UPC	Cable	Extreme	20 480	1 472		99.37	110.42	4.85	5.39
Czech Republic				**10 468**	**676**		**47.42**	**52.69**	**5.87**	**6.53**
Denmark	Dansk Bredbånd	FTTx	Internet 512/512	512	512		19.05	11.27	37.20	22.01
Denmark	Dansk Bredbånd	FTTx	Internet 2/2 Mbit/s	2 000	2 000		38.29	22.66	19.14	11.33
Denmark	Dansk Bredbånd	FTTx	2/2 Mbit/s (Dong)	2 000	2 000		38.29	22.66	19.14	11.33
Denmark	Dansk Bredbånd	FTTx	Internet 10/10 Mbit/s	10 000	10 000		57.53	34.04	5.75	3.40
Denmark	Dansk Bredbånd	FTTx	10/10 Mbit/s (Dong)	10 000	10 000		57.53	34.04	5.75	3.40
Denmark	Dansk Bredbånd	FTTx	Internet 25/25 Mbit/s	25 000	25 000		67.15	39.73	2.69	1.59
Denmark	Dansk Bredbånd	FTTx	25/25 Mbit/s (Dong)	25 000	25 000		67.15	39.73	2.69	1.59
Denmark	Dansk Bredbånd	FTTx	50 Mbit/s	50 000	50 000		86.58	51.23	1.73	1.02
Denmark	Dansk Bredbånd	FTTx	100 Mbit/s	100 000	100 000		192.40	113.85	1.92	1.14
Denmark	Stofa	Cable	FlatRate 2.048/384	2 048	384		28.67	16.96	14.00	8.28
Denmark	Stofa	Cable	FlatRate 4.096/384	4 096	384		45.98	27.21	11.23	6.64
Denmark	Stofa	Cable	FlatRate 6.144/384	6 144	384		55.60	32.90	9.05	5.36
Denmark	Stofa	Cable	SuperSize 10.240/512	10 240	512		59.45	35.18	5.81	3.44
Denmark	Stofa	Cable	SuperSize 25.600/1.024	25 600	1 024		71.00	42.01	2.77	1.64
Denmark	TDC	ADSL	1 Mbit / 128 kbit	1 024	128		29.63	17.53	28.94	17.12
Denmark	TDC	ADSL	4 Mbit / 256 kbit	4 000	256		37.33	22.09	9.33	5.52
Denmark	TDC	ADSL	6 Mbit / 512 kbit	6 000	512		60.41	35.75	10.07	5.96
Denmark	TDC	ADSL	10 Mbit / 1 Mbit	10 000	1 000		76.77	45.43	7.68	4.54
Denmark	TDC	ADSL	20 Mbit / 1 Mbit	20 000	1 000		82.54	48.84	4.13	2.44
Denmark	TDC	ADSL	50 Mbit / 2 Mbit	50 000	2 000		105.63	62.50	2.11	1.25
Denmark	TDC	Wireless	Bredbånd-2-GO Basic	1 000	384	10 000	44.06	26.07	44.06	26.07
Denmark	TDC	Wireless	Bredbånd-2-GO	3 000	384	10 000	57.53	34.04	19.18	11.35
Denmark				**16 712**	**10 585**	**10 000**	**62.66**	**37.08**	**12.02**	**7.11**

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008** ***(cont.)***

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
Finland	Elisa	ADSL	Heti 600/600 kbit/s	600	600		25.68	17.01	42.80	28.35
Finland	Elisa	ADSL	1M / 512 kbit/s	1 024	512		35.72	23.66	34.89	23.10
Finland	Elisa	ADSL	Heti 1,2M/600 kbit/s	1 200	600		31.42	20.81	26.18	17.34
Finland	Elisa	ADSL	2M / 512 kbit/s	2 048	512		48.64	32.21	23.75	15.73
Finland	Elisa	ADSL	Heti 3M/600 kbit/s	3 000	600		40.03	26.51	13.34	8.84
Finland	Elisa	ADSL	Heti 5M/700 kbit/s*	5 000	700		50.07	33.16	10.01	6.63
Finland	Elisa	ADSL	8M / 1M Full Rate	8 000	1 000		61.55	40.76	7.69	5.10
Finland	Elisa	ADSL	Heti 10M/1M	10 000	1 000		50.07	33.16	5.01	3.32
Finland	Elisa	ADSL	24M / 1M Full Rate	24 000	1 000		71.59	47.41	2.98	1.98
Finland	Elisa	ADSL	Heti 30/1M	30 000	1 000		57.25	37.91	1.91	1.26
Finland	Elisa	Cable	Supter 1M/1M	1 000	1 000		31.42	20.81	31.42	20.81
Finland	Elisa	Cable	Super 5M/1M	5 000	5 000		35.72	23.66	7.14	4.73
Finland	Elisa	Cable	Super 10M/1M	10 000	10 000		47.20	31.26	4.72	3.13
Finland	Elisa	Cable	Super 25M/1M	25 000	1 000		54.38	36.01	2.18	1.44
Finland	Elisa	FTTx	Super 1M/1M	1 000	1 000		31.42	20.81	31.42	20.81
Finland	Elisa	FTTx	Super 5M/5M	5 000	5 000		35.72	23.66	7.14	4.73
Finland	Elisa	FTTx	Super 10M/10M	10 000	10 000		47.20	31.26	4.72	3.13
Finland	Elisa	FTTx	Super 50M/10M	50 000	50 000		54.38	36.01	1.09	0.72
Finland	Elisa	FTTx	Super 100M/10M	100 000	100 000		61.55	40.76	0.62	0.41
Finland	Sonera	ADSL	2 Mbit/s / 512 Kbit/s	1 000	512		23.60	15.63	23.60	15.63
Finland	Sonera	ADSL	8 Mbit/s / 1 Mbit/s	8 000	2 000		30.06	19.91	3.76	2.49
Finland	Sonera	ADSL	24 Mbit/s / 1 Mbit/s	24 000	1 000		35.15	23.28	1.46	0.97
Finland	Sonera	FTTx	Laajakaista Extra 1/1 Mbit/s	1 000	1 000		32.86	21.76	32.86	21.76
Finland	Sonera	FTTx	Laajakaista Extra 10/10 Mbit/s	10 000	10 000		47.20	31.26	4.72	3.13
Finland	Sonera	FTTx	Laajakaista Extra 100/10 Mbit/s	100 000	10 000		61.55	40.76	0.62	0.41
Finland	Welho	ADSL	Welho 2M	2 000	500		35.72	23.66	17.86	11.83
Finland	Welho	ADSL	Welho 5M	5 000	1 000		51.51	34.11	10.30	6.82
Finland	Welho	ADSL	Welho 10M	10 000	1 000		64.42	42.66	6.44	4.27
Finland	Welho	Cable	Welho 275	275	100		28.55	18.91	103.82	68.76
Finland	Welho	Cable	Welho 2M	2 000	500		35.72	23.66	17.86	11.83
Finland	Welho	Cable	Welho 5M	5 000	1 000		51.51	34.11	10.30	6.82
Finland	Welho	Cable	Welho 10M	10 000	1 000		64.42	42.66	6.44	4.27
Finland	Welho	Cable	Welho 110M	110 000	5 000		78.77	52.16	0.72	0.47
Finland	Welho	FTTx	Welho 2M	2 000	2 000		35.72	23.66	17.86	11.83
Finland	Welho	FTTx	Welho 10M	10 000	10 000		51.51	34.11	5.15	3.41
Finland	Welho	FTTx	Welho 100M	100 000	10 000		64.42	42.66	0.64	0.43
Finland				**19 226**	**6 865**		**46.21**	**30.61**	**14.54**	**9.63**
France	Free Telecon	ADSL	ADSL	28 000	1 000		43.03	33.62	1.54	1.20
France	Free Telecon	FTTx	FTTH	100 000	50 000		43.03	33.62	0.43	0.34
France	Neuf	ADSL	Internet + Téléphone en présélection (en zone non-dégroupée)	8 000	800		28.55	22.31	3.57	2.79
France	Neuf	ADSL	Internet + Téléphone en présélection (en zone dégroupée)	20 000	1 000		21.38	16.70	1.07	0.84
France	Neuf	FTTx	100% Neuf Box en Fibre Optique	50 000	50 000		42.90	33.51	0.86	0.67
France	Numericable	Cable	Internet ultra haut debit	30 000			31.42	24.55	1.05	0.82
France	Numericable	Cable	Internet ultra haut debit	100 000			31.42	24.55	0.31	0.25
France	Orange	ADSL	1 mégamax	1 000			35.72	27.91	35.72	27.91
France	Orange	ADSL	8 mégamax + téléphone	8 000	800		42.90	33.51	5.36	4.19
France	Orange	ADSL	18 mégamax + téléphone	18 000	800		50.07	39.12	2.78	2.17
France	Orange	FTTx	La fibre	100 000	10 000		64.42	50.33	0.64	0.50
France	Orange	FTTx	La fibre	100 000	10 000		64.42	50.33	0.64	0.50
France	Orange	FTTx	La fibre (100 méga symétrique)	100 000	100 000		93.11	72.74	0.93	0.73
France				**51 000**	**22 440**		**45.57**	**35.60**	**4.22**	**3.30**
Germany	Arcor	ADSL	Internet flat-Paket (6000)	6 144	640		35.80	28.87	5.83	4.70
Germany	Arcor	ADSL	Internet flat-Paket (16000)	16 128	800		42.97	34.65	2.66	2.15
Germany	Kabel Deutsc	Cable	Packet Classic	6 000	460		28.55	23.02	4.76	3.84
Germany	Kabel Deutsc	Cable	Flat Comfort	20 000	1 000		42.90	34.60	2.14	1.73
Germany	Kabel Deutsc	Cable	Flat Deluxe	32 000	2 000		57.25	46.17	1.79	1.44
Germany	T Home	ADSL	Call & Surf Basic Internet	2 048	192		42.97	34.65	20.98	16.92
Germany	T Home	ADSL	Call & Surf Basic Internet	2 048	192		48.69	39.27	23.78	19.17
Germany	T Home	ADSL	Call & Surf Comfort	6 016	576		57.32	46.22	9.53	7.68
Germany	T Home	ADSL	Call & Surf Comfort	6 016	576		63.06	50.85	10.48	8.45
Germany	T Home	ADSL	Call & Surf Comfort Plus	16 000	1 024		71.66	57.79	4.48	3.61
Germany	T Home	ADSL	Call & Surf Comfort Plus	16 000	1 024		77.40	62.42	4.84	3.90
Germany	T Home	VDSL	Entertain Comfort	17 696	1 184		71.66	57.79	4.05	3.27
Germany	T Home	VDSL	Entertain Comfort	17 696	1 184		77.40	62.42	4.37	3.53
Germany	T Home	VDSL	Entertain Comfort	25 000	5 000		86.01	69.36	3.44	2.77
Germany	T Home	VDSL	Entertain Comfort	50 000	50 000		93.19	75.15	1.86	1.50
Germany				**15 919**	**4 390**		**59.79**	**48.22**	**7.00**	**5.64**
Greece	Forthnet	ADSL	ADSL 512	512	128		26.54	23.91	51.84	46.70
Greece	Forthnet	ADSL	ADSL 768	768	192		26.54	23.91	34.56	31.14
Greece	Forthnet	ADSL	ADSL 1024	1 024	256		30.85	27.79	30.12	27.14
Greece	Forthnet	ADSL	ADSL 2048	2 048	256		41.61	37.48	20.32	18.30
Greece	OTE	ADSL	Conn-x 1024/ 256	1 024	256		28.17	25.38	27.51	24.78
Greece	OTE	ADSL	Conn-x 2048/256	2 048	256		33.29	29.99	16.26	14.65
Greece	OTE	ADSL	Conn-x 4096/256	4 096	256		38.41	34.61	9.38	8.45
Greece	OTE	ADSL	Conn-x 8192/384	8 192	384		45.93	41.38	5.61	5.05
Greece	OTE	ADSL	Conn-x 24576/1024	24 576	1 024		51.05	45.99	2.08	1.87
Greece	Vivodi	ADSL	TELEFONET	1 024	256		20.09	18.10	19.62	17.67
Greece	Vivodi	ADSL	MaXx4 (APYΣ)	1 024	256		27.26	24.56	26.62	23.98
Greece	Vivodi	ADSL	MaXx8 (APYΣ)	8 192	384		30.13	27.14	3.68	3.31
Greece	Vivodi	ADSL	DSLnet MaXx10 10240/512 Shared LI	10 240	512		27.26	24.56	2.66	2.40
Greece	Vivodi	ADSL	DSLnet MaXx10 10240/512 Full LLU	10 240	512		35.87	32.31	3.50	3.16
Greece	Vivodi	ADSL	TELEFONET+	20 480	512		42.90	38.65	2.09	1.89
Greece	Vivodi	ADSL	CableTV by vivodi	24 576	512		27.98	25.20	1.14	1.03
Greece				**7 504**	**372**		**33.37**	**30.06**	**16.06**	**14.47**

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008 *(cont.)***

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
Hungary	GTS-Datanet	ADSL	Yo DSL 1	1 696	256		17.67	20.08	10.42	11.84
Hungary	GTS-Datanet	ADSL	Yo DSL 4	4 096	256		24.44	27.77	5.97	6.78
Hungary	T-Online	ADSL	DSL Classic Easy	2 000	192	500	17.82	20.25	8.91	10.13
Hungary	T-Online	ADSL	DSL Solo Easy	2 000	192	500	26.77	30.42	13.38	15.21
Hungary	T-Online	ADSL	DSL Solo Happy	2 000	192		32.73	37.19	16.36	18.59
Hungary	T-Online	ADSL	DSL Classic Happy	8 000	480		23.79	27.03	2.97	3.38
Hungary	T-Online	ADSL	DSL Solo Medium	8 000	480		50.01	56.83	6.25	7.10
Hungary	T-Online	ADSL	DSL Classic Medium	8 000	480		50.01	56.83	6.25	7.10
Hungary	T-Online	Cable	Kábelnet Easy	2 000	192	500	17.82	20.25	8.91	10.13
Hungary	T-Online	Cable	Kábelnet Happy	2 000	192		23.79	27.03	11.89	13.51
Hungary	T-Online	Cable	Kábelnet Medium	8 000	480		41.07	46.67	5.13	5.83
Hungary	UPC	Cable	chello start	512	256		20.86	23.71	40.75	46.31
Hungary	UPC	Cable	chello bronze	2 000	1 000		29.81	33.87	14.90	16.94
Hungary	UPC	Cable	chello silver	10 000	2 000		44.71	50.81	4.47	5.08
Hungary	UPC	Cable	chello gold	20 000	3 000		56.63	64.35	2.83	3.22
Hungary				**5 354**	**643**	**500**	**31.86**	**36.21**	**10.63**	**12.08**
Iceland	Hringiðan	ADSL	ADSL 1Mb/1GB	1 000		1 000	49.22	37.29	49.22	37.29
Iceland	Hringiðan	ADSL	ADSL 2Mb/2GB	2 000		2 000	60.18	45.59	30.09	22.80
Iceland	Hringiðan	ADSL	ADSL 8Mb/8GB	8 000		8 000	71.14	53.90	8.89	6.74
Iceland	Hringiðan	ADSL	ADSL2+ Búnaður	24 000			68.24	51.70	2.84	2.15
Iceland	Hringiðan	FTTx	Ljósleið 20Mb/4GB	20 000		4 000	69.94	52.98	3.50	2.65
Iceland	Hringiðan	FTTx	Ljósleið 40Mb/6GB	40 000		6 000	80.90	61.29	2.02	1.53
Iceland	Hringiðan	FTTx	Ljósleið 60Mb/10GB	60 000		10 000	102.83	77.90	1.71	1.30
Iceland	Hringiðan	FTTx	Ljósleið 100Mb/10GB	100 000		10 000	146.67	111.12	1.47	1.11
Iceland	Siminn	ADSL	Góður	1 024		4 000	45.93	34.80	44.86	33.98
Iceland	Siminn	ADSL	Betri	2 048		6 000	56.89	43.10	27.78	21.05
Iceland	Siminn	ADSL	Bestur	8 192		80 000	67.86	51.41	8.28	6.28
Iceland	Siminn	ADSL	Langbestur	12 288			73.34	55.56	5.97	4.52
Iceland	Tal	ADSL	1 Mb	1 000	512	60 000	32.78	24.83	32.78	24.83
Iceland	Tal	ADSL	4 Mb	4 000	768	60 000	43.74	33.14	10.93	8.28
Iceland	Tal	ADSL	8 Mb	8 000	1 216	80 000	54.70	41.44	6.84	5.18
Iceland	Tal	ADSL	12 Mb	12 000		80 000	65.66	49.75	5.47	4.15
Iceland	Tal	FTTx	Ljós 10 Mb	10 000	10 000	4 000	73.23	55.48	7.32	5.55
Iceland	Tal	FTTx	Ljós 20 Mb	20 000	20 000		96.25	72.92	4.81	3.65
Iceland	Vodafone	ADSL	ADSL 1 Mbit	1 000	1 000	1 000	37.30	28.26	37.30	28.26
Iceland	Vodafone	ADSL	1 Mbit utan heimasvæðis	1 000	512	1 000	37.30	28.26	37.30	28.26
Iceland	Vodafone	ADSL	2 Mbit utan heimasvæðis	2 000	512	2 000	49.90	37.80	24.95	18.90
Iceland	Vodafone	ADSL	ADSL 6 Mbit	6 000	1 000	2 000	49.90	37.80	8.32	6.30
Iceland	Vodafone	ADSL	6 Mbit án heimasíma	6 000	1 000	2 000	49.90	37.80	8.32	6.30
Iceland	Vodafone	ADSL	ADSL 8 Mbit	8 000	1 000	80 000	62.48	47.34	7.81	5.92
Iceland	Vodafone	ADSL	8 Mbit án heimasíma	8 000	1 000	80 000	62.48	47.34	7.81	5.92
Iceland	Vodafone	ADSL	8 Mbit utan heimasvæðis	8 000	512	80 000	62.48	47.34	7.81	5.92
Iceland	Vodafone	ADSL	ADSL extra 8 Mbit	8 000	2 000	80 000	94.53	71.61	11.82	8.95
Iceland	Vodafone	ADSL	Extra 8 Mbit án heimas.	8 000	2 000	80 000	94.53	71.61	11.82	8.95
Iceland	Vodafone	ADSL	ADSL 12 Mbit	12 000	1 000	80 000	74.28	56.27	6.19	4.69
Iceland	Vodafone	ADSL	12 Mbit án heimasíma	12 000	1 000	80 000	74.28	56.27	6.19	4.69
Iceland	Vodafone	ADSL	ADSL extra 12 Mbit	12 000	2 000	80 000	108.26	82.02	9.02	6.83
Iceland	Vodafone	ADSL	Extra 12 Mbit án heimas	12 000	2 000	80 000	108.26	82.02	9.02	6.83
Iceland	Vodafone	ADSL	ADSL extra 14 Mbit	14 000	2 000	80 000	119.71	90.69	8.55	6.48
Iceland	Vodafone	ADSL	Extra 14 Mbit án heimas	14 000	2 000	80 000	119.71	90.69	8.55	6.48
Iceland				**13 693**	**2 525**	**42 032**	**72.49**	**54.92**	**13.69**	**10.37**
Ireland	BT	ADSL	Basic Broadband Option 1	1 000		10 000	32.28	20.05	32.28	20.05
Ireland	BT	ADSL	Value Broadband Option 2	6 000		30 000	46.63	28.96	7.77	4.83
Ireland	BT	ADSL	Deluxe Broadband Option 3	24 000		30 000	60.98	37.87	2.54	1.58
Ireland	Digiweb	ADSL	DSL Lite	1 024	128	10 000	35.80	22.23	34.96	21.71
Ireland	Digiweb	ADSL	DSL	3 000	384	20 000	42.97	26.69	14.32	8.90
Ireland	Digiweb	ADSL	DSL Xtra	7 600	672	40 000	57.32	35.60	7.54	4.68
Ireland	Digiweb	ADSL	DSL Pro	10 000	832	60 000	129.05	80.16	12.91	8.02
Ireland	Eircom	ADSL	1Mb broadband eircom home starter	1 000	128	10 000	35.85	22.27	35.85	22.27
Ireland	Eircom	ADSL	3Mb broadband eircom home plus	3 000	384	30 000	43.03	26.73	14.34	8.91
Ireland	Eircom	ADSL	7.6Mb broadband eircom home professional	7 600	672	50 000	69.44	43.13	9.14	5.68
Ireland	Irish Broadband	ADSL	Home Start	1 000	128	10 000	21.52	13.37	21.52	13.37
Ireland	Irish Broadband	ADSL	Home Plus	2 000	256	20 000	35.87	22.28	17.93	11.14
Ireland	Irish Broadband	ADSL	Home Pro 3Mb	3 000	384	30 000	50.22	31.19	16.74	10.40
Ireland	Irish Broadband	ADSL	Home Pro 4Mb	4 000	384	60 000	114.78	71.29	28.69	17.82
Ireland	Irish Broadband	ADSL	Home Pro 6Mb	6 000	512	60 000	215.21	133.67	35.87	22.28
Ireland	Irish Broadband	ADSL	Home Pro 12 Mb	12 000	1 000	60 000	243.90	151.49	20.33	12.62
Ireland	Irish Broadband	Wireless	Breeze 2Mb	2 000	2 000		51.64	32.07	25.82	16.04
Ireland	Irish Broadband	Wireless	Breeze 3Mb	3 000	3 000		69.44	43.13	23.15	14.38
Ireland	UPC Ireland	Cable	Broadband Value	3 000	256	20 000	28.69	17.82	9.56	5.94
Ireland	UPC Ireland	Cable	Broadband Express	10 000	1 000		43.04	26.73	4.30	2.67
Ireland	UPC Ireland	Cable	Broadband Ultra	20 000	1 500		57.39	35.65	2.87	1.78
Ireland				**6 201**	**757**	**32 353**	**70.72**	**43.92**	**18.02**	**11.19**
Italy	Alice	ADSL	7 Mega	7 000	384		28.62	22.72	4.09	3.25
Italy	Alice	ADSL	20Mega	20 000	1 000		35.80	28.41	1.79	1.42
Italy	Fastweb	ADSL	NavigaSenzaLimiti	20 000	1 000		57.25	45.43	2.86	2.27
Italy	Fastweb	FTTx	NavigaSenzaLimiti	10 000	10 000		57.25	45.43	5.72	4.54
Italy	Tiscali	ADSL	ADSL Mini	512	256		14.35	11.39	28.02	22.24
Italy	Tiscali	ADSL	8 Mega	8 000	384		28.62	22.72	3.58	2.84
Italy	Tiscali	ADSL	10 MB ADSL Gaming	10 000	1 000		50.14	39.80	5.01	3.98
Italy	Tiscali	ADSL	20 Mega	20 000	1 000		42.97	34.10	2.15	1.71
Italy				**11 939**	**1 878**		**39.37**	**31.25**	**6.65**	**5.28**

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008** ***(cont.)***

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
Japan	J:COM	Cable	J:COM ライトネット	256	128		27.08	22.02	105.78	86.00
Japan	J:COM	Cable	J:COM NET 8Mコース	8 000	2 000		49.03	39.86	6.13	4.98
Japan	J:COM	Cable	J:COM NET 30Mコース	30 000	2 000		54.15	44.03	1.81	1.47
Japan	J:COM	Cable	J:COM NET ウルトラ 160Mコース	160 000	10 000		59.07	48.03	0.37	0.30
Japan	K Opticom	FTTx	eo Hikari Net (Home 100M)	100 000			46.88	38.12	0.47	0.38
Japan	K Opticom	FTTx	eo Hikari Net (Home 100M Premium)	100 000			52.51	42.69	0.53	0.43
Japan	K Opticom	FTTx	eo Hikari Net (Home 1G)	1 000 000			82.52	67.09	0.08	0.07
Japan	K Opticom	VDSL	eo Hikari Net (Appartment)	100 000			30.76	25.01	0.31	0.25
Japan	NTT	ADSL	Flets ADSL (1.5M Plan)	1 500	512		31.51	25.62	21.00	17.08
Japan	NTT	ADSL	Flets ADSL (8M Plan)	8 000	1 000		32.49	26.42	4.06	3.30
Japan	NTT	ADSL	Flets ADSL (More)	12 000	1 000		33.48	27.22	2.79	2.27
Japan	NTT	ADSL	Flets ADSL (More 24)	24 000	1 000		33.97	27.62	1.42	1.15
Japan	NTT	ADSL	Flets ADSL (More 40)	40 000	1 000		34.26	27.86	0.86	0.70
Japan	NTT	ADSL	Flets ADSL (More Special)	47 000	5 000		34.26	27.86	0.73	0.59
Japan	NTT	FTTx	Flets Hikari Premium (Standalone house)	100 000	100 000		47.26	38.42	0.47	0.38
Japan	NTT	FTTx	Flets Hikari Premium (Apartments)	100 000	100 000		35.44	28.82	0.35	0.29
Japan	NTT	FTTx	Flets Hikari Premium (Apartments)	100 000	100 000		30.52	24.81	0.31	0.25
Japan	NTT	LAN	Flets Hikari Premium (Apartments)	100 000	100 000		35.44	28.82	0.35	0.29
Japan	NTT	LAN	Flets Hikari Premium (Apartments)	100 000	100 000		30.52	24.81	0.31	0.25
Japan	NTT	VDSL	Flets Hikari Premium (Apartments)	100 000	100 000		35.44	28.82	0.35	0.29
Japan	NTT	VDSL	Flets Hikari Premium (Apartments)	100 000	100 000		30.52	24.81	0.31	0.25
Japan	NTT	VDSL	Flets Hikari Premium (Apartments)	100 000	100 000		43.32	35.22	0.43	0.35
Japan	Yahoo! BB	ADSL	Reach DSL	960	960		23.99	19.50	24.99	20.31
Japan	Yahoo! BB	ADSL	8M	8 000	900		23.99	19.50	3.00	2.44
Japan	Yahoo! BB	ADSL	12M	12 000	1 000		25.96	21.10	2.16	1.76
Japan	Yahoo! BB	ADSL	26M	26 000	1 000		27.92	22.70	1.07	0.87
Japan	Yahoo! BB	ADSL	50M	50 000	3 000		28.91	23.50	0.58	0.47
Japan	Yahoo! BB	ADSL	50M Revo	50 500	12 500		28.91	23.50	0.57	0.47
Japan	Yahoo! BB	FTTx	Fiber (Home)	100 000	100 000		52.67	42.82	0.53	0.43
Japan	Yahoo! BB	LAN	Fibre (Apartment type E)	100 000	100 000		29.34	23.85	0.29	0.24
Japan	Yahoo! BB	VDSL	Fibre (Apartment type V)	100 000	50 000		29.34	23.85	0.29	0.24
Japan				**92 846**	**40 481**		**37.47**	**30.46**	**5.89**	**4.79**
Korea	C&M	LAN	광랜 (Fiber LAN)	100 000			26.16	33.97	0.26	0.34
Korea	KT	ADSL	Megapass Lite	8 000	640		27.61	35.86	3.45	4.48
Korea	KT	FTTx	Megapass Lite	50 000	50 000		27.61	35.86	0.55	0.72
Korea	KT	FTTx	Megapass Special	100 000	100 000		33.13	43.03	0.33	0.43
Korea	KT	VDSL	Megapass Lite	50 000	10 000		27.61	35.86	0.55	0.72
Korea	KT	VDSL	Megapass Special	100 000	100 000		33.13	43.03	0.33	0.43
Korea	SK Broadband	Cable	Speed	100 000	768		26.31	34.17	0.26	0.34
Korea	SK Broadband	FTTx	Speed	100 000	100 000		26.31	34.17	0.26	0.34
Korea	SK Broadband	LAN	광랜 (Fiber LAN)	100 000	100 000		31.01	40.27	0.31	0.40
Korea	SK Broadband	VDSL	Speed	100 000	6 000		26.31	34.17	0.26	0.34
Korea				**80 800**	**51 934**		**28.52**	**37.04**	**0.66**	**0.85**
Luxembourg	Cegecom	ADSL	Basic	2 048	256	15 000	37.45	29.72	18.28	14.51
Luxembourg	Cegecom	ADSL	Standard	8 192	384	25 000	54.23	43.04	6.62	5.25
Luxembourg	Cegecom	ADSL	Advanced	8 192	384		60.69	48.17	7.41	5.88
Luxembourg	Cegecom	ADSL	Pro	15 360	512		102.01	80.96	6.64	5.27
Luxembourg	Cegecom	Cable	Easy	4 000	192		28.62	22.72	7.16	5.68
Luxembourg	Cegecom	Cable	Standard	6 000	256		37.16	29.49	6.19	4.92
Luxembourg	Cegecom	Cable	Advanced	10 000	384		51.51	40.88	5.15	4.09
Luxembourg	Cegecom	Cable	Pro	18 000	512		80.20	63.65	4.46	3.54
Luxembourg	EPT	ADSL	LuxDSL Junior	2 000	256	2 000	41.61	33.02	20.80	16.51
Luxembourg	EPT	ADSL	LuxDSL Run	8 000	384	15 000	67.43	53.52	8.43	6.69
Luxembourg	EPT	ADSL	LuxDSL Professional	15 000	512		113.34	89.95	7.56	6.00
Luxembourg	Numericable	Cable	Internet 3 Mega	3 000	256	3 000	32.86	26.08	10.95	8.69
Luxembourg	Numericable	Cable	Internet 20 Mega	30 000	1 024		57.25	45.43	1.91	1.51
Luxembourg				**9 984**	**409**	**12 000**	**58.80**	**46.66**	**8.58**	**6.81**
Mexico	Cablevision	Cable	GHOST 300 Kbps	300			21.93	30.03	73.09	100.12
Mexico	Cablevision	Cable	MONSTER 450 Kbps	450			32.73	44.83	72.73	99.62
Mexico	Cablevision	Cable	DEMON 1500 Kbps	1 500			42.45	58.15	28.30	38.76
Mexico	Megacable	Cable	256 kbps	256			21.49	29.44	83.96	115.01
Mexico	Megacable	Cable	2048 kbps	2 048			32.29	44.24	15.77	21.60
Mexico	Megacable	Cable	3000 kbps	3 000			43.10	59.03	14.37	19.68
Mexico	Megacable	Cable	4000 kbps	4 000			53.90	73.83	13.47	18.46
Mexico	Telmex	ADSL	Paquete Conectes en Infinitum	512			36.53	50.05	71.36	97.75
Mexico	Telmex	ADSL	Paquete acerques	1 024			56.26	77.07	54.94	75.26
Mexico	Telmex	ADSL	Todo México sin Límites	2 048			93.83	128.53	45.81	62.76
Mexico				**1 514**			**43.45**	**59.52**	**47.38**	**64.90**
Netherlands	KPN	ADSL	Basis	3 000	512		35.87	28.93	11.96	9.64
Netherlands	KPN	ADSL	Extra	8 000	1 000		50.22	40.50	6.28	5.06
Netherlands	KPN	ADSL	Premium	20 000	1 000		71.74	57.85	3.59	2.89
Netherlands	KPN	FTTx	KPN Glasvezel brons	30 000	3 000		93.26	75.21	3.11	2.51
Netherlands	KPN	FTTx	KPN Glasvezel zilver	50 000	5 000		114.78	92.56	2.30	1.85
Netherlands	KPN	FTTx	KPN Glasvezel goud	60 000	6 000		157.82	127.27	2.63	2.12
Netherlands	Tele2	ADSL	ADSL Internet	20 000	1 024		28.62	23.08	1.43	1.15
Netherlands	UPC	Cable	Starter	384	128		21.52	17.36	56.04	45.20
Netherlands	UPC	Cable	Easy	1 500	256		34.43	27.77	22.96	18.51
Netherlands	UPC	Cable	Extreme	24 000	2 500		86.08	69.42	3.59	2.89
Netherlands	Ziggo	Cable	Internet Z1	1 600	500		28.62	23.08	17.89	14.43
Netherlands	Ziggo	Cable	Internet Z2	4 000	1 000		42.97	34.65	10.74	8.66
Netherlands	Ziggo	Cable	Internet Z3	12 000	1 500		68.79	55.48	5.73	4.62
Netherlands	Ziggo	Cable	Internet Z3i	20 000	2 000		100.36	80.93	5.02	4.05
Netherlands				**18 177**	**1 816**		**66.79**	**53.86**	**10.95**	**8.83**

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008** ***(cont.)***

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
New Zealand	Telecom	ADSL	Basic	4 000	128	200	20.19	18.87	5.05	4.72
New Zealand	Telecom	ADSL	Go	4 000	128	3 000	26.93	25.17	6.73	6.29
New Zealand	Telecom	ADSL	Basic	4 000	128	200	26.93	25.17	6.73	6.29
New Zealand	Telecom	ADSL	Explorer	4 000	128	6 000	33.67	31.47	8.42	7.87
New Zealand	Telecom	ADSL	Go	4 000	128	3 000	33.67	31.47	8.42	7.87
New Zealand	Telecom	ADSL	Adventure	4 000	128	10 000	40.42	37.77	10.10	9.44
New Zealand	Telecom	ADSL	Explorer	4 000	128	6 000	40.42	37.77	10.10	9.44
New Zealand	Telecom	ADSL	Adventure	4 000	128	10 000	47.16	44.07	11.79	11.02
New Zealand	Telecom	ADSL	Go Express	24 000	1 024	3 000	33.67	31.47	1.40	1.31
New Zealand	Telecom	ADSL	Go Express	24 000	1 024	3 000	40.42	37.77	1.68	1.57
New Zealand	Telecom	ADSL	Pro	24 000	1 024	15 000	53.90	50.37	2.25	2.10
New Zealand	Telecom	ADSL	Pro	24 000	1 024	15 000	60.64	56.67	2.53	2.36
New Zealand	Telecom	ADSL	Pro Advanced	24 000	1 024	30 000	67.38	62.98	2.81	2.62
New Zealand	Telecom	ADSL	Pro Advanced	24 000	1 024	30 000	74.13	69.28	3.09	2.89
New Zealand	Telecom	ADSL	Pro Ultra	24 000	1 024	50 000	101.09	94.48	4.21	3.94
New Zealand	Telecom	ADSL	Pro Ultra	24 000	1 024	50 000	107.83	100.78	4.49	4.20
New Zealand	TelstraClear	ADSL	PDQ Launch	256	128	0	16.18	15.12	63.20	59.07
New Zealand	TelstraClear	ADSL	PDQ Turbo	24 000	128	0	24.27	22.68	1.01	0.95
New Zealand	TelstraClear	ADSL	PDQ Max	24 000	1 024	0	29.66	27.72	1.24	1.16
New Zealand	TelstraClear	Cable	HighSpeed 10G	4 000	2 000	10 000	37.05	34.62	9.26	8.66
New Zealand	TelstraClear	Cable	HighSpeed 20G	10 000	2 000	20 000	53.90	50.37	5.39	5.04
New Zealand	TelstraClear	Cable	LightSpeed 40G	10 000	2 000	40 000	74.13	69.28	7.41	6.93
New Zealand	TelstraClear	Cable	LightSpeed 80G	10 000	2 000	80 000	101.09	94.48	10.11	9.45
New Zealand	TelstraClear	Cable	WarpSpeed 120G	25 000	2 000	120 000	155.03	144.88	6.20	5.80
New Zealand	Woosh	ADSL	Launch	256	128	200	23.56	22.02	92.04	86.02
New Zealand	Woosh	ADSL	Orbit 1	24 576	128	5 000	28.28	26.43	1.15	1.08
New Zealand	Woosh	ADSL	Orbit 5	24 576	128	5 000	33.67	31.47	1.37	1.28
New Zealand	Woosh	ADSL	Orbit 10	24 576	128	10 000	40.42	37.77	1.64	1.54
New Zealand	Woosh	ADSL	Orbit Pro 20	24 576	1 024	20 000	60.64	56.67	2.47	2.31
New Zealand	Woosh	ADSL	Orbit Pro 50	24 576	1 024	50 000	90.98	85.03	3.70	3.46
New Zealand	Woosh	ADSL	Orbit Pro 100	24 576	1 024	100 000	124.69	116.53	5.07	4.74
New Zealand	Woosh	Wireless	Entry	1 600	128	200	16.82	15.72	10.51	9.83
New Zealand	Woosh	Wireless	Elevate	1 600	128	1 000	20.19	18.87	12.62	11.79
New Zealand	Woosh	Wireless	Express 5	1 600	128	5 000	26.93	25.17	16.83	15.73
New Zealand	Woosh	Wireless	Express 10	1 600	128	10 000	33.67	31.47	21.05	19.67
New Zealand	Woosh	Wireless	Express 20	1 600	128	20 000	40.42	37.77	25.26	23.61
New Zealand				**13 527**	**687**	**20 300**	**51.11**	**47.77**	**10.76**	**10.06**
Norway	Get	Cable	S	1 250	750		34.29	20.53	27.43	16.43
Norway	Get	Cable	S	1 250	1 250		42.91	25.69	34.33	20.55
Norway	Get	Cable	M	3 500	750		49.06	29.38	14.02	8.39
Norway	Get	Cable	M	3 500	1 500		57.68	34.54	16.48	9.87
Norway	Get	Cable	L	6 500	1 000		66.65	39.91	10.25	6.14
Norway	Get	Cable	L	6 500	2 000		75.26	45.07	11.58	6.93
Norway	Get	Cable	Xtreme	26 000	1 500		122.92	73.60	4.73	2.83
Norway	Get	Cable	Xtreme	26 000	3 000		131.53	78.76	5.06	3.03
Norway	Get	Cable	XL	12 500	1 500		84.23	50.44	6.74	4.03
Norway	Get	Cable	XL	12 500	2 500		92.85	55.60	7.43	4.45
Norway	Lyse	FTTx	Internett Familie, 10/10 Mbit/s	10 000	10 000		78.95	47.28	7.90	4.73
Norway	Lyse	FTTx	Internett Ekspress 30/30 Mbit/s	30 000	30 000		122.92	73.60	4.10	2.45
Norway	Lyse	FTTx	Internett Super 50/50 Mbit/s	50 000	50 000		254.98	152.68	5.10	3.05
Norway	Telenor	ADSL	ADSL Mini	1 500	300		52.58	31.48	35.05	20.99
Norway	Telenor	ADSL	ADSL Basis	3 500	350		61.37	36.75	17.53	10.50
Norway	Telenor	ADSL	ADSL Pluss	4 500	400		73.68	44.12	16.37	9.80
Norway	Telenor	ADSL	ADSL Ekstra	6 000	500		87.75	52.54	14.62	8.76
Norway	Telenor	ADSL	ADSL Turbo	16 000	700		70.16	42.01	4.39	2.63
Norway	Telenor	ADSL	ADSL Max	16 000	700		96.54	57.81	6.03	3.61
Norway	Telenor	FTTx	Bredbånd Medium	8 000	5 000		70.16	42.01	8.77	5.25
Norway	Telenor	FTTx	Bredbånd Premium	25 000	10 000		87.75	52.54	3.51	2.10
Norway	Telenor	WiMAX	WiMax Bredbånd Mini	2 000			63.13	37.80	31.56	18.90
Norway				**12 364**	**5 890**		**85.33**	**51.10**	**13.32**	**7.97**
Poland	Dialog	ADSL	DialNet 512	512	128		33.64	37.80	65.71	73.83
Poland	Dialog	ADSL	DialNet 1	1 024	256		54.94	61.73	53.65	60.28
Poland	Dialog	ADSL	DialNet 2	2 048	512		67.71	76.08	33.06	37.15
Poland	Dialog	ADSL	DialNet 6	6 144	512		93.27	104.79	15.18	17.06
Poland	TP	ADSL	256 kb/s	256	128		15.76	17.70	61.55	69.16
Poland	TP	ADSL	512 kb/s	512	128		23.00	25.84	44.92	50.47
Poland	TP	ADSL	1 mb/s	1 024	256		27.26	30.62	26.62	29.91
Poland	TP	ADSL	2 mb/s	2 048	256		37.90	42.59	18.51	20.79
Poland	TP	ADSL	6 mb/s	6 144	512		46.42	52.16	7.56	8.49
Poland	UPC	Cable	Internet Sprint	2 048	384		29.39	33.02	14.35	16.12
Poland	UPC	Cable	Internet Turbo	10 000	1 000		37.90	42.59	3.79	4.26
Poland	UPC	Cable	Internet Ultra	20 000	2 000		63.46	71.30	3.17	3.56
Poland				**4 313**	**506**		**44.22**	**49.69**	**29.01**	**32.59**

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008** ***(cont.)***

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
Portugal	Cabovisao	Cable	Netvisao Banda Larga 10MB	10 240	512	10 000	49.80	47.88	4.86	4.68
Portugal	Cabovisao	Cable	Netvisao Banda Larga 20MB	20 480	1 024	30 000	64.03	61.57	3.13	3.01
Portugal	Cabovisao	Cable	Netvisao Banda Larga 30MB	30 720	1 024	50 000	84.38	81.13	2.75	2.64
Portugal	Clix	ADSL	4 Mb	4 000	512		28.32	27.23	7.08	6.81
Portugal	Clix	ADSL	12 Mb	12 000	512		42.54	40.90	3.54	3.41
Portugal	Clix	ADSL	24 Mb	24 000	1 024		56.77	54.59	2.37	2.27
Portugal	Portugal Telecom	ADSL	2 Mb	2 048	128		28.44	27.34	13.88	13.35
Portugal	Portugal Telecom	ADSL	6 Mb	6 016	512		35.44	34.07	5.89	5.66
Portugal	Portugal Telecom	ADSL	16 Mb	16 000	1 024		50.62	48.67	3.16	3.04
Portugal	Portugal Telecom	ADSL	24 Mb	24 000	1 024		57.37	55.17	2.39	2.30
Portugal	TV Cabo	Cable	Netcabo 2Mb	2 000	128	5 000	21.51	20.68	10.75	10.34
Portugal	TV Cabo	Cable	Netcabo 4Mb	4 000	256	10 000	28.44	27.34	7.11	6.84
Portugal	TV Cabo	Cable	Netcabo 8Mb	8 000	512		35.55	34.18	4.44	4.27
Portugal	TV Cabo	Cable	Netcabo 18Mb	18 000	1 024		50.65	48.70	2.81	2.71
Portugal	TV Cabo	Cable	Netcabo 30Mb	30 000	1 024		85.35	82.07	2.85	2.74
Portugal				**14 100**	**683**	**21 000**	**47.95**	**46.10**	**5.13**	**4.94**
Slovak Republic	Dial Telecom	ADSL	Dial FLEX DSL	1 536	256	1 000	14.04	15.60	9.14	10.16
Slovak Republic	Dial Telecom	ADSL	Dial Mini Flat	1 536	256		28.14	31.27	18.32	20.36
Slovak Republic	Dial Telecom	ADSL	Dial Maxi Flat	8 192	1 024		112.73	125.26	13.76	15.29
Slovak Republic	Swan	ADSL	FLAT Home	2 048	256		23.65	26.28	11.55	12.83
Slovak Republic	Swan	ADSL	FLAT Basic	2 560	256		50.70	56.33	19.80	22.00
Slovak Republic	Swan	ADSL	FLAT Profi	3 584	384		174.77	194.19	48.76	54.18
Slovak Republic	T-Com	ADSL	Turbo 1	2 048	256	2 000	18.91	21.01	9.23	10.26
Slovak Republic	T-Com	ADSL	Turbo 2	2 048	256		28.14	31.27	13.74	15.27
Slovak Republic	T-Com	ADSL	Turbo 3	3 584	256		39.42	43.80	11.00	12.22
Slovak Republic	T-Com	ADSL	Turbo 4	12 288	512		169.13	187.92	13.76	15.29
Slovak Republic	UPC	Cable	chello small	2 048	256		21.33	23.70	10.41	11.57
Slovak Republic	UPC	Cable	chello medium	10 240	1 024		30.80	34.23	3.01	3.34
Slovak Republic	UPC	Cable	chello professional	15 360	1 024		236.91	263.23	15.42	17.14
Slovak Republic	UPC	Cable	chello large	20 480	2 048		45.02	50.02	2.20	2.44
Slovak Republic				**6 254**	**576**	**1 500**	**70.98**	**78.86**	**14.29**	**15.88**
Spain	Jazztel	ADSL	ADSL hasta 1 MB	1 024	512		33.20	28.87	32.42	28.19
Spain	Jazztel	ADSL	ADSL hasta 20 MB	2 048	1 024		49.85	43.34	24.34	21.16
Spain	Jazztel	ADSL	ADSL hasta 3 MB	3 000	512		36.53	31.77	12.18	10.59
Spain	Jazztel	ADSL	ADSL hasta 6 MB	6 000	512		43.19	37.55	7.20	6.26
Spain	Ono	Cable	TV Esencial + Banda Ancha 6 MB	6 000	300		66.57	57.89	11.10	9.65
Spain	Ono	Cable	TV Esencial + Banda Ancha 12 MB	12 000	500		83.21	72.36	6.93	6.03
Spain	Ono	Cable	TV Esencial + Banda Ancha 25 MB	25 000	1 000		108.18	94.07	4.33	3.76
Spain	Ono	Cable	Banda Ancha 50 MB	50 000	3 000		99.86	86.83	2.00	1.74
Spain	Orange	ADSL	adsl 1 Mb + llamadas nacionales	1 024	320		33.29	28.94	32.51	28.27
Spain	Orange	ADSL	adsl 6 Mb + llamadas + tv	6 000	512		41.52	36.11	6.92	6.02
Spain	Orange	ADSL	toto en 1	20 000	1 024		58.17	50.58	2.91	2.53
Spain	Tele 2	ADSL	Línea Tele2 ADSL 1 MB	1 024	300		49.76	43.27	48.60	42.26
Spain	Tele 2	ADSL	Línea Tele2 ADSL 3 MB	3 000	300		54.75	47.61	18.25	15.87
Spain	Tele 2	ADSL	Línea Tele2 ADSL 20 MB	20 000	500		66.40	57.74	3.32	2.89
Spain	Tele 2	ADSL	Línea Tele2 Internet	20 000	500		49.76	43.27	2.49	2.16
Spain	Telefonica	ADSL	Dúo Kit ADSL Mini	1 000	320	2 000	33.12	28.80	33.12	28.80
Spain	Telefonica	ADSL	Dúo Kit ADSL 1 MB	1 000	256		49.76	43.27	49.76	43.27
Spain	Telefonica	ADSL	Dúo Kit ADSL 3 MB	3 000	320		68.07	59.19	22.69	19.73
Spain	Telefonica	ADSL	Dúo Kit ADSL 6 MB	6 000	320		68.07	59.19	11.34	9.87
Spain	Telefonica	ADSL	Dúo Kit ADSL 10 MB	10 000	320		74.73	64.98	7.47	6.50
Spain	Ya	ADSL	1MB + Llamadas	1 024	300		33.20	28.87	32.42	28.19
Spain	Ya	ADSL	3MB + Llamadas	3 000	320		38.20	33.21	12.73	11.07
Spain	Ya	ADSL	10MB + Llamadas	10 000	512		41.52	36.11	4.15	3.61
Spain	Ya	ADSL	20MB + Llamadas	20 000	1 000		49.85	43.34	2.49	2.17
Spain				**9 631**	**604**	**2 000**	**55.45**	**48.22**	**16.32**	**14.19**
Sweden	Bredbandsbolaget	ADSL	Bredband 2	2 000	1 000		37.33	26.86	18.67	13.43
Sweden	Bredbandsbolaget	ADSL	Bredband 8	8 000	1 000		47.83	34.41	5.98	4.30
Sweden	Bredbandsbolaget	ADSL	Bredband 20 Pro	20 000	3 000		52.32	37.64	2.62	1.88
Sweden	Bredbandsbolaget	ADSL	Bredband 24	24 000	1 000		52.32	37.64	2.18	1.57
Sweden	Bredbandsbolaget	LAN	Bredband 2 (bredbandsuttag)	2 000	2 000		34.33	24.70	17.17	12.35
Sweden	Bredbandsbolaget	LAN	Bredband 100	100 000	10 000		47.98	34.51	0.48	0.35
Sweden	Com Hem AB	Cable	Bredband 250	250	64		14.84	10.68	59.37	42.71
Sweden	Com Hem AB	Cable	Bredband 2000	2 000	400		29.83	21.46	14.92	10.73
Sweden	Com Hem AB	Cable	Bredband 2/2	2 000	2 000		37.33	26.86	18.67	13.43
Sweden	Com Hem AB	Cable	Bredband 10	10 000	1 000		44.83	32.25	4.48	3.22
Sweden	Com Hem AB	Cable	Bredband 10/10	10 000	10 000		53.82	38.72	5.38	3.87
Sweden	Com Hem AB	Cable	Bredband 24000	24 000	1 000		50.82	36.56	2.12	1.52
Sweden	Com Hem AB	Cable	Bredband 24/10	24 000	10 000		59.82	43.04	2.49	1.79
Sweden	Glocalnet	ADSL	Glocalnet Bredband 0,25	250	250		22.34	16.07	89.35	64.28
Sweden	Glocalnet	ADSL	Glocalnet Bredband 0,5	500	400		29.83	21.46	59.67	42.93
Sweden	Glocalnet	ADSL	Glocalnet Bredband 2	2 000	900		37.33	26.86	18.67	13.43
Sweden	Glocalnet	ADSL	Glocalnet Bredband 8	8 000	900		41.83	30.09	5.23	3.76
Sweden	Glocalnet	ADSL	Glocalnet Bredband 24	24 000	900		44.83	32.25	1.87	1.34
Sweden	Tele2	ADSL	Tele2 Bredband ADSL 0,25 Mbit/s	250	250		22.34	16.07	89.35	64.28
Sweden	Tele2	ADSL	Tele2 Bredband ADSL 0,5 Mbit/s	512	400		29.83	21.46	58.27	41.92
Sweden	Tele2	ADSL	Tele2 Bredband ADSL 2 Mbit/s	2 000	1 000		37.33	26.86	18.67	13.43
Sweden	Tele2	ADSL	Tele2 Bredband ADSL 8 Mbit/s	8 000	700		41.83	30.09	5.23	3.76
Sweden	Tele2	ADSL	Tele2 Bredband ADSL 24 Mbit/s	24 000	1 000		52.32	37.64	2.18	1.57
Sweden	Telia	ADSL	Telia Bredband, upp till 0,25 Mbit/s	250	64		34.33	24.70	137.33	98.80
Sweden	Telia	ADSL	Telia Bredband, upp till 2 Mbit/s	2 000	400		38.83	27.94	19.42	13.97
Sweden	Telia	ADSL	Telia Bredband, upp till 8 Mbit/s	8 000	800		46.33	33.33	5.79	4.17
Sweden	Telia	ADSL	Telia Bredband, upp till 24 Mbit/s	24 000	1 000		53.82	38.72	2.24	1.61
Sweden				**12 297**	**1 905**		**40.61**	**29.22**	**24.73**	**17.79**

Table 7.14. **Broadband pricing for residential users in the OECD area, September 2008** ***(cont.)***

Country	Company	Type	Plan	Down (kbit/s)	Up (kbit/s)	Bit cap (MB)	Price USD	Price USD PPP	USD/MB	USD PPP /MB
Switzerland	Cablecom	Cable	hispeed 1000	1 000	100		27.03	17.22	27.03	17.22
Switzerland	Cablecom	Cable	hispeed 5000	5 000	500		40.54	25.82	8.11	5.16
Switzerland	Cablecom	Cable	hispeed 15000	15 000	1 500		58.56	37.30	3.90	2.49
Switzerland	Cablecom	Cable	hispeed 25000	25 000	2 500		67.57	43.04	2.70	1.72
Switzerland	Sunrise	ADSL	click&call 300	300	100		35.14	22.38	117.13	74.60
Switzerland	Sunrise	ADSL	click&call 1000	1 000	100		62.17	39.60	62.17	39.60
Switzerland	Sunrise	ADSL	click&call 5000+	5 000	500		53.16	33.86	10.63	6.77
Switzerland	Sunrise	ADSL	click&call 5000	5 000	500		71.18	45.34	14.24	9.07
Switzerland	Sunrise	ADSL	click&call 15000	15 000	1 000		71.18	45.34	4.75	3.02
Switzerland	Swisscom	ADSL	DSL mini	1 000	100		30.63	19.51	30.63	19.51
Switzerland	Swisscom	ADSL	DSL standard	5 000	500		44.15	28.12	8.83	5.62
Switzerland	Swisscom	ADSL	Infinity	20 000	1 000		62.17	39.60	3.11	1.98
Switzerland	Tele2	ADSL	ADSL 5000	5 000	500		44.06	28.06	8.81	5.61
Switzerland				**7 946**	**685**		**51.35**	**32.71**	**23.23**	**14.80**
Turkey	Superonline	ADSL	LİMİTLİ SUPERADSL 1024/256	1 024	256	4 000	23.53	24.51	22.98	23.94
Turkey	Superonline	ADSL	LİMİTLİ SUPERADSL 1024/256	1 024	256	6 000	31.65	32.97	30.91	32.19
Turkey	Superonline	ADSL	SINIRSIZ SUPERADSL	1 024	256		39.76	41.42	38.83	40.45
Turkey	Superonline	ADSL	LİMİTLİ SUPERADSL 2048/512	2 048	512	6 000	39.76	41.42	19.42	20.22
Turkey	Superonline	ADSL	SINIRSIZ SUPERADSL	2 048	512		55.99	58.33	27.34	28.48
Turkey	Superonline	ADSL	SINIRSIZ SUPERADSL	4 096	1 024		72.22	75.23	17.63	18.37
Turkey	TTNet	ADSL	1 Mbps	1 000		4 000	23.53	24.51	23.53	24.51
Turkey	TTNet	ADSL	1 Mbps	1 000		6 000	31.65	32.97	31.65	32.97
Turkey	TTNet	ADSL	1 Mbps	1 000			39.76	41.42	39.76	41.42
Turkey	TTNet	ADSL	2 Mbps	2 000		6 000	39.76	41.42	19.88	20.71
Turkey	TTNet	ADSL	2 Mbps	2 000			55.99	58.33	28.00	29.16
Turkey	TTNet	ADSL	4 Mbps	4 000			72.22	75.23	18.06	18.81
Turkey	Turksat	Satellite	512 / 128 Kbps	512	128	1 000	8.11	8.45	15.85	16.51
Turkey	Turksat	Satellite	512 / 128 Kbps	512	128		15.42	16.06	30.11	31.37
Turkey	Turksat	Satellite	1024 / 256 Kbps	1 024	256	1 000	12.98	13.52	12.68	13.21
Turkey	Turksat	Satellite	1024 / 256 Kbps	1 024	256		31.65	32.97	30.91	32.19
Turkey	Turksat	Satellite	2048 / 512 Kbps	2 048	512	1 000	16.23	16.91	7.92	8.25
Turkey	Turksat	Satellite	2048 / 512 Kbps	2 048	512		47.88	49.87	23.38	24.35
Turkey	Turksat	Satellite	4096 / 1024 Kbps	4 096	1 024	1 000	24.34	25.36	5.94	6.19
Turkey	Turksat	Satellite	4096 / 1024 Kbps	4 096	1 024		64.11	66.78	15.65	16.30
Turkey	Turksat	Satellite	6144 / 1024 Kbps	6 144	1 024	1 000	32.46	33.81	5.28	5.50
Turkey	Turksat	Satellite	6144 / 1024 Kbps	6 144	1 024		96.57	100.59	15.72	16.37
Turkey	Turksat	Satellite	8192 / 1024 Kbps	8 192	1 024	1 000	40.57	42.27	4.95	5.16
Turkey	Turksat	Satellite	8192 / 1024 Kbps	8 192	1 024		112.80	117.50	13.77	14.34
Turkey	Turksat	Satellite	10240 / 1024 Kbps	10 240	1 024	1 000	48.69	50.72	4.75	4.95
Turkey	Turksat	Satellite	10240 / 1024 Kbps	10 240	1 024		120.91	125.95	11.81	12.30
Turkey				**3 338**	**640**	**3 000**	**46.10**	**48.02**	**19.87**	**20.70**
United Kingdom	Be	ADSL	Be Value	8 000	1 300		25.15	21.68	3.14	2.71
United Kingdom	Be	ADSL	Be unlimited	24 000	1 300		32.34	27.88	1.35	1.16
United Kingdom	Be	ADSL	Be Pro	24 000	2 500		39.53	34.07	1.65	1.42
United Kingdom	BT	ADSL	Option 1	8 192		10 000	28.73	24.77	3.51	3.02
United Kingdom	BT	ADSL	Option 2	8 192		15 000	37.71	32.51	4.60	3.97
United Kingdom	BT	ADSL	Option 3	8 192			44.90	38.70	5.48	4.72
United Kingdom	BT	ADSL	Anywhere	8 192			53.88	46.45	6.58	5.67
United Kingdom	Tiscali	ADSL	Tiscali Lite	2 000			20.66	17.81	10.33	8.91
United Kingdom	Tiscali	ADSL	Broadband & phone	8 000			23.34	20.12	2.92	2.51
United Kingdom	Tiscali	ADSL	Tiscali Standard	8 000			26.05	22.46	3.26	2.81
United Kingdom	Tiscali	ADSL	Broadband only	8 000			26.93	23.22	3.37	2.90
United Kingdom	Tiscali	ADSL	8mb extra	8 000			35.91	30.96	4.49	3.87
United Kingdom	Tiscali	ADSL	Tiscali Pro	16 000			35.03	30.20	2.19	1.89
United Kingdom	Virgin	Cable	M	2 000			30.54	26.33	15.27	13.16
United Kingdom	Virgin	Cable	L	10 000			43.12	37.17	4.31	3.72
United Kingdom	Virgin	Cable	XL	20 000			64.68	55.76	3.23	2.79
United Kingdom				**10 673**	**1 700**	**12 500**	**35.53**	**30.63**	**4.73**	**4.08**
United States	AT&T	ADSL	Basic DSL	768			14.99	14.99	19.52	19.52
United States	AT&T	ADSL	High Speed Internet Express	1 500	384		25.00	25.00	16.67	16.67
United States	AT&T	ADSL	High Speed Internet Pro	3 000	512		30.00	30.00	10.00	10.00
United States	AT&T	ADSL	High Speed Internet Elite	6 000	768		35.00	35.00	5.83	5.83
United States	AT&T	VDSL	U-verse Express	1 500	1 000		25.00	25.00	16.67	16.67
United States	AT&T	VDSL	U-verse Pro	3 000	1 000		30.00	30.00	10.00	10.00
United States	AT&T	VDSL	U-verse Elite	6 000	1 000		35.00	35.00	5.83	5.83
United States	AT&T	VDSL	U-verse Max	10 000	1 500		55.00	55.00	5.50	5.50
United States	Comcast	Cable	Performance with PowerBoost	12 000	2 000		42.95	42.95	3.58	3.58
United States	Comcast	Cable	Performance PLUS with PowerBoost	16 000	2 000		52.95	52.95	3.31	3.31
United States	Qwest	ADSL	Connect Silver with Windows Live	1 500	896		39.99	39.99	26.66	26.66
United States	Qwest	ADSL	Connect Platinum with Windows Live	7 000	896		49.99	49.99	7.14	7.14
United States	Qwest	ADSL	Connect Titanium with Windows Live	12 000	896		59.99	59.99	5.00	5.00
United States	Qwest	ADSL	Connect Quantum with Windows Live	20 000	896		109.99	109.99	5.50	5.50
United States	Time Warner	Cable	Roadrunner Lite	768	128		19.95	19.95	25.98	25.98
United States	Time Warner	Cable	Roadrunner Basic	1 500	256		25.90	25.90	17.27	17.27
United States	Time Warner	Cable	Roadrunner Standard	10 000	384		39.95	39.95	4.00	4.00
United States	Time Warner	Cable	Roadrunner Turbo	15 000	1 000		49.95	49.95	3.33	3.33
United States	Verizon	ADSL	DSL starter plan	768	128		19.99	19.99	26.03	26.03
United States	Verizon	ADSL	DSL power plan	3 072	768		29.99	29.99	9.76	9.76
United States	Verizon	FTTx	FiOS Fast	10 000	2 000		42.99	42.99	4.30	4.30
United States	Verizon	FTTx	FiOS Faster	20 000	5 000		52.99	52.99	2.65	2.65
United States	Verizon	FTTx	FiOS Faster Plus - Symmetric	20 000	20 000		64.99	64.99	3.25	3.25
United States	Verizon	FTTx	FiOS Fastest	50 000	20 000		139.95	139.95	2.80	2.80
United States				**9 641**	**2 757**		**45.52**	**45.52**	**10.02**	**10.02**
DSL				**11 543**	**2 271**	**29 936**	**52.42**	**43.78**	**16.48**	**14.06**
Cable				**14 856**	**1 264**	**27 730**	**53.40**	**45.41**	**12.37**	**11.21**
FTTx				**65 882**	**35 156**	**6 800**	**65.62**	**48.98**	**5.29**	**3.61**
Wireless				**3 297**	**660**	**5 012**	**46.45**	**42.22**	**20.77**	**18.11**
Total				**17 412**	**5 012**	**26 972**	**53.48**	**44.53**	**14.54**	**12.49**

StatLink http://dx.doi.org/10.1787/626516135685

Table 7.15. **Trends in leased line pricing over different distances, 1992-2008**

OECD average	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
56/64 kbit/s																	
2 km	100	97	121	129	132	114	113	77	73	67	65	56	55	57	59	62	62
50 km	100	99	100	91	84	72	63	39	42	37	36	31	31	31	33	31	32
200 km	100	99	105	103	73	68	59	39	40	36	35	32	31	30	31	30	32
2 Mbit/s																	
2 km	100	100	106	108	106	101	95	60	58	57	54	50	48	45	48	40	40
50 km	100	98	89	85	78	72	60	40	43	40	38	35	31	28	34	33	34
200 km	100	99	95	88	77	73	61	42	45	39	36	33	31	26	32	33	33

Source: OECD/Teligen.

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Table 7.16. **OECD basket of national leased line charges, yearly price, August 2008**

Excluding tax

	64 kbit/s		2 Mbit/s		34 Mbit/s	
	USD PPP	USD	USD PPP	USD	USD PPP	USD
Australia	4 241	5 810	30 564	41 873		
Austria	4 123	5 484	11 454	15 234	76 053	101 150
Belgium	4 632	6 485	17 327	24 258	82 765	115 871
Canada	4 390	5 225	38 812	46 186	228 647	272 090
Czech Republic	10 647	10 434	58 557	57 386		
Denmark	1 825	3 321	3 239	5 894	43 479	79 131
Finland						
France	4 791	6 659	21 082	29 304	127 840	177 698
Germany	3 239	4 372	15 475	20 892	55 954	75 538
Greece	3 745	4 494	17 364	20 836	60 887	73 064
Hungary						
Iceland	1 202	1 779	4 360	6 452	20 141	29 808
Ireland	2 552	4 414	15 470	26 763	165 381	286 110
Italy	4 060	5 522	22 178	30 162	122 593	166 726
Japan	3 638	4 439	31 178	38 037	167 345	204 161
Korea	7 699	6 467	53 955	45 322	197 271	165 708
Luxembourg	2 209	3 027	10 847	14 860	42 619	58 387
Mexico	4 473	3 310	41 476	30 693	324 487	240 120
Netherlands	4 316	5 783	15 595	20 897		
New Zealand						
Norway	2 370	4 290	7 107	12 863	22 510	40 743
Poland	6 808	6 536	44 727	42 938		
Portugal	3 466	3 916	18 008	20 349	135 062	152 620
Slovak Republic						
Spain	4 761	5 951	24 270	30 338	169 737	212 171
Sweden	2 395	3 664	4 754	7 273		
Switzerland						
Turkey	1 814	1 742	12 298	11 806	72 856	69 942
United Kingdom	5 355	6 748	21 199	26 711	145 092	182 816
United States[1]	7 007	7 007	49 275	49 275	114 511	114 511
OECD	4 230	5 075	23 623	27 064	118 761	140 918

1. The basket uses intrastate tariffs for the United States. These tariffs are often significantly higher than the interstate tariffs which firms commonly purchase.

Source: OECD and Teligen.

StatLink http://dx.doi.org/10.1787/626527083762

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OECD Communications Outlook 2009
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Chapter 8

Trade in Telecommunication Equipment and Services

Telecommunications trade in the OECD area reached a historical peak in 2006 at USD 378.6 billion, then declined slightly in 2007. Korea, the United States and Germany remained the major exporters within the OECD area. China continues to grab a growing share of the world's telecommunication exports. Smaller economies like Finland, Hungary and Sweden managed to develop and maintain their strong comparative advantage in this sector's foreign trade. Telecommunication trade data for 2007 are estimations, following a major change in the trade statistical system of classification.

Introduction

This chapter focuses on the major trends in telecommunication equipment trade and the weight of telecommunication equipment in the ICT goods group, and compares the situation of the OECD accession countries with member countries. The chapter also examines some major players in equipment trade, including China, and provides an analysis of four smaller economies with a large share of their trade in telecommunication equipment. A section of this chapter examines the composition of the telecommunication equipment group to determine the relative importance of the different items in this group.

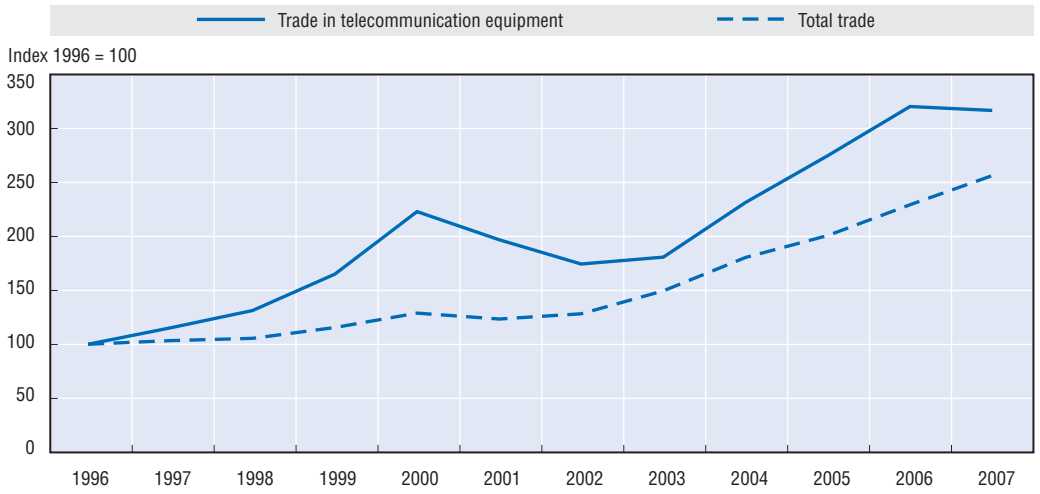
Measuring telecommunication equipment trade was more problematic for 2007 than in previous years, mainly due to changes in the harmonised system of statistics (HS) classification from the 2002 version to the revised 2007 edition.

The definition of telecommunication equipment used in this chapter is based on the HS 2002 classification in order to allow for longer time series (Box 8.1). Data for 2007 are estimations, as countries declared their exports and imports based on the new HS 2007 classification. The trade data available for 2007 in the HS 2002 classification were in fact formatted for the new HS 2007 classification and then converted using a conversion table from HS 2007 to HS 2002.

Major trends in telecommunication equipment trade

Trade in telecommunications equipment by OECD economies increased by 300% in the last decade (Figure 8.1 and Table 8.1) from USD 126.6 billion in 1996 to USD 374.6 billion in 2007 (Figure 8.2). The growth in telecommunication equipment trade has been

Figure 8.1. **Growth indices for OECD countries' total trade and trade in telecommunications equipment, 1996-2007**



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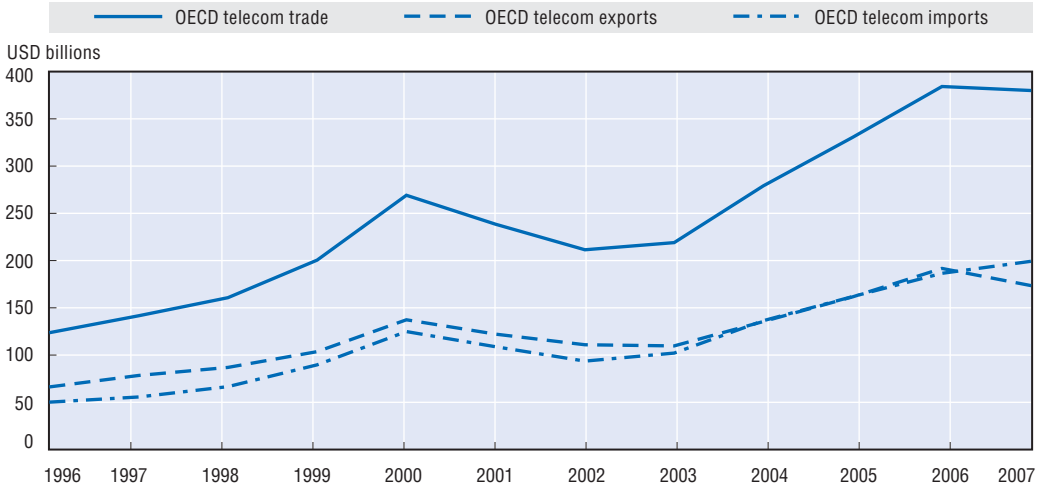
higher than the overall increase in total world goods trade and its proportion in total trade is growing, having increased from 3.5% to 5% of total trade of the OECD economies.

Despite the decline in trade from 2000 to 2003 following the burst of the dot.com bubble, by 2006 trade had rebounded in most of the OECD economies, exceeding the peak level that had been attained in 2000 export level in value terms (Table 8.1). Almost all OECD countries, with the notable exception of Japan, increased their exports and imports of telecommunications equipment after 2003 (Tables 8.1 and 8.2).

Exports and imports are growing at a similar pace (Figure 8.2) and according to the estimates, there was a negative balance of trade for the OECD economies in 2007 after ten years of mostly positive trade balance (Table 8.3).

Figure 8.2. **Trade in telecommunication equipment in OECD, 1996-2007**



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The telecommunication equipment group defined in the OECD "Guide for Measuring the Information Society" (2005) contains 18 different categories selected from the harmonised system classification of 1996 and 2002 (Box 8.1). Twelve of these items could be considered as consumption goods (final goods), and six categories are for intermediate goods (components). Among final goods, three categories cover network infrastructure equipment. The goods (categories) included in the Telecommunications equipment group and in the ICT group were determined by a group of experts from different countries. These ICT measurement guidelines issued by this experts group are available in the Guide for Measuring the Information Society (OECD, 2005).

OECD countries which export the most telecommunication equipment are Korea, the United States, Germany, the Netherlands, Finland, Sweden and Mexico (Figure 8.3). China was added in the graphic to show the tremendous volume of export that it has attained in recent years. Ten years ago, China had a lower level of telecommunication equipment exports than leading OECD countries whereas in 2007, the value of Chinese exports was almost three times higher than that of the leading OECD countries.

The United States is still, after ten years, leading in importation of telecommunication equipment (Figure 8.4) with a level of imports over three times higher than the Netherlands and the UK, the second and third largest importers. The US has the largest trade deficit in

Box 8.1. **List of components of the Telecommunications Equipment category according to the HS 1996 and HS 2002 classification systems**

851711:	Line telephone sets with cordless handsets
851719:	Other telephone sets, video phones
851721:	Facsimile machines
851722:	Teleprinters
851730:	Telephonic or telegraphic switching apparatus
851750:	Other apparatus, for carrier-current line systems or for digital line systems
851780:	Other electrical apparatus for line telephony or line telegraphy
851790:	Parts for other electrical apparatus for line telephony or line telegraphy
852020:	Telephone answering machines
852510:	Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television not incorporating reception apparatus
852520:	Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television incorporating reception apparatus
852530:	Television cameras
852610:	Radar apparatus
852790:	Reception apparatus, n.e.s.
852910:	Aerials and aerial reflectors of all kinds; parts suitable for use therewith
853110:	Burglar or fire alarms and similar apparatus
854420:	Co-axial cable and other co-axial electric conductors
854470:	Optical fibre cables made up of individually sheathed fibres

Source: OECD (2005), "Guide to Measuring the Information Society", OECD, Paris.

Box 8.2. **United Kingdom missing trader fraud, "carousel" fraud and trade data accuracy**

The United Kingdom missing trader fraud was defined as follows in Her Majesty's Treasury and Customs and Excise paper of November 2001, *Tackling Indirect Tax Fraud*, published with the 2001 Pre-Budget Report:

"VAT intra-Community missing trader fraud is a systematic criminal attack on the VAT system, which has been detected in many EU Member States. In essence, fraudsters obtain VAT registration to acquire goods VAT free from other Member States. They then sell on the goods at VAT inclusive prices and disappear without paying over the VAT paid by their customers to the tax authorities. The fraud is usually carried out very quickly, with the fraudsters disappearing by the time the tax authorities follow up the registration with their regular assurance activities." The report gives details on the 'carousel' version of the fraud, which "occurs when goods that have been imported into the UK are sold through a series of transactions before being re-exported to another EU Member State. They may then be re-imported back into the UK".

According to the Office for National Statistics and HM Customs & Excise, the fraud effects on trade data have been corrected by now. Nevertheless the report underlines the fact that criminal activities are by nature difficult to measure and to trace and that the fraudsters favoured goods such as mobile phone and computer components which both have small volume, low weight and high values. This is why we are still careful in analysing UK's high growth in telecommunications equipment exports.

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Figure 8.3. **OECD countries' worldwide exports of telecommunications equipment**

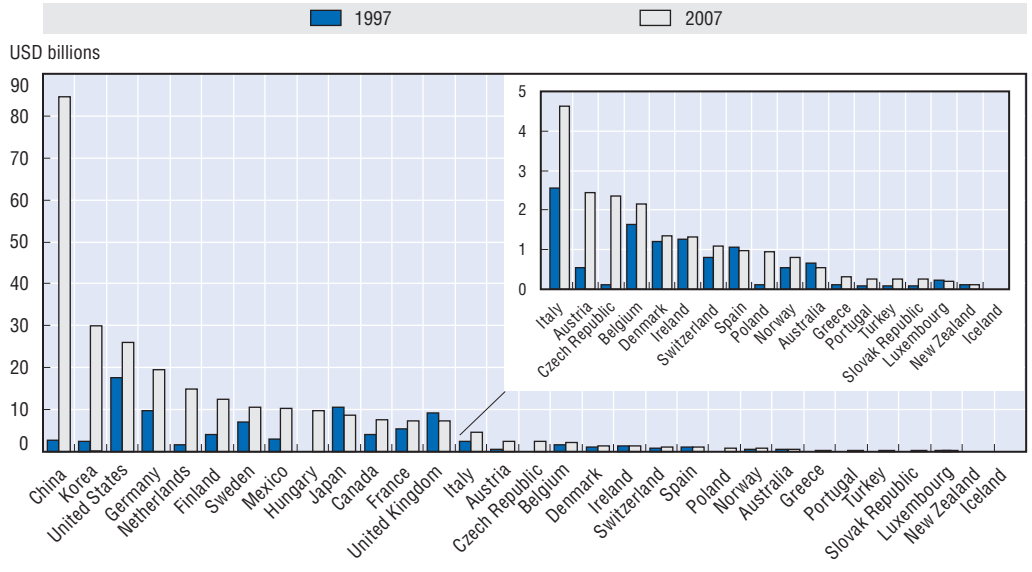

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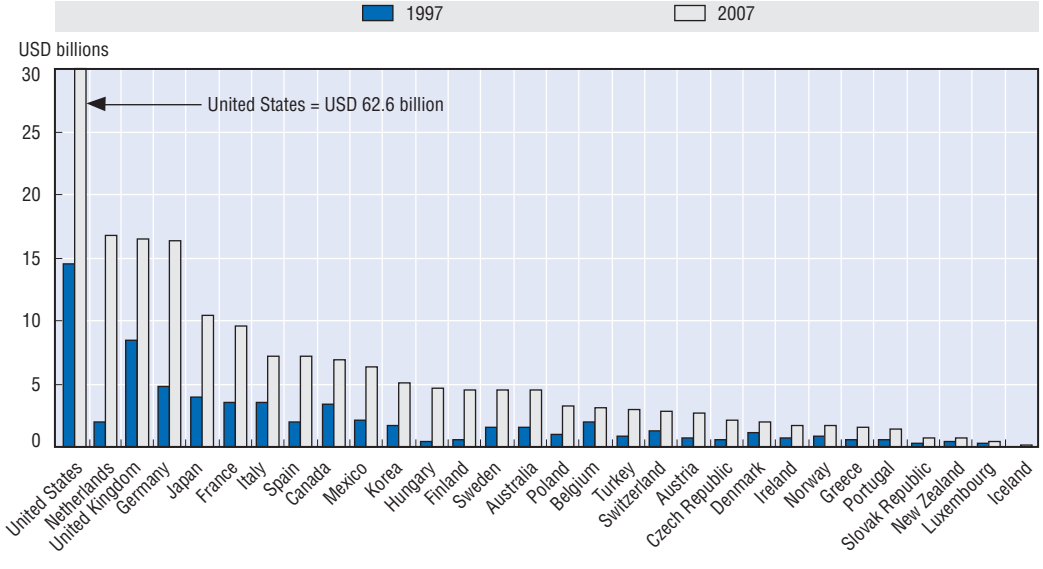
Figure 8.4. **OECD countries' worldwide imports of telecommunications equipment**



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this group of goods. Only eight OECD countries have a positive trade balance in telecommunication equipment (Figure 8.5).

Share of the telecommunication sector in the ICT group

The telecommunication equipment group is part of the wider group of ICT goods (including electronic components, audio and video equipment, computer equipment, and other ICT goods). The telecommunication equipment group has remained in third position within the ICT group in terms of value of total trade (Figure 8.6) and volume of exports (Figure 8.7). Telecommunication equipment exports grew at a slightly faster rate than the four other groups until 2006. In that year, the telecommunication equipment group

Figure 8.5. **Telecommunications equipment trade balance, 2006**

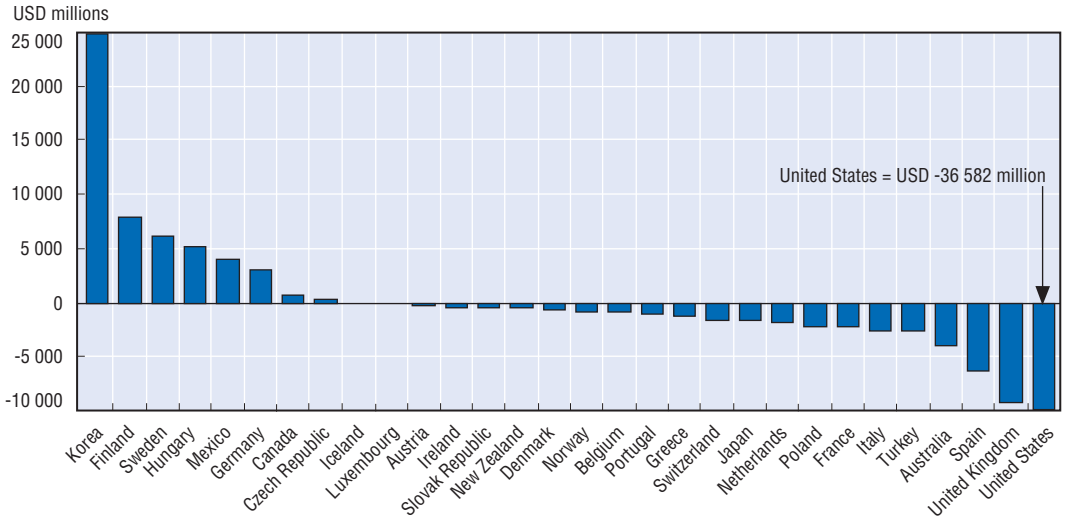

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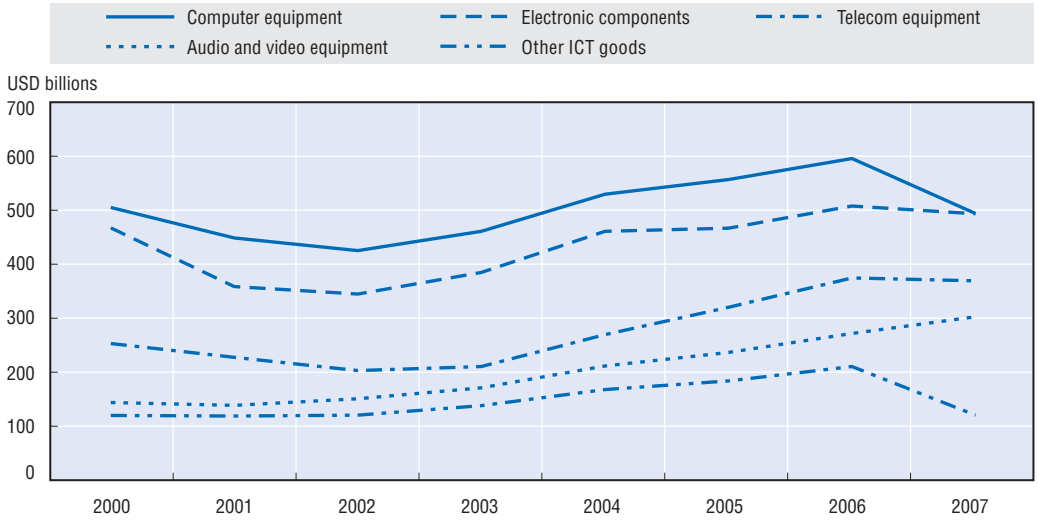
Figure 8.6. **ICT sector total trade, 2000-07**



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accounted for 19% of ICT total trade; the leading category, computer equipment, accounted for 30%. If we consider exports alone, the trends are different, with the lead taken by the electronic equipment group with 29% of total ICT exports and telecommunication equipment still third in the group with 20% of exports. The change from HS 2002 to HS 2007 created a break in the time series in 2007, which is why the trend for that year is erratic and why we have preferred to base our comments on the year 2006.

The OECD accession countries: Chile, Estonia, Israel, Russian Federation and Slovenia

Total trade of the OECD accession countries has increased by 260% in the last decade. Figure 8.8 shows that trade by the Russian Federation boomed over the last three years (mainly due to massive imports). Israel had the highest level of trade in telecommunication equipment among these five countries until 2005. Chile and Slovenia

Figure 8.7. **ICT sector exports, 2000-07**

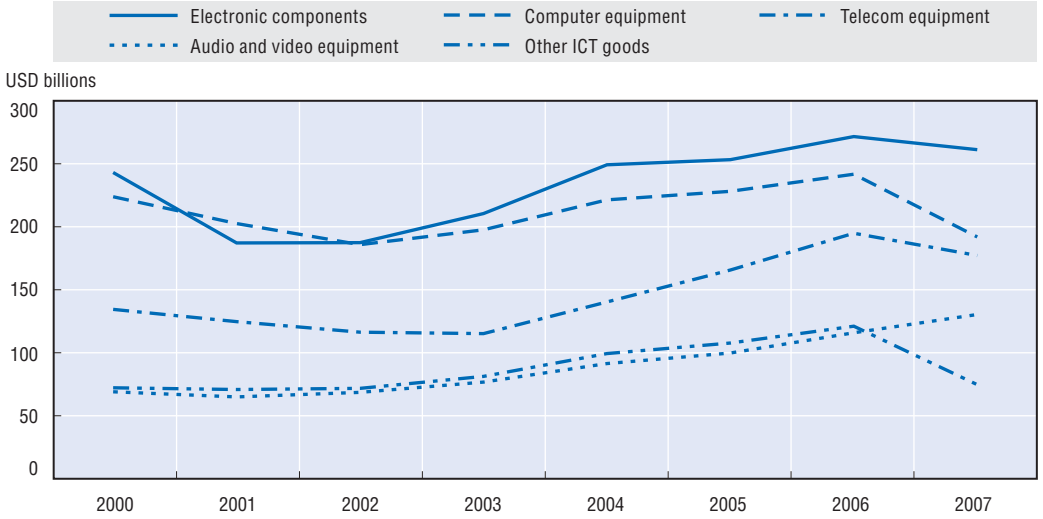

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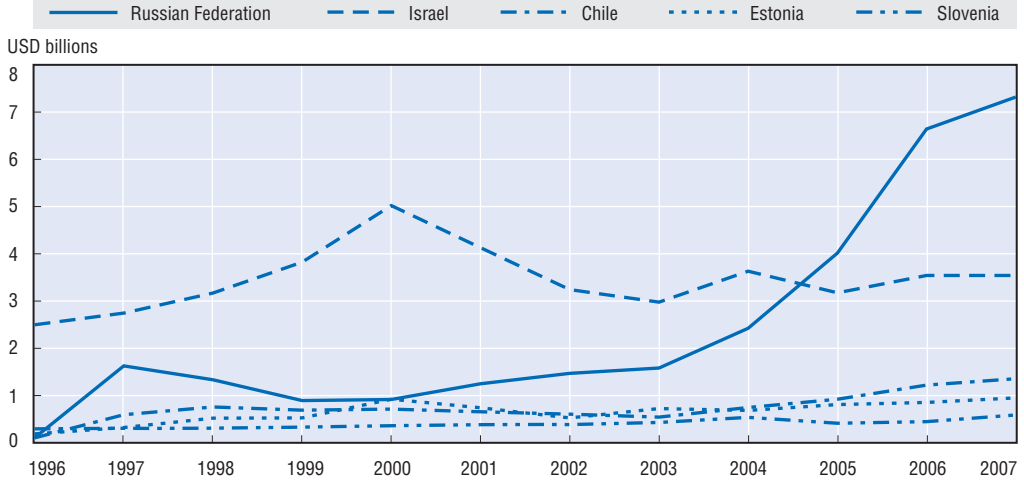
Figure 8.8. **OECD accession countries' trade in telecommunication equipment, 1996-2007**



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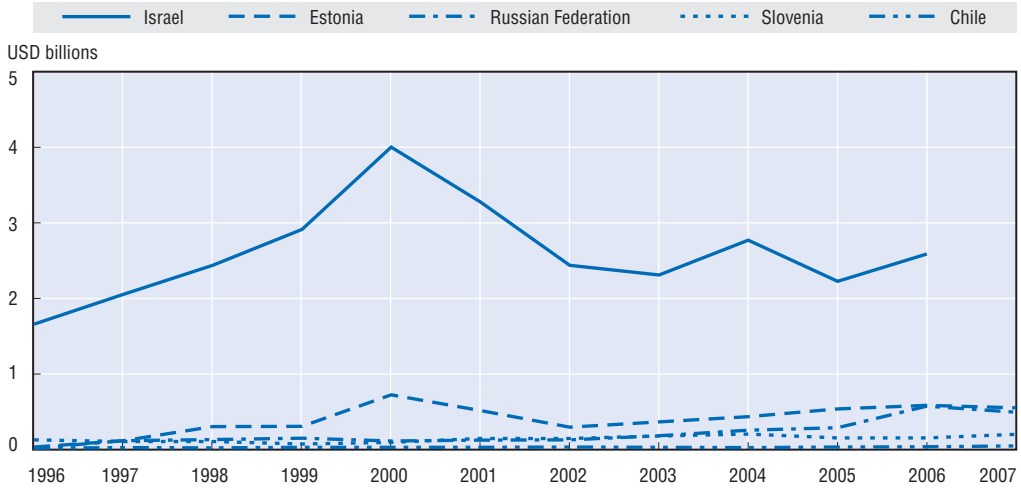
increased their trade by 254% and 240% respectively and Estonia showed its dynamism with a 387% increase.

Examining export performance shows that Israel is the leading exporter among the current accession countries with a level comparable to Austria's in 2006 (Figure 8.9). All accession countries experienced growth in exports, with the best performers being Estonia and the Russian Federation.

Focus on countries

In order to better understand the trends in telecommunication equipment trade, this section focuses on individual countries: the major players in telecommunication equipment trade, and then smaller economies with a high share of trade dedicated to telecommunication equipment.

Figure 8.9. **OECD accession countries' exports of telecommunication equipment, 1996-2007**



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The major players

China. As is many other sectors, China is a major player in telecommunication equipment trade (Figure 8.10). China is the world's largest exporter of telecommunication equipment with exports in 2006 equivalent to 28% of OECD's trade in telecommunication goods. In 2004, China surpassed the United States in the export value of telecommunication equipment (Figures 8.11 and Table 8.7), and by 2006, exports from China were over three times higher than US exports.

Figure 8.10. **Comparison of OECD, US and Chinese telecommunication equipment trade**

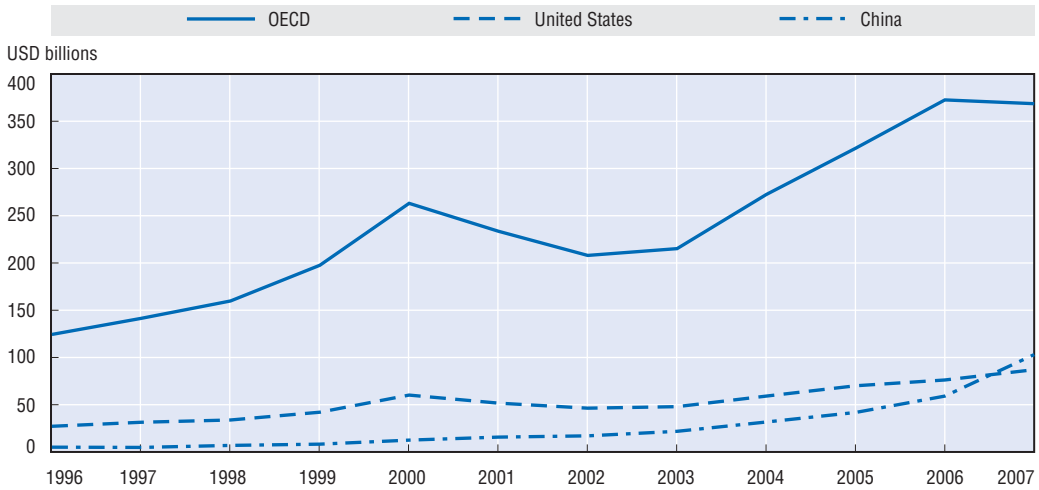

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Figure 8.11 shows that China's exports to OECD countries grew by 350% over the last decade. The United States accounts for 39.6% of OECD's imports of telecommunication equipment from China, playing an important role in the growth of Chinese telecommunication exports. China's exports to the US increased by 450%, and by 375% to

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Germany over the last five years (Figure 8.12). This represents a tremendous change in trade flows of telecommunication equipment.

Figure 8.11. **Comparison of OECD, US and Chinese telecommunication equipment exports**

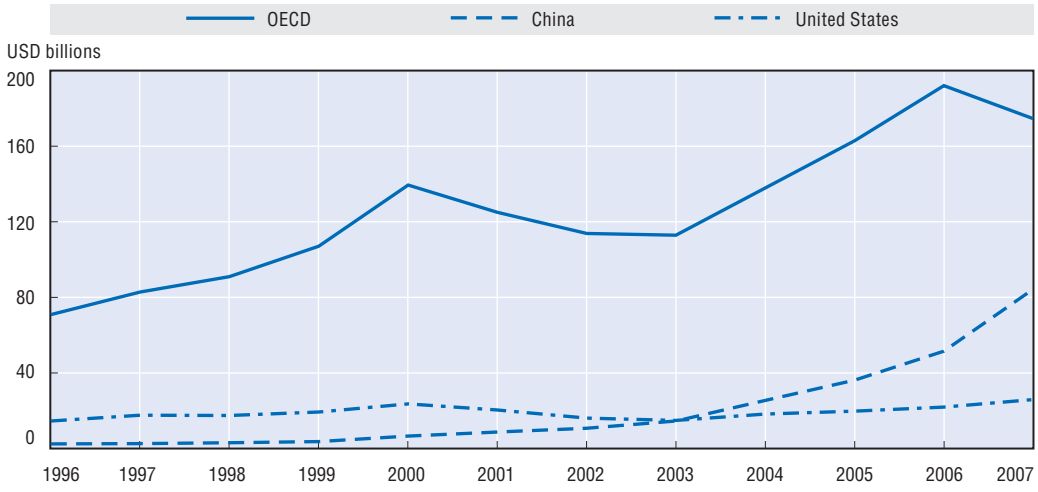

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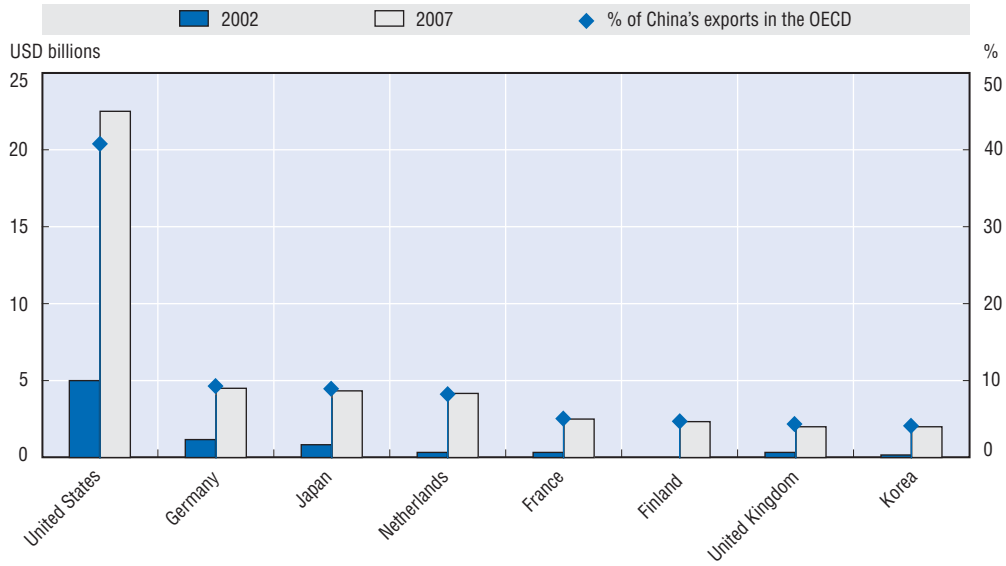
Figure 8.12. **China's export destinations**



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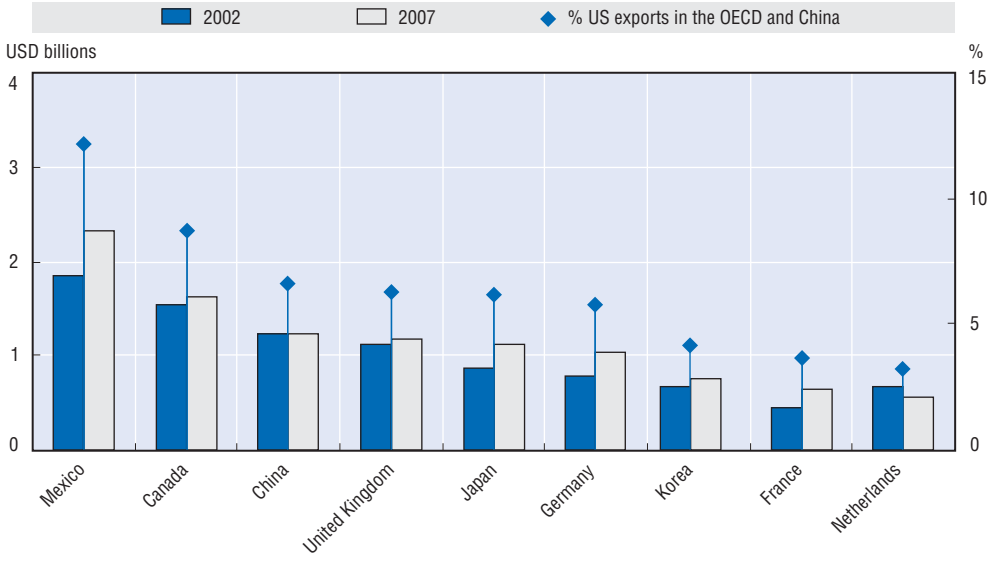
United States. US exports of telecommunication equipments had been growing since 2003 and according to the 2007 estimates, they surpassed the level they had reached in 2000. In 2004, the US lost its world lead in telecommunication equipment exports to China (Figure 8.11). The main destinations of US exports are now Mexico (12%) and Canada (8.4%) (Figure 8.13). The Netherlands, one of the largest importers of US telecommunication equipment, has reduced its imports from the US in value terms over the past five years.

US exports are still growing, but imports are increasing at a very high rate. As a consequence, the United States had the highest trade deficit in telecommunication equipment

trade in 2006. The US increased its imports of telecommunication equipment by 431% in the last decade and now has a trade deficit of USD 33.7 billion for these goods (Table 8.3).

Figure 8.13. **US export destinations**



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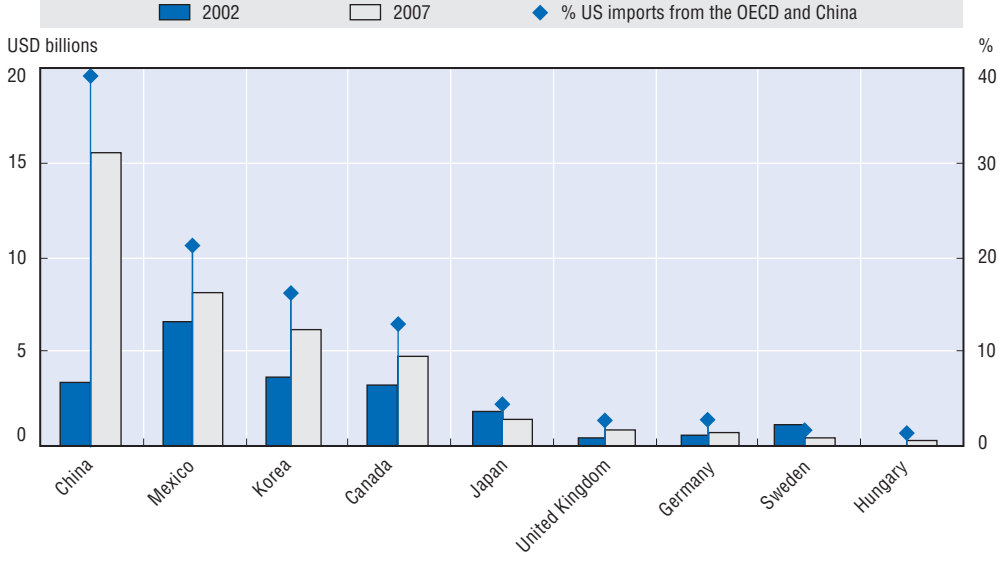
The sources of US imports are China with 39.3% of all imports, followed by Mexico (20.5%), Canada (15.4%) and Korea (12.1%).

There is a USD 5 billion difference when examining China's exports to US (Figure 8.12) and US imports from China (Figure 8.14). This is a typical export/import mirror data problem, as the declared value of exports from a country A to a country B often does not match the value declared by country B of its imports from country A. The OECD Statistics

Figure 8.14. **US import provenance**



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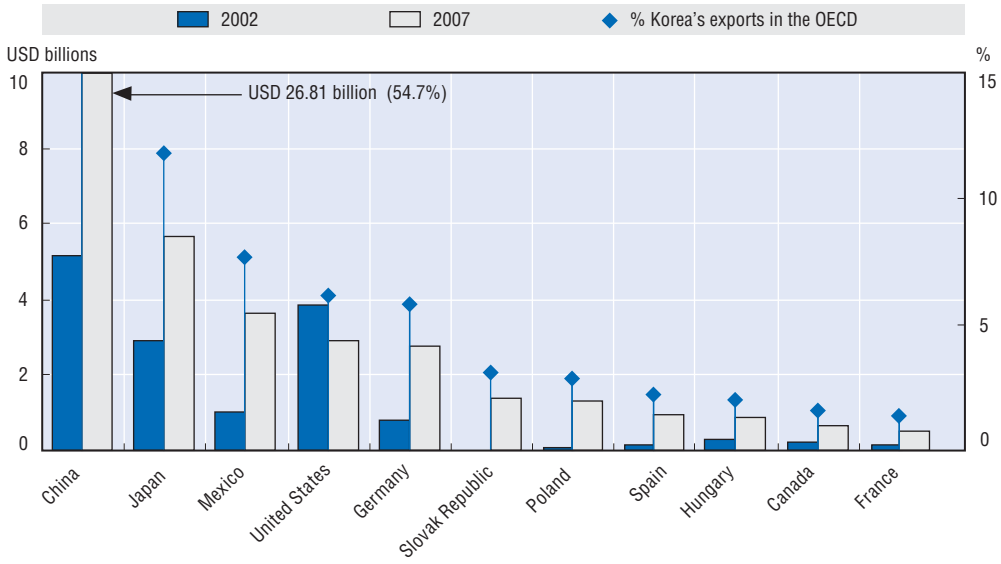
Directorate has undertaken work to eliminate these reporting errors. In this specific case, the difference might also result from Hong Kong, China re-exports. In this case, China might have included in its data the value of Hong Kong, China exports to the US and the US might have declared imports from China and from Hong Kong, China separately.

Korea. According to estimations for 2007, Korea is the largest telecommunication equipment exporter in the OECD. The growth in Korean telecommunication equipment exports has been quite impressive over the last decade (1200%). Korea's exports are mainly directed toward China (54.7%) followed by Japan (11.5%), Mexico, the United States and Germany (Figure 8.15). Korea is the first exporter to China, followed by Japan, the United States, Finland and Sweden (based on 2007 estimated data).

Figure 8.15. **Korea's export destinations**



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Germany. Germany is the third largest exporter of telecommunication equipment in the OECD after Korea and the United States. Germany's main export destinations (accounting for over half of its exports) are geographically close European countries (United Kingdom, Spain, Italy, the Netherlands, Sweden, etc.). Germany increased its exports to all of its main destination countries except France, Poland and Austria (Figure 8.16).

Small economies with a high share of telecommunication exports

One interesting aspect when comparing trade data of OECD countries is the share of telecommunication equipment in total exports (Figures 8.17 and Table 8.5) and the share of telecommunication equipment in GDP (Figures 8.18 and Table 8.6). There are four examples of countries that have developed an export-driven economy specialising in telecommunication and ICT.

Finland. Finland succeeded in building a knowledge-based economy in the early 1990s. Public policies played an important role in the early stage of the mobile communication industry, which was helped by the early liberalisation of the Finnish telecommunication market. In addition, there have been high levels of investment in public and private R&D

Figure 8.16. **Germany's export destinations**

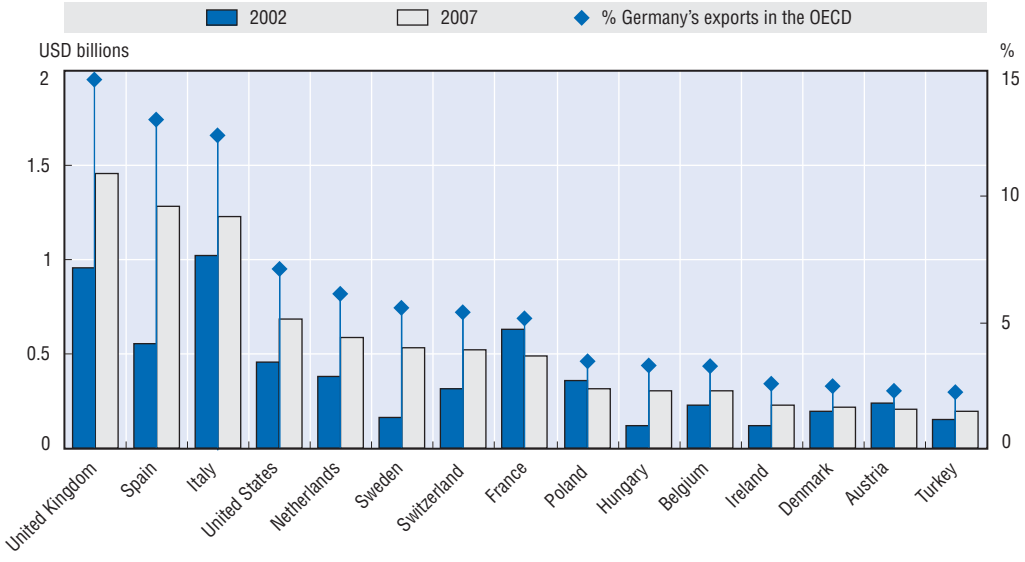

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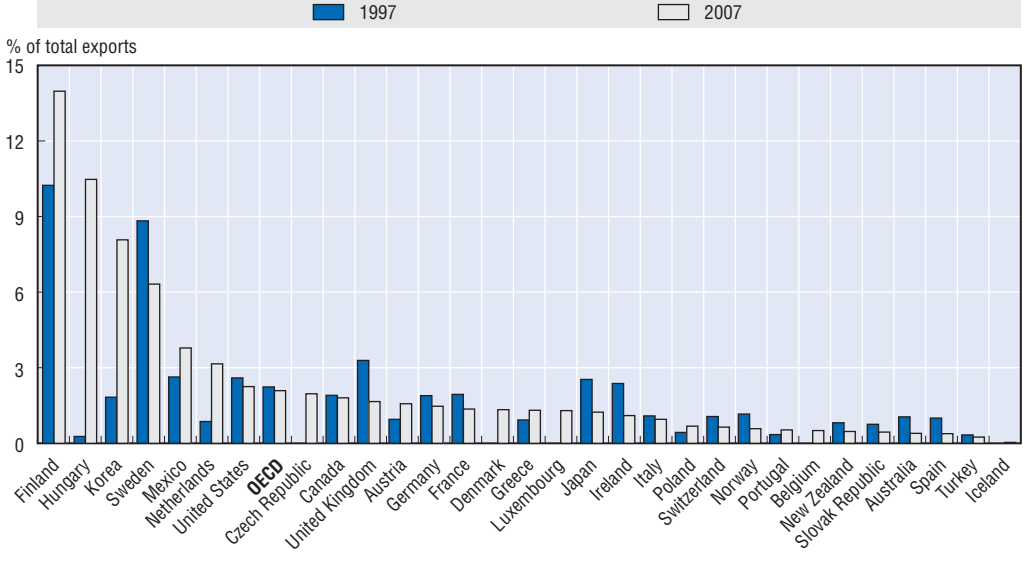
Figure 8.17. **Ratio of telecommunications equipment exports to total exports**



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supported by public agencies. These public policies succeeded in that Finland has the highest level of telecommunication equipment exports to total exports of the OECD, and has maintained this lead over the last decade (Figure 8.17). Finland also has the highest revealed comparative advantage (RCA) ratio in the OECD (Figure 8.22 and Table 8.10).

Hungary. Hungary has only recently begun to specialise in the telecommunication equipment area and has become a major outsourcing destination for European IT businesses. Hungary has attracted foreign direct investment related to information technologies and from these investments and technology transfer built a web of SMEs

Figure 8.18. **Ratio of telecommunications equipment exports to GDP**

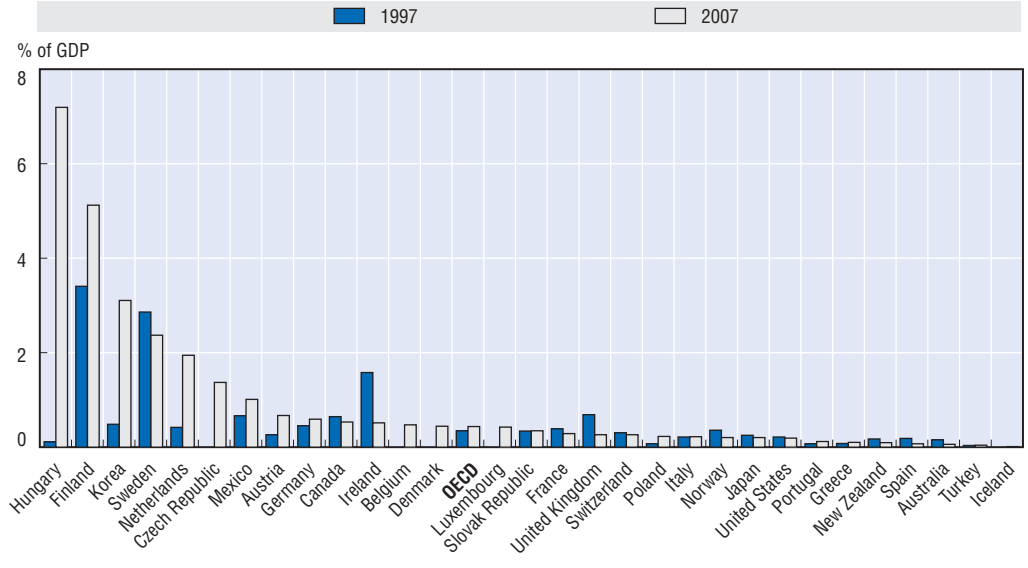

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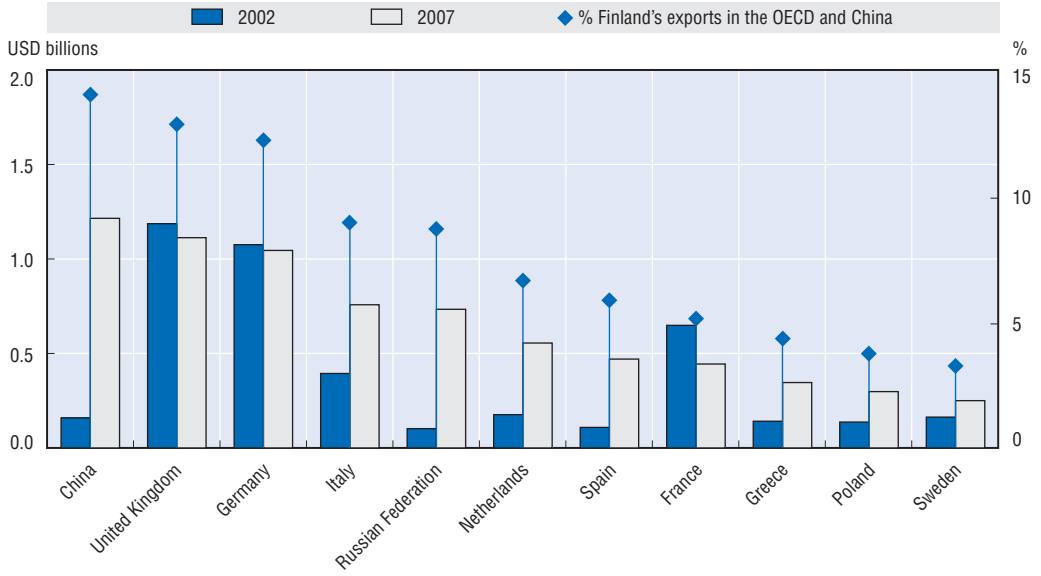
Figure 8.19. **Finland's export destinations**



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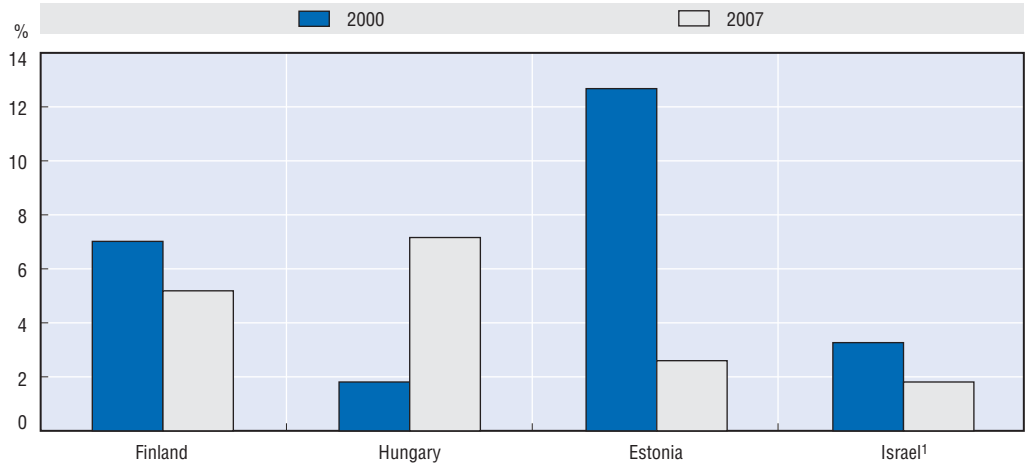
specialising in IT and ICT. These SMEs have moved up the value chain from assembling to R&D and are now at the origin of some breakthrough innovations. Hungary has the highest ratio of telecommunication equipment exports to GDP in the OECD (Figures 8.18 and 8.20) and the third highest revealed comparative advantage score in the OECD (Figure 8.22).

Israel. In 2001, 33% of foreign investment in Israel was in the telecommunication sector. This industry is a major strength of the Israeli economy. The dynamism of the telecommunication industry in Israel is due to a convergence of factors: a very dense network of some 3 000 high-tech businesses (of which 2 000 start-ups), international co-operation projects, R&D incentives

Figure 8.20. **Export value in GDP**



1. Data for Israel are for 2006.

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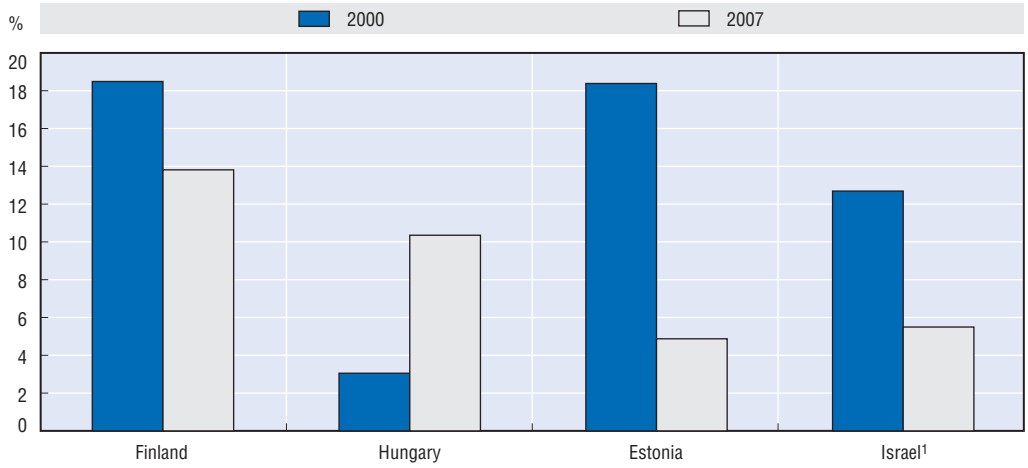
Figure 8.21. **Export value in total exports**



1. Data for Israel are for 2006.

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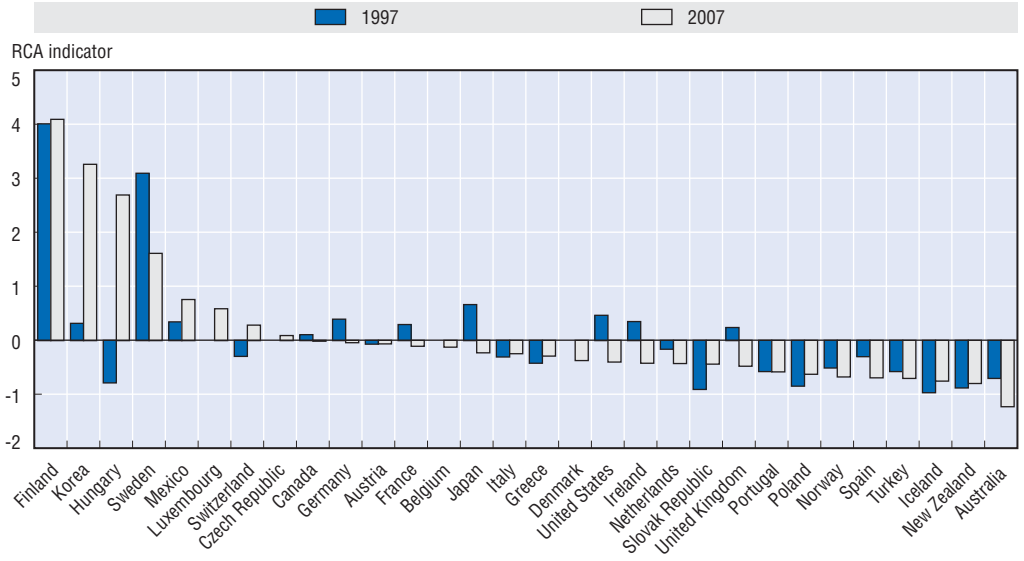
and good management of the migration of workforce and technologies from the military to civilian markets. Israel has the highest value of telecommunication equipment exports in the new OECD accession countries, and it is sixth and seventh among OECD countries in terms of the ratio of exports to GDP and exports of telecommunications equipment as a ratio of total exports (Figures 8.20 and 8.21; Tables 8.5 and 8.6, based on 2006 data).

Estonia. After its independence from the USSR in 1991, Estonia undertook a rapid and rigorous restructuring policy, including privatisation, helped by an important amount of foreign direct investment coming mainly from Sweden and Finland. Transport and communication was the second largest sector for foreign investment in Estonia. The production of telecommunication equipment, which has grown steadily over the 2001-2006 period, represented 3.6% of all industrial production by 2006. Estonia's ratio of telecommunication equipment exports to total exports (4.9%) would rank fifth among

OECD countries, behind Finland, Hungary, Korea and Sweden (Figures 8.20 and 8.21 and Tables 8.5 and 8.6).

Figure 8.22. **Revealed comparative advantages (Lafay index), 1997 and 2007**



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The leading equipment categories

Within the telecommunication equipment trade classification group, the product group that accounts for the most exports comes under the heading "transmission apparatus for radio-telephony, radio-telegraphy, radio broadcasting or television incorporating reception apparatus" (HS 2002: 852520, see Box 8.1), corresponding to cell phone handsets (Table 8.9 and Figure 8.23). This category alone accounts for 65% of all telecommunication equipment exports and has contributed to export growth for the entire telecommunication equipment category by increasing sixfold the value of exports in ten years. This group alone accounts for 1.32% of OECD countries' total worldwide exports. The three other groups of articles in Figure 8.23, which rank second (HS 2002: 851790), third (HS 2002: 851750) and fourth (HS 2002: 852910) in terms of telecommunication equipment exports, are made up of products used in network infrastructure for conventional and mobile telephone networks.

Figure 8.24 shows the evolution of exports by broadly grouping categories in three groups according to their usage destination: consumption goods, intermediate goods and goods use in infra-structure building. The most important growth is for the consumption goods, mainly due to the lead of the mobile phone category (HS 2002: 852520).

Trade in services

In 2006, the share of trade in communication services in aggregate trade in services was at a fairly modest level (1.7%) and the level of telecommunication services (a sub-category of communication services) was 1.37%.

Growth in trade in communication services and telecommunication services has been fairly substantial for the past six years (Figure 8.25). On another scale, the category of computer services, which accounted for 3.26% of total services in 2006, is the top-ranking category in terms of growth in trade in services (Figure 8.26 and Table 8.8).

Figure 8.23. **Top four exported telecommunication equipment goods by OECD countries, 1996-2006**

USD billions

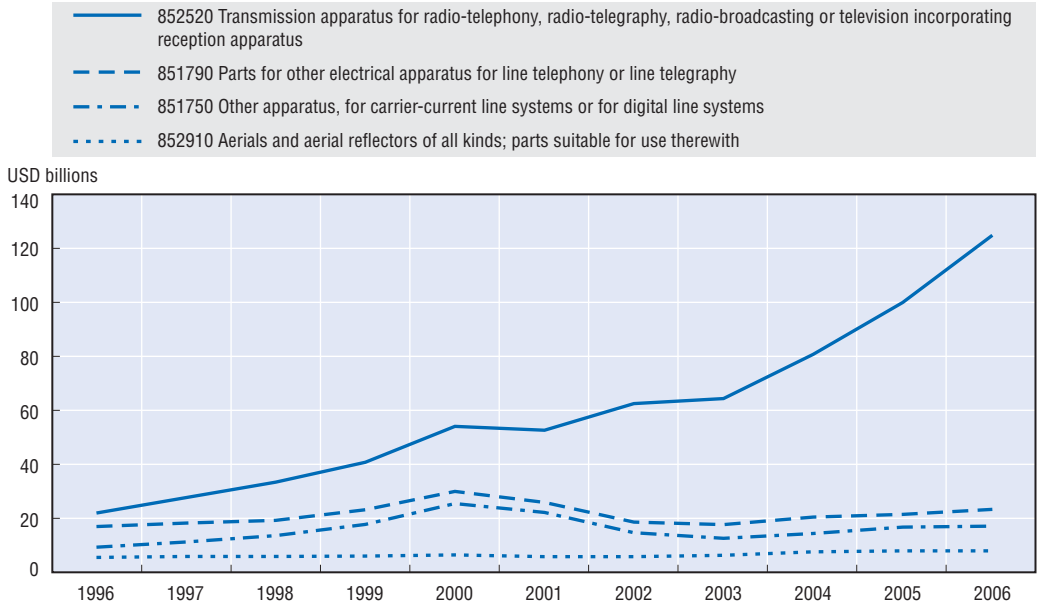

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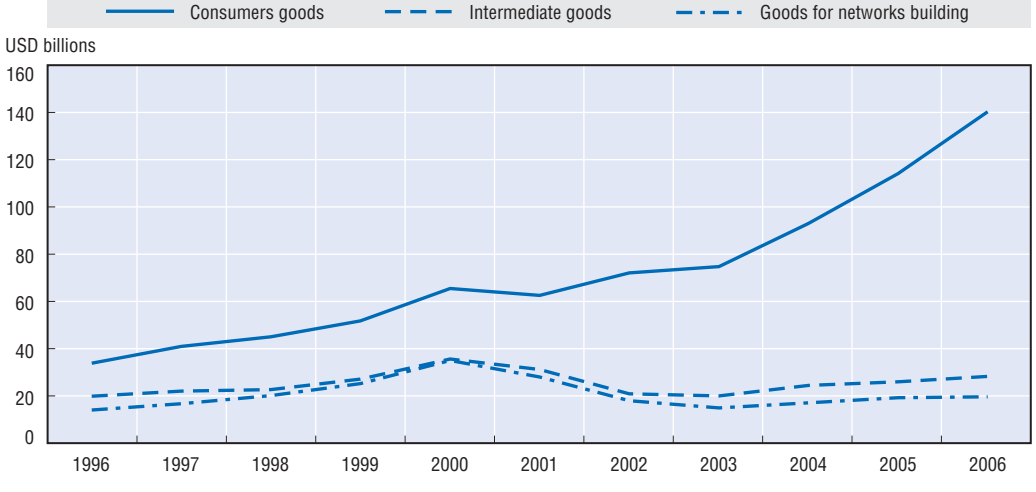
Figure 8.24. **OECD exported telecommunication equipment goods split into three categories, 1996-2006**



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Data on services are less complete than before as some countries have begun to treat their data as confidential. As a consequence, the services totals for trade and exports are based on 22 OECD countries.

Communication services (245) are generally used here as an indicator rather than the sub-category telecommunication services (247), which would be better suited to the subject of this chapter. Given the current state of the trade-in-services database, however, the subcategory does not contain enough detailed data for all countries, nor are its time series

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Figure 8.25. **Total services trade, 2000-06**

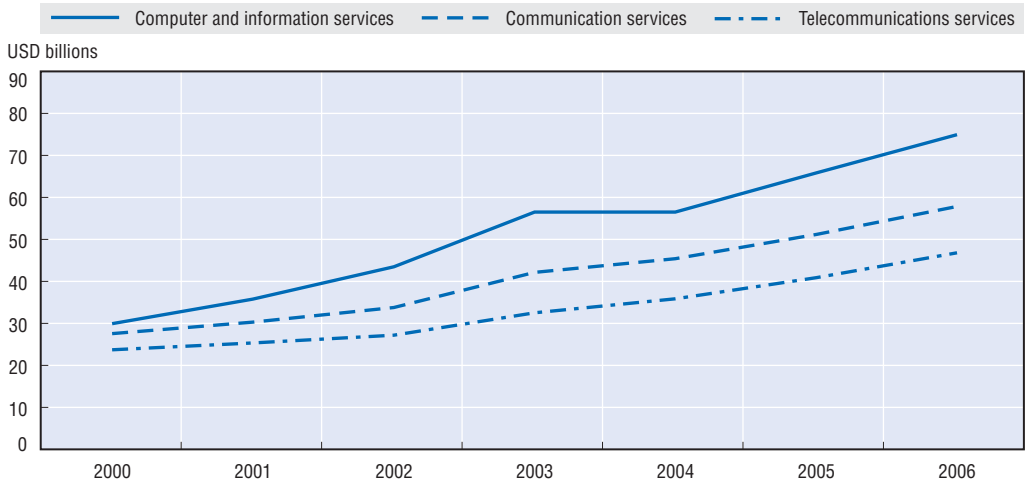

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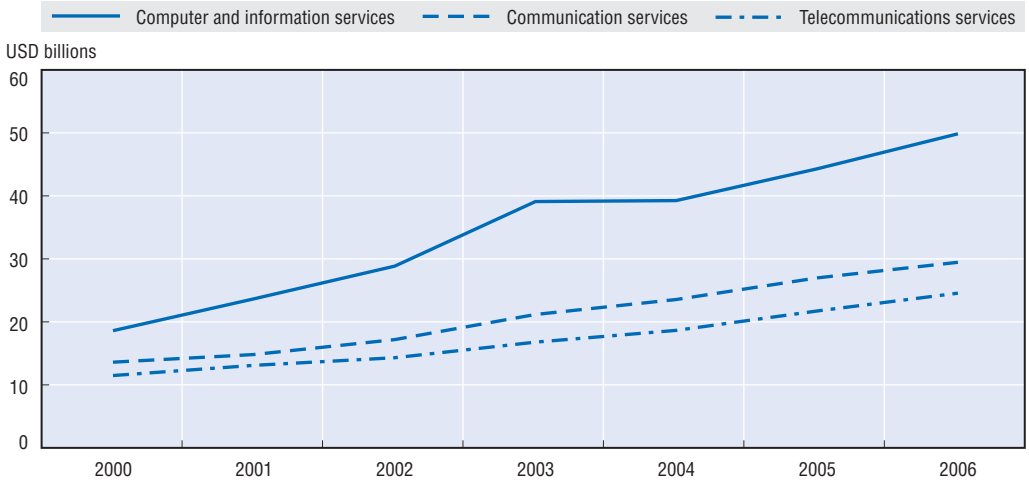
Figure 8.26. **Services exports, 2000-06**



StatLink http://dx.doi.org/10.1787/623814847137

long enough (Table 8.8). See Box 8.3 for the definition of communication services. In absolute value, OECD member countries' exports of computer and information services total more than USD 49.8 billion and are expected to continue to grow in the years ahead (Figure 8.27). Exports of communication and telecommunication services, while growing at a more modest pace, are also expanding considerably.

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 thus are not counted in international traffic statistics. Moreover, telecommunication services increasingly make use of technologies that use the Internet protocol (IP), such as voice over Internet protocol (VoIP) where transmission is in the form of "IP packets" sent over the Internet and which are not included in measurements of trade in services.

Figure 8.27. **Exports of communication services for 2002 and 2006**

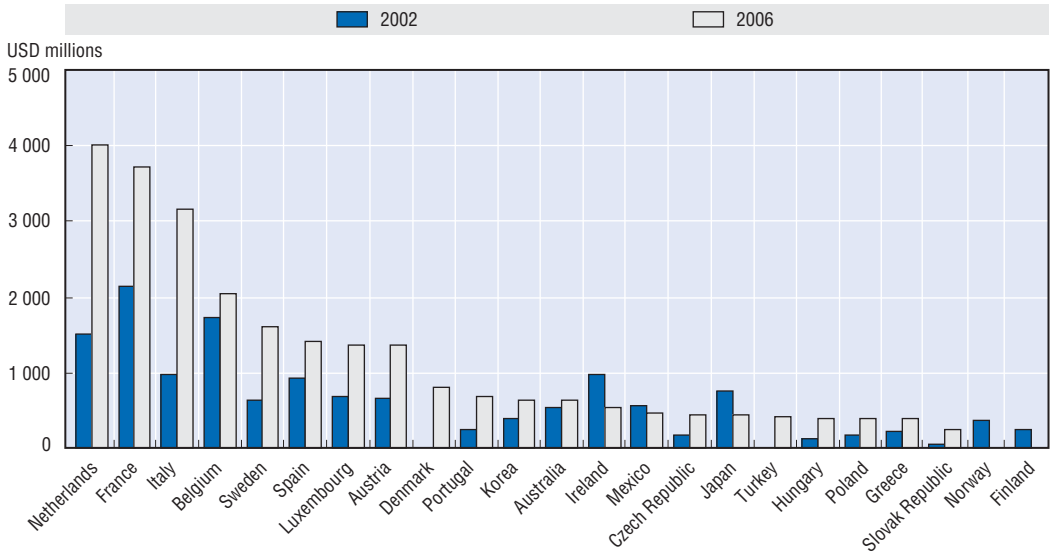


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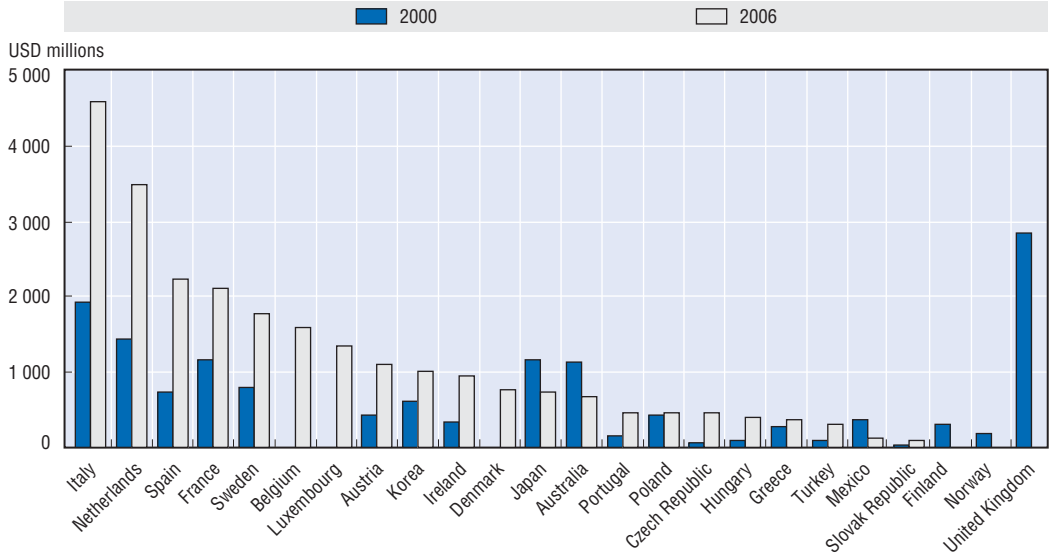
Figure 8.28. **Imports of communication services for 2000 and 2006**



StatLink http://dx.doi.org/10.1787/623827106373

Conclusion

In the last decade the OECD countries and accession countries increased their exports (with the exception of Japan) and imports of telecommunication equipment by 300%. The increase in trade in intermediate goods means that almost all OECD countries developed their telecommunication industry, and the increase in trade of finished goods means that countries have a wider offer of telecommunication products available in their national markets.

A feature that can be underlined from this is the changing relationships of trade in telecommunication equipment. In Figure 8.29, trade in telecommunication equipment is split into three different types: one-way trade (when there is no bilateral exchange of goods

Box 8.3. **Definition of communication services (EBOPS 245)**

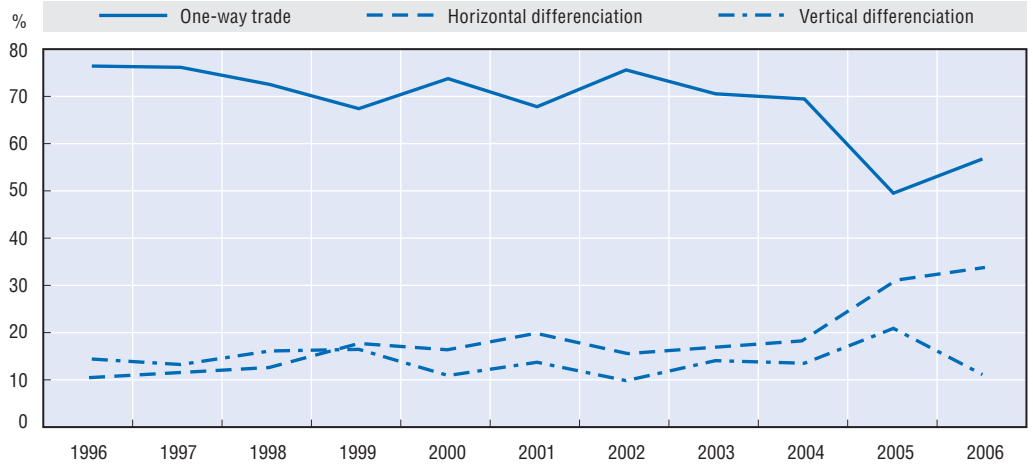
Communication services comprise two major categories of transactions relating to international communications between residents and non-residents:

a) Telecommunications (247), which include 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.

b) Postal and courier services (246), including 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 post box rentals.

in the same category – only one country exports goods), two-way trade with vertical differentiation (when two countries import and export similar goods of differing quality), and two-way trade with horizontal differentiation (when two countries import and export similar goods of similar quality). Figure 8.29 shows a slight decline in one-way trade and a slight increase in two-way trade with horizontal differentiation. This happened after 2002, when the dot.com bubble burst, which seems to have changed the pattern of international specialisation in the telecommunication equipment sector. The increase in two-way trade horizontal differentiation means that more OECD countries are able to produce high-quality telecommunication equipment and maintain the pace of innovation to counter the rapid obsolescence of such goods.

Figure 8.29. **Changes in types of trade in telecommunication equipment in OECD member countries between 1996 and 2006**



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Will China change this situation, in which all countries reap some benefits from the growth of this industry? China is expected over time to be less specialised as a low-end telecommunication equipment producer and become more competitive in the high end of this sector. More than ever, OECD countries will have to rely on their innovation capacities and on trade in services in order maintain the direct and indirect benefits of developing a dynamic telecommunication industry in their economies.

Table 8.1. **Telecommunication equipment exports, 1996-2006**

USD millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR* 1997-2007
Australia	485	658	501	489	708	630	348	392	470	513	498	551	-1.7
Austria	466	538	503	518	497	478	792	936	1 205	1 985	2 062	2 450	16.4
Belgium	..	..	..	1 624	2 453	2 999	1 633	1 567	1 604	1 922	1 577	2 155	3.6
Canada	3 560	4 090	4 246	5 834	10 824	5 196	4 023	3 798	4 762	6 228	7 372	7 520	6.3
Czech Republic	73	..	127	87	211	509	584	873	1 082	873	897	2 360	38.3
Denmark	621	..	1 207	1 349	1 360	1 366	2 307	1 711	1 690	2 796	1 868	1 352	1.3
Finland	3 477	4 164	5 676	6 125	8 449	7 029	7 330	8 359	7 934	10 800	10 749	12 461	11.6
France	4 245	5 450	7 333	8 184	10 756	8 201	7 362	6 723	7 863	7 711	10 552	7 283	2.9
Germany	8 315	9 648	9 418	11 232	12 596	14 047	13 947	13 408	19 234	21 777	21 155	19 444	7.3
Greece	79	103	140	160	310	228	202	236	325	277	370	305	11.5
Hungary	30	52	74	66	861	1 730	2 928	4 121	6 989	6 243	6 398	9 834	68.8
Iceland	..	..	0.1	0.2	0.7	0.5	0.5	0.4	0.8	1.04	2.58	1.80	37.6
Ireland	888	1 264	1 798	3 476	2 921	2 924	2 233	1 247	1 305	1 195	1 029	1 327	0.5
Italy	2 210	2 561	2 875	2 976	3 202	3 748	2 747	2 763	3 598	4 225	4 429	4 636	6.1
Japan	10 407	10 618	8 546	8 499	10 409	8 057	5 211	5 689	5 765	4 927	4 552	8 725	-1.9
Korea	2 099	2 481	2 832	5 073	7 138	9 044	11 269	15 170	21 045	21 254	19 205	29 788	28.2
Luxembourg	..	..	..	233	454	749	540	272	234	244	182	208	-1.4
Mexico	2 151	2 879	3 813	5 372	8 935	9 078	7 447	6 081	7 942	9 370	11 037	10 205	13.5
Netherlands	1 576	1 594	1 888	3 115	4 990	4 713	2 338	3 461	4 830	5 139	5 663	14 928	25.1
New Zealand	81	113	100	95	105	81	94	99	106	103	103	127	1.1
Norway	470	557	555	500	496	484	414	485	651	682	714	791	3.6
Poland	75	111	103	95	118	132	174	187	245	540	701	936	23.8
Portugal	79	82	86	115	119	136	128	161	195	237	217	269	12.6
Slovak Republic		72	55	39	42	49	33	29	73	150	322	258	13.6
Spain	930	1 051	1 106	1 364	1 337	1 477	1 235	1 585	1 526	1 466	1 290	979	-0.7
Sweden	5 983	7 143	8 200	8 859	10 881	5 145	5 703	6 283	8 547	8 613	7 793	10 618	4.0
Switzerland	768	806	813	765	843	795	653	669	852	1 397	992	1 098	3.1
Turkey	108	87	106	86	117	173	118	113	112	117	175	261	11.7
United Kingdom	7 342	9 106	11 437	11 490	14 961	15 623	16 180	11 807	9 637	22 580	48 698	7 213	-2.3
United States	14 561	17 726	17 559	19 432	23 617	20 400	16 167	14 871	18 319	19 893	21 918	26 018	3.9
OECD	71 079	82 953	91 098	107 252	139 713	125 225	114 140	113 094	138 141	163 258	192 507	174 885	7.7
Chile	..	6	5	13	12	12	14	12	9	16	18	29	18.0
Estonia	14	98	286	289	708	500	278	349	420	521	568	540	18.6
Israel	1 651	2 047	2 432	2 909	4 004	3 274	2 433	2 303	2 766	2 219	2 582	..	2.6
Russian Federation	..	98	113	131	96	105	110	166	239	271	559	497	17.7
Slovenia	111	89	90	54	78	129	128	160	187	134	134	275	12.0
Brazil	..	214	251	402	1 145	1 337	1 361	1 349	1 162	2 844	3 112	2 234	26.4
China	2 417	2 685	3 004	3 738	6 675	8 759	10 801	14 558	25 579	36 303	51 627	84 536	41.2
India	54	63	45	49	68	84	0	101	101	161	298	355	18.9

*Note: When data for 1997 are not available, the CAGR is calculated using the next available year.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/626536067643

Table 8.2. **Telecommunication equipment imports, 1996-2006**

USD millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR* 1997-2007
Australia	1 606	1 528	1 454	2 488	3 237	2 306	1 976	2 384	3 164	3 422	4 087	4 495	11.4
Austria	651	691	1 240	1 642	1 656	1 310	1 461	1 807	2 092	2 743	2 252	2 638	14.3
Belgium	..	..	..	2 032	2 268	2 869	1 923	1 848	1 980	2 772	2 186	3 097	5.4
Canada	2 871	3 318	3 479	4 197	6 207	4 864	4 055	4 080	4 789	4 909	5 780	6 905	7.6
Czech Republic	654	..	555	568	907	752	718	894	1 136	857	1 131	2 071	15.8
Denmark	811	..	1 179	1 241	1 609	1 571	2 228	1 773	2 251	3 458	2 854	2 034	6.2
Finland	562	584	730	798	1 374	1 208	815	998	1 291	2 378	2 592	4 542	22.8
France	2 714	3 542	4 172	4 754	5 875	5 929	4 534	5 168	6 417	7 809	11 470	9 541	10.4
Germany	4 662	4 857	5 970	6 897	8 386	10 391	9 410	8 904	14 522	17 783	18 784	16 379	12.9
Greece	459	524	887	996	885	765	720	993	1 147	1 002	1 221	1 602	11.8
Hungary	391	397	434	488	721	764	1 076	1 861	2 575	1 996	1 891	4 679	28.0
Iceland	..	40	53	52	69	44	39	50	51	78	70	107	8.2
Ireland	419	641	991	1 811	1 963	2 408	1 610	1 070	1 332	1 482	1 606	1 707	10.3
Italy	2 475	3 522	4 217	4 767	5 501	4 745	4 401	4 936	7 856	7 683	7 425	7 246	7.5
Japan	4 343	3 936	3 840	4 192	5 663	4 722	3 677	3 436	3 668	3 958	4 638	10 437	10.2
Korea	1 715	1 716	888	1 713	3 338	2 055	1 787	1 755	1 743	2 234	3 047	5 040	11.4
Luxembourg	..	..	..	320	526	782	524	387	418	490	381	385	2.3
Mexico	1 501	2 153	2 743	3 380	4 986	4 536	3 002	3 059	4 008	4 430	6 439	6 281	11.3
Netherlands	1 786	1 932	2 593	4 680	6 262	6 362	3 496	4 166	6 227	6 849	6 417	16 788	24.1
New Zealand	392	375	342	450	495	354	279	365	499	591	536	644	5.6
Norway	751	787	870	896	951	830	738	864	1 164	1 125	1 296	1 644	7.6
Poland	662	951	1 108	1 303	1 477	1 408	1 291	1 406	1 530	1 939	2 286	3 190	12.9
Portugal	403	536	722	813	759	788	748	805	967	1 048	1 031	1 371	9.8
Slovak Republic	..	305	267	154	154	208	257	311	413	526	698	768	9.7
Spain	2 448	1 986	2 451	4 013	4 368	3 519	3 004	3 748	5 149	6 019	6 307	7 241	13.8
Sweden	1 306	1 516	1 944	1 931	2 559	1 989	1 673	1 966	3 141	3 106	3 098	4 537	11.6
Switzerland	1 077	1 249	1 369	1 483	1 707	1 361	1 253	1 409	1 742	2 297	2 013	2789	8.4
Turkey	528	779	1 171	1 971	2 444	911	733	937	1 553	1 861	2 207	2 953	14.3
United Kingdom	7 011	8 490	8 586	10 107	13 548	10 357	8 719	10 392	14 149	17 012	28 074	16 439	6.8
United States	13 339	14 540	17 085	23 588	37 753	32 204	31 265	34 046	41 890	51 589	55 572	62 600	15.7
OECD	55 536	60 895	71 339	93 727	127 647	112 313	97 412	105 816	138 864	163 446	187 377	199 702	12.6
Chile	..	509	679	597	625	561	511	446	659	836	1 145	1 303	9.9
Estonia	72	130	150	150	145	162	163	301	184	215	212	352	10.5
Israel	842	703	759	964	1 115	915	838	687	906	977	1 000	..	4.0
Russian Federation	..	1 492	1 172	690	749	1 090	1 313	1 376	2 174	3 804	6 249	7 561	17.6
Slovenia	89	123	122	189	190	159	164	179	263	190	227	351	11.1
Brazil	..	2 027	1 811	1 588	1 889	2 193	689	599	922	1 150	1 241	619	-11.2
China	2 861	2 453	4 427	4 904	6 297	7 416	6 792	7 812	6 904	6 544	8 620	20 507	23.7
India	171	280	302	352	481	753	0	2 674	3 619	5 402	6 285	8 320	40.4

*Note: When data for 1997 are not available, the CAGR is calculated using the next available year.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/626536131583

Table 8.3. **Telecommunication equipment trade balance, 1996-2006**

USD millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	- 1 121	- 870	- 952	- 1 999	- 2 530	- 1 675	- 1 627	- 1 992	- 2 694	- 2 908	- 3 589	- 3 944
Austria	- 185	- 154	- 737	- 1 124	- 1 159	- 831	- 669	- 871	- 887	- 758	- 190	- 188
Belgium	..	..	..	- 408	186	131	- 289	- 281	- 376	- 851	- 609	- 941
Canada	689	771	767	1 637	4 616	331	- 33	- 282	- 26	1 320	1 592	615
Czech Republic	- 581	..	- 428	- 482	- 696	- 244	- 134	- 21	- 53	16	- 234	288
Denmark	- 190	..	28	108	- 249	- 204	79	- 62	- 560	- 662	- 987	- 682
Finland	2 915	3 580	4 946	5 326	7 075	5 821	6 515	7 360	6 643	8 422	8 158	7 919
France	1 531	1 908	3 161	3 430	4 881	2 272	2 827	1 555	1 447	- 99	- 918	- 2 258
Germany	3 653	4 791	3 449	4 335	4 211	3 656	4 537	4 504	4 712	3 994	2 372	3 065
Greece	- 380	- 421	- 748	- 836	- 575	- 537	- 518	- 757	- 822	- 725	- 851	- 1 297
Hungary	- 360	- 344	- 360	- 422	140	966	1 852	2 260	4 414	4 248	4 507	5 156
Iceland	0	- 40	- 53	- 52	- 68	- 44	- 39	- 50	- 51	- 77	- 68	- 105
Ireland	470	624	807	1 665	958	516	623	177	- 28	- 288	- 577	- 380
Italy	- 265	- 962	- 1 342	- 1 791	- 2 299	- 997	- 1 654	- 2 173	- 4 259	- 3 458	- 2 995	- 2 610
Japan	6 064	6 682	4 706	4 307	4 747	3 335	1 534	2 253	2 098	969	- 85	- 1 712
Korea	384	765	1 944	3 360	3 800	6 990	9 483	13 416	19 303	19 019	16 158	24 748
Luxembourg	..	..	..	- 87	- 72	- 33	16	- 115	- 185	- 246	- 198	- 177
Mexico	650	726	1 071	1 992	3 949	4 542	4 444	3 022	3 934	4 941	4 598	3 924
Netherlands	- 211	- 338	- 705	- 1 565	- 1 272	- 1 648	- 1 158	- 705	- 1 397	- 1 710	- 755	- 1 860
New Zealand	- 311	- 261	- 242	- 356	- 391	- 273	- 185	- 266	- 393	- 488	- 432	- 517
Norway	- 281	- 230	- 315	- 396	- 455	- 346	- 324	- 378	- 513	- 443	- 582	- 852
Poland	- 587	- 841	- 1 005	- 1 209	- 1 359	- 1 276	- 1 117	- 1 220	- 1 285	- 1 399	- 1 586	- 2 254
Portugal	- 324	- 454	- 636	- 697	- 640	- 652	- 620	- 644	- 771	- 811	- 814	- 1 103
Slovak Republic	..	- 233	- 212	- 115	- 112	- 159	- 224	- 282	- 340	- 376	- 377	- 509
Spain	- 1 519	- 935	- 1 345	- 2 649	- 3 030	- 2 042	- 1 769	- 2 162	- 3 623	- 4 553	- 5 017	- 6 262
Sweden	4 677	5 627	6 256	6 928	8 322	3 156	4 029	4 317	5 406	5 508	4 695	6 081
Switzerland	- 309	- 443	- 556	- 718	- 863	- 566	- 600	- 740	- 889	- 900	- 1 020	- 1 691
Turkey	- 420	- 692	- 1 065	- 1 885	- 2 327	- 737	- 615	- 825	- 1 441	- 1 744	- 2 032	- 2 692
United Kingdom	331	616	2 851	1 383	1 413	5 266	7 461	1 415	- 4 512	5 568	20 624	- 9 226
United States	1 222	3 185	474	- 4 157	- 14 135	- 11 804	- 15 098	- 19 175	- 23 572	- 31 696	- 33 653	- 36 582
OECD	15 543	22 058	19 759	13 525	12 066	12 913	16 729	7 278	- 722	- 187	5 130	- 24 817
Chile	..	- 503	- 674	- 584	- 614	- 549	- 497	- 434	- 650	- 820	- 1 127	- 1 274
Estonia	- 58	- 32	136	139	563	338	116	48	236	306	356	188
Israel	809	1 344	1 673	1 944	2 889	2 359	1 595	1 616	1 861	1 243	1 583	..
Russian Federation	..	- 1 394	- 1 059	- 560	- 653	- 985	- 1 203	- 1 210	- 1 935	- 3 533	- 5 690	- 7 064
Slovenia	22	- 34	- 32	- 135	- 112	- 30	- 36	- 19	- 76	- 56	- 92	- 76
Brazil	..	- 1 813	- 1 560	- 1 186	- 744	- 857	673	749	240	1 693	1 871	1 615
China	- 444	232	- 1 422	- 1 166	378	1 342	4 009	6 746	18 676	29 759	43 006	64 029
India	- 117	- 218	- 257	- 303	- 413	- 670	0	- 2 573	- 3 518	- 5 241	- 5 986	- 7 966

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/626573741071

Table 8.4. **Telecommunication equipment total trade, 1996-2006**

USD millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR* 1997-2007
Australia	2 092	2 186	1 955	2 976	3 945	2 936	2 324	2 776	3 634	3 935	4 584	5 047	8.7
Austria	1 117	1 229	1 743	2 160	2 154	1 788	2 254	2 742	3 297	4 728	4 314	5 088	15.3
Belgium	..	..	..	3 656	4 721	5 868	3 556	3 415	3 584	4 694	3 763	5 252	4.6
Canada	6 432	7 408	7 725	10 032	17 031	10 060	8 078	7 878	9 551	11 137	13 151	14 425	6.9
Czech Republic	727	..	682	655	1 118	1 261	1 302	1 767	2 218	1 729	2 027	4 431	23.1
Denmark	1 432	..	2 387	2 590	2 969	2 937	4 535	3 483	3 941	6 254	4 722	3 386	4.0
Finland	4 039	4 748	6 407	6 923	9 823	8 237	8 145	9 357	9 224	13 178	13 341	17 003	13.6
France	6 959	8 992	11 505	12 938	16 631	14 129	11 896	11 890	14 280	15 520	22 021	16 823	6.5
Germany	12 977	14 505	15 388	18 130	20 982	24 439	23 356	22 312	33 755	39 560	39 939	35 823	9.5
Greece	538	627	1 027	1 157	1 195	994	921	1 228	1 472	1 278	1 591	1 908	11.8
Hungary	421	449	508	555	1 582	2 494	4 004	5 982	9 564	8 239	8 289	14 513	41.6
Iceland	..	40	53	52	69	45	40	51	52	79	73	109	8.4
Ireland	1 307	1 905	2 790	5 287	4 884	5 332	3 842	2 316	2 637	2 677	2 636	3 035	4.8
Italy	4 685	6 083	7 092	7 743	8 703	8 494	7 148	7 700	11 454	11 908	11 854	11 882	6.9
Japan	14 750	14 554	12 386	12 692	16 072	12 778	8 888	9 125	9 433	8 885	9 190	19 161	2.8
Korea	3 813	4 197	3 721	6 786	10 475	11 099	13 056	16 925	22 788	23 488	22 252	34 829	23.6
Luxembourg	..	..	..	553	980	1 532	1 064	659	652	734	563	593	0.9
Mexico	3 652	5 032	6 556	8 751	13 921	13 614	10 449	9 140	11 950	13 800	17 476	16 486	12.6
Netherlands	3 362	3 525	4 480	7 795	11 251	11 075	5 834	7 627	11 057	11 987	12 080	31 716	24.6
New Zealand	473	488	442	545	600	436	372	464	605	694	639	771	4.7
Norway	1 221	1 345	1 425	1 396	1 447	1 315	1 152	1 349	1 815	1 807	2 009	2 435	6.1
Poland	738	1 062	1 210	1 398	1 595	1 541	1 465	1 593	1 774	2 479	2 987	4 125	14.5
Portugal	482	618	808	928	878	924	876	966	1 162	1 286	1 249	1 640	10.2
Slovak Republic	..	377	322	193	196	256	290	339	486	677	1 020	1 026	10.5
Spain	3 378	3 037	3 557	5 377	5 705	4 995	4 239	5 333	6 675	7 484	7 597	8 220	10.5
Sweden	7 288	8 659	10 144	10 789	13 441	7 134	7 376	8 249	11 688	11 719	10 890	15 155	5.8
Switzerland	1 844	2 055	2 182	2 248	2 550	2 156	1 906	2 078	2 594	3 693	3 005	3 887	6.6
Turkey	635	865	1 276	2 056	2 561	1 084	851	1 050	1 665	1 979	1 107	3 214	14.0
United Kingdom	14 353	17 595	20 022	21 596	28 510	25 981	24 898	22 199	23 786	39 592	76 748	23 652	3.0
United States	27 900	32 266	34 644	43 020	61 370	52 605	47 432	48 917	60 209	71 482	77 490	88 619	10.6
OECD	126 616	143 848	162 437	200 979	267 360	237 538	211 552	218 910	277 005	326 704	378 608	374 587	10.0
Chile	..	514	683	610	637	574	526	458	668	852	1 163	1 332	10.0
Estonia	86	228	436	438	853	662	441	649	604	736	780	892	14.6
Israel	2 493	2 751	3 191	3 873	5 119	4 190	3 271	2 989	3 672	3 196	3 582	..	3.0
Russian Federatior	..	1 590	1 284	821	845	1 195	1 424	1 542	2 413	4 075	6 809	8 059	17.6
Slovenia	200	212	212	244	268	287	292	339	450	325	361	626	11.5
Brazil	..	2 241	2 063	1 990	3 034	3 530	2 050	1 948	2 084	3 994	4 353	2 854	2.4
China	5 277	5 138	7 431	8 642	12 971	16 175	17 593	22 370	32 483	42 846	60 247	105 043	35.2
India	225	343	347	402	550	837	0	2 775	3 720	5 564	6 583	8 675	38.1

*Note: When data for 1997 are not available, the CAGR is calculated using the next available year.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/626634833065

Table 8.5. **Telecommunication equipment exports as a percentage of all goods exports, 1996-2006**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR* 1997-2007
Australia	0.81	1.05	0.90	0.90	1.11	1.00	0.54	0.56	0.54	0.49	0.40	0.40	-9.3
Austria	0.81	0.95	0.83	0.87	0.78	0.72	1.08	1.05	1.09	1.69	1.54	1.56	5.1
Belgium	..	..	..	0.91	1.33	1.58	0.76	0.61	0.52	0.58	0.43	0.50	-7.2
Canada	1.76	1.89	1.98	2.44	3.91	1.99	1.59	1.40	1.50	1.73	1.90	1.79	-0.6
Czech Republic	0.33	..	0.45	0.32	0.73	1.52	1.52	1.79	1.65	1.12	0.94	1.95	17.7
Denmark	1.27	..	2.53	2.75	2.77	2.68	4.14	2.65	2.26	3.39	2.04	1.33	-6.9
Finland	8.57	10.16	13.14	14.66	18.58	16.42	16.47	15.92	13.02	16.55	13.91	13.88	3.2
France	1.50	1.92	2.44	2.76	3.64	2.83	2.41	1.88	1.90	1.78	2.20	1.35	-3.5
Germany	1.59	1.88	1.73	2.07	2.29	2.46	2.26	1.79	2.11	2.23	1.89	1.46	-2.5
Greece	0.67	0.92	1.28	1.45	2.83	2.19	1.95	1.73	2.13	1.59	1.77	1.30	3.5
Hungary	0.24	0.27	0.32	0.27	3.06	5.67	8.53	9.58	12.60	10.03	8.64	10.40	43.8
Iceland	..	0.00	0.01	0.01	0.03	0.02	0.02	0.02	0.03	0.03	0.07	0.04	24.4
Ireland	1.95	2.36	2.80	4.88	3.83	3.52	2.52	1.34	1.25	1.09	0.95	1.09	-7.4
Italy	0.88	1.07	1.19	1.27	1.33	1.53	1.08	0.92	1.02	1.13	1.06	0.94	-1.3
Japan	2.53	2.52	2.20	2.04	2.17	2.00	1.25	1.21	1.02	0.83	0.70	1.22	-7.0
Korea	1.62	1.82	2.14	3.53	4.14	6.01	6.94	7.83	8.29	7.47	5.90	8.02	16.0
Luxembourg	..	..	..	3.03	6.08	8.93	6.28	2.72	1.92	1.92	1.29	1.28	-10.2
Mexico	2.25	2.62	3.25	3.94	5.38	5.73	4.63	3.69	4.22	4.37	4.42	3.75	3.7
Netherlands	0.89	0.86	1.13	1.83	2.77	2.78	1.33	1.52	1.66	1.61	1.53	3.13	13.7
New Zealand	0.57	0.81	0.83	0.76	0.79	0.59	0.65	0.60	0.52	0.47	0.46	0.47	-5.2
Norway	0.96	1.15	1.37	1.10	0.83	0.82	0.70	0.71	0.79	0.66	0.58	0.58	-6.6
Poland	0.31	0.43	0.36	0.35	0.37	0.37	0.43	0.35	0.33	0.60	0.64	0.67	4.6
Portugal	0.34	0.35	0.36	0.47	0.49	0.57	0.50	0.51	0.55	0.62	0.50	0.52	4.1
Slovak Republic	..	0.75	0.51	0.39	0.35	0.38	0.23	0.13	0.26	0.47	0.77	0.45	-5.0
Spain	0.92	0.99	1.01	1.22	1.18	1.27	0.98	1.00	0.83	0.76	0.60	0.39	-9.0
Sweden	7.17	8.77	9.65	11.71	12.52	6.74	6.87	6.14	6.93	6.61	5.29	6.27	-3.3
Switzerland	0.96	1.06	1.03	0.95	1.03	0.97	0.71	0.64	0.69	1.07	0.67	0.64	-4.9
Turkey	0.47	0.33	0.39	0.32	0.43	0.55	0.33	0.24	0.18	0.16	0.20	0.24	-3.0
United Kingdom	2.89	3.26	4.23	4.33	5.29	5.73	5.77	3.84	2.76	5.87	10.96	1.64	-6.7
United States	2.34	2.58	2.58	2.80	3.03	2.79	2.33	2.06	2.24	2.20	2.11	2.24	-1.4
OECD	1.95	2.23	2.39	2.63	3.15	2.92	2.57	2.21	2.27	2.46	2.56	2.07	-0.7
Chile	..	0.03	0.03	0.08	0.06	0.07	0.08	0.06	0.03	0.04	0.03	0.04	2.8
Estonia	0.67	3.34	8.82	9.56	18.48	12.46	6.42	6.20	7.19	6.75	5.91	4.90	3.9
Israel	8.05	9.10	10.44	11.26	12.75	11.27	8.24	7.24	7.16	5.19	5.52	..	-5.4
Russian Federation	..	0.11	0.16	0.18	0.09	0.11	0.10	0.12	0.13	0.11	0.19	0.14	2.2
Slovenia	1.33	1.06	0.99	0.64	0.89	1.39	1.23	1.25	1.18	0.75	0.64	1.04	-0.2
Brazil	..	0.40	0.49	0.84	2.08	2.29	2.25	1.84	1.20	2.40	2.26	1.39	13.2
China	1.60	1.47	1.63	1.92	2.68	3.29	3.32	3.32	4.31	4.76	5.33	6.94	16.8
India	0.16	0.18	0.14	0.13	0.15	0.19	0.00	0.16	0.13	0.16	0.24	0.24	3.1

*Note: When data for 1997 are not available, the CAGR is calculated using the next available year.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/626665770775

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Table 8.6. **Telecommunication equipment exports as a percentage of GDP, 1996-2007**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR* 1997-2007
Australia	0.11	0.15	0.13	0.12	0.18	0.17	0.08	0.07	0.07	0.07	0.06	0.06	-9.2
Austria	0.20	0.26	0.24	0.25	0.26	0.25	0.38	0.37	0.42	0.65	0.64	0.66	9.7
Belgium	0.00	0.00	0.00	0.64	1.06	1.30	0.65	0.51	0.45	0.51	0.40	0.47	-3.8
Canada	0.58	0.64	0.69	0.88	1.50	0.73	0.55	0.44	0.48	0.55	0.58	0.52	-2.0
Czech Republic	0.12	0.00	0.21	0.14	0.37	0.82	0.78	0.96	0.99	0.70	0.63	1.36	23.3
Denmark	0.34	0.00	0.70	0.78	0.85	0.85	1.33	0.80	0.69	1.08	0.68	0.44	-5.1
Finland	2.70	3.37	4.36	4.69	6.96	5.63	5.40	5.10	4.22	5.49	5.15	5.06	4.2
France	0.27	0.38	0.50	0.56	0.81	0.61	0.50	0.38	0.38	0.36	0.47	0.28	-3.0
Germany	0.34	0.45	0.43	0.52	0.67	0.74	0.69	0.55	0.70	0.78	0.73	0.59	2.7
Greece	0.06	0.08	0.10	0.11	0.24	0.17	0.14	0.12	0.14	0.11	0.14	0.10	2.6
Hungary	0.07	0.11	0.15	0.13	1.80	3.25	4.39	4.88	6.84	5.65	5.66	7.10	51.5
Iceland	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.02	0.01	24.8
Ireland	1.19	1.56	2.03	3.60	3.04	2.80	1.82	0.80	0.71	0.59	0.47	0.51	-10.6
Italy	0.18	0.21	0.24	0.25	0.29	0.34	0.22	0.18	0.21	0.24	0.24	0.22	0.2
Japan	0.22	0.25	0.22	0.19	0.22	0.20	0.13	0.13	0.13	0.11	0.10	0.20	-2.2
Korea	0.38	0.48	0.82	1.14	1.40	1.88	2.06	2.49	3.09	2.69	2.16	3.07	20.4
Luxembourg	0.00	0.00	0.00	1.10	2.25	3.72	2.38	0.94	0.69	0.65	0.43	0.42	-11.4
Mexico	0.59	0.66	0.83	1.02	1.40	1.33	1.05	0.87	1.05	1.11	1.17	1.00	4.3
Netherlands	0.38	0.41	0.47	0.76	1.30	1.18	0.53	0.65	0.80	0.81	0.85	1.92	16.6
New Zealand	0.12	0.17	0.18	0.16	0.20	0.16	0.15	0.12	0.11	0.09	0.10	0.10	-5.4
Norway	0.29	0.35	0.37	0.31	0.29	0.28	0.22	0.22	0.25	0.23	0.21	0.20	-5.3
Poland	0.05	0.07	0.06	0.06	0.07	0.07	0.09	0.09	0.10	0.18	0.20	0.22	12.2
Portugal	0.07	0.07	0.07	0.09	0.11	0.12	0.10	0.10	0.11	0.13	0.11	0.12	5.2
Slovak Republic	0.00	0.33	0.25	0.19	0.21	0.23	0.13	0.09	0.17	0.32	0.58	0.34	0.3
Spain	0.15	0.18	0.18	0.22	0.23	0.24	0.18	0.18	0.15	0.13	0.11	0.07	-9.5
Sweden	2.17	2.83	3.24	3.45	4.43	2.28	2.29	2.02	2.39	2.35	1.98	2.34	-1.9
Switzerland	0.25	0.30	0.30	0.28	0.34	0.31	0.23	0.21	0.23	0.38	0.25	0.26	-1.7
Turkey	0.04	0.03	0.04	0.03	0.04	0.09	0.05	0.04	0.03	0.02	0.01	0.04	1.7
United Kingdom	0.61	0.68	0.79	0.78	1.03	1.07	1.03	0.64	0.45	1.01	2.02	0.26	-9.3
United States	0.19	0.21	0.20	0.21	0.24	0.20	0.16	0.14	0.16	0.16	0.17	0.19	-1.3
OECD	0.29	0.35	0.38	0.42	0.54	0.49	0.43	0.38	0.41	0.46	0.52	0.43	2.2
Chile	..	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	10.2
Estonia	0.30	1.94	5.14	5.07	12.58	8.08	3.81	3.55	3.50	3.77	3.45	2.58	2.9
Israel	1.57	1.90	2.22	2.64	3.24	2.69	2.18	1.95	2.20	1.67	1.80	..	-0.6
Russian federatio	..	0.02	0.04	0.07	0.04	0.03	0.03	0.04	0.04	0.04	0.06	0.04	4.8
Slovenia	0.52	0.44	0.41	0.25	0.39	0.63	0.55	0.55	0.55	0.37	0.35	0.58	2.8

*Note: When data for 1997 are not available, the CAGR is calculated using the next available year.

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/626780866733

Table 8.7. **OECD telecommunication equipment exports and imports to/from China**

USD millions

	1996		1998		2000		2002		2004		2006		2007	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Australia	5.2	46.0	11.2	60.6	10.7	93.9	14.1	193.0	9.5	579.5	11.4	1 050.5	20.3	1 580.9
Austria	7.2	13.3	28.3	9.4	4.2	16.1	4.7	58.7	5.0	133.1	3.1	473.8	1.3	22.0
Belgium	0.0	0.0	0.0	0.0	52.9	67.1	31.9	53.0	16.6	115.4	16.8	285.2	16.2	418.1
Canada	192.8	60.9	83.2	86.8	36.3	226.2	63.2	360.2	94.5	606.4	162.0	1 413.1	119.4	1 474.4
Czech Republic	0.0	3.8	0.0	8.3	0.1	9.7	0.2	166.8	0.7	306.5	3.0	219.3	2.5	502.2
Denmark	5.5	12.5	10.3	13.4	3.1	11.6	3.7	15.9	11.8	54.5	13.1	173.5	13.8	108.9
Finland	132.9	5.9	523.0	9.4	215.8	79.6	123.3	47.5	239.7	198.4	462.9	1 128.2	656.3	2 327.2
France	68.2	165.2	254.2	171.0	176.7	344.9	104.0	289.1	268.6	1 074.2	134.5	1 937.1	187.3	2 550.5
Germany	281.0	222.6	501.8	195.0	514.2	888.0	289.5	1 204.8	323.4	3 718.8	314.0	6 622.4	293.2	4 557.7
Greece	0.0	5.7	0.0	5.6	0.3	7.4	0.1	12.3	0.4	29.5	1.4	44.9	2.1	86.6
Hungary	0.0	1.8	0.0	7.4	0.0	76.9	12.5	301.9	33.0	834.0	18.9	401.0	205.2	1 150.6
Iceland	0.0	0.0	0.0	0.7	0.1	0.6	0.0	1.2	0.0	8.0	0.0	8.0	0.0	13.3
Ireland	2.0	3.6	3.8	15.2	18.4	48.8	37.5	47.1	8.2	61.5	5.2	52.2	8.0	132.2
Italy	70.8	77.0	78.2	70.4	80.2	108.9	72.6	115.6	121.8	426.9	79.6	561.8	88.2	686.8
Japan	344.8	353.1	453.7	342.4	689.0	359.0	637.7	883.2	495.0	1 447.2	266.8	1 889.8	1 836.6	4 311.9
Korea	75.6	21.1	71.9	34.6	121.0	138.9	1 485.2	237.4	700.5	344.9	443.0	967.3	5 174.1	1 971.6
Luxembourg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	7.5	0.1	0.4	..	..
Mexico	0.2	19.5	1.7	37.2	14.5	64.8	22.7	149.6	3.1	411.4	23.0	1 561.1	17.3	1 786.5
Netherlands	83.3	22.9	25.5	44.5	12.5	127.0	23.7	330.7	18.8	1 399.1	22.5	1 976.9	41.9	4 228.4
New Zealand	0.5	16.5	0.5	18.1	1.5	18.8	2.0	34.2	2.6	82.1	1.8	124.7	1.9	191.1
Norway	4.4	9.6	9.3	16.8	6.7	12.3	14.4	26.4	13.2	164.0	10.7	189.6	28.9	307.5
Poland	0.1	10.3	0.4	34.1	2.6	30.4	1.1	79.5	1.7	162.6	3.6	674.8	3.7	1 122.2
Portugal	0.0	7.5	0.0	6.0	0.1	8.3	0.1	8.5	0.4	18.2	0.2	51.0	1.0	181.5
Slovak Republic	0.0	0.0	0.0	1.1	0.0	1.5	0.0	7.8	0.3	20.0	0.1	84.1	0.1	129.9
Spain	12.3	37.2	7.7	37.3	24.0	69.9	12.8	85.3	4.4	319.9	6.4	803.8	9.0	775.5
Sweden	545.6	10.2	674.0	27.1	674.4	103.6	326.3	76.4	568.1	247.3	277.4	526.5	318.2	874.9
Switzerland	10.8	18.6	8.2	20.6	8.2	17.6	13.2	17.8	9.1	31.2	14.7	57.0	..	..
Turkey	0.0	6.8	10.5	15.2	0.0	27.4	0.1	38.2	0.0	201.7	0.0	415.6	0.1	772.6
United Kingdom	27.3	44.9	146.0	124.9	215.2	497.3	119.2	408.6	90.3	771.2	85.6	1 369.0	73.7	2 026.1
United States	491.9	1 444.8	496.4	2 001.0	652.2	3 437.8	747.0	4 973.7	729.2	9 988.9	897.4	18 648.1	1 057.6	22 518.7
OECD	2 362.3	2 641.2	3 399.7	3 414.1	3 534.9	6 894.4	4 162.6	10 224.6	3 770.0	23 763.9	3 627.8	50 428.2	10 352.2	70 643.8

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/626812557778

Table 8.8. **Trade in communication and telecommunication services, 2000 and 2006**

USD millions

	Export				Import			
	Communication services		Telecommunication services		Communication services		Telecommunication services	
	2000	**2006**	**2000**	**2006**	**2000**	**2006**	**2000**	**2006**
Australia	889	641	..	..	1 121	657	..	..
Austria	480	1 354	..	968	432	1 099	..	859
Belgium	..	2 037	..	1 332	..	1 594	..	1 179
Canada	..	..	..	..	..	..	..	..
Czech Republic	124	436	104	377	46	453	29	351
Denmark	..	801	..	643	..	763	..	666
Finland	207	..	171	..	300	..	277	..
France	1 330	3 721	1 098	..	1 146	2 089	989	..
Germany	..	..	..	..	..	..	..	..
Greece	261	385	253	332	287	359	265	315
Hungary	69	389	..	325	76	411	..	358
Iceland	..	..	..	..	..	..	..	..
Ireland	330	523	297	523	344	960	309	960
Italy	1 282	3 159	1 037	3 025	1 933	4 585	1 524	4 108
Japan	821	436	..	..	1 150	733	..	..
Korea	387	642	..	..	623	1 012	..	..
Luxembourg	..	1 362	..	1 323	..	1 339	..	1 292
Mexico	1 213	466	1 213	466	366	107	366	107
Netherlands	1 424	3 995	..	2 028	1 421	3 481	..	1 770
New Zealand	..	..	..	..	..	..	..	..
Norway	286	..	205	..	169	..	149	..
Poland	234	385	..	337	421	456	..	421
Portugal	173	679	161	648	158	471	140	442
Slovak Republic	52	255	42	238	26	98	21	77
Spain	673	1 411	..	..	743	2 239	..	..
Sweden	647	1 602	559	1 407	793	1 754	701	1 640
Switzerland	..	..	..	..	..	..	..	..
Turkey	..	416	..	416	84	299	..	247
United Kingdom	2 820	..	2 598	..	2 825	..	2 404	..
United States	..	..	3 883	6 256	..	..	5 428	4 556
OECD	13 703	25 095	11 622	20 645	..	..	..	..

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/627011436840

Table 8.9. **Total OECD exports of telecommunication equipment by category**

USD millions

	1996	2000	2004	2005	2006
Telecommunications equipment (HS 1996 and HS 2002)					
851711 Line telephone sets with cordless handsets	1 289	1 653	1 517	1 707	1 603
851719 Other telephone sets, video phones	1 748	2 166	1 908	2 265	2 946
851721 Facsimile machines	1 926	1 137	646	780	794
851722 Teleprinters	16	15	4	3	3
851730 Telephonic or telegraphic switching apparatus	5 306	8 934	4 210	4 216	4 209
851750 Other apparatus, for carrier-current line systems or for digital line systems	6 571	23 186	11 791	14 181	14 620
851780 Other electrical apparatus for line telephony or line telegraphy	2 705	3 427	1 603	1 464	1 427
851790 Parts for other electrical apparatus for line telephony or line telegraphy	14 418	27 731	18 044	19 071	21 000
852020 Telephone answering machines	291	134	23	34	33
852510 Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television not incorporating reception apparatus	2 235	3 537	3 458	3 922	3 058
852520 Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television incorporating reception apparatus	19 563	52 451	79 810	99 514	124 964
852530 Television cameras	4 706	1 901	2 284	2 569	3 162
852610 Radar apparatus	1 123	1 041	1 685	1 531	1 686
852790 Reception apparatus for radio-telephony, radio-telegraphy or radio-broadcasting, whether or not combined, in the same housing, with sound recording or reproducing apparatus or a clock, n.e.s	1 728	1 813	768	716	805
852910 Aerials and aerial reflectors of all kinds; parts suitable for use therewith	2 695	3 670	4 819	5 184	5 211
853110 Burglar or fire alarms and similar apparatus	1 551	1 974	2 248	2 389	2 535
854420 Co-axial cable and other co-axial electric conductors	1 589	1 965	1 964	2 098	2 583
854470 Optical fibre cables	1 621	2 978	1 360	1 614	1 869

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/627015162405

Table 8.10. **Revealed comparative advantages for telecommunication equipment trade**

Lafay index for international specialisation

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	-0.93	-0.83	-0.87	-1.53	-1.71	-1.40	-1.16	-1.12	-1.24	-1.19	-1.34	-1.24
Austria	-0.25	-0.07	-0.65	-0.92	-0.82	-0.57	-0.46	-0.46	-0.40	-0.30	-0.07	-0.06
Belgium	-0.01	-0.05	-0.03	-0.16	0.00	-0.01	-0.11	-0.09	-0.08	-0.15	-0.10	-0.12
Canada	0.09	0.11	0.13	0.25	0.66	-0.10	-0.11	-0.15	-0.12	0.08	0.12	-0.01
Czech Republic	-1.00	-0.99	-0.68	-0.82	-1.04	-0.27	-0.12	0.02	-0.03	0.00	-0.13	0.09
Denmark	-0.34	-0.11	-0.01	-0.02	-0.42	-0.42	-0.19	-0.25	-0.55	-0.63	-0.65	-0.37
Finland	3.31	4.06	5.33	5.95	7.11	6.20	6.87	6.67	5.19	6.23	5.07	4.14
France	0.25	0.30	0.49	0.55	0.85	0.41	0.46	0.23	0.21	0.07	0.02	-0.11
Germany	0.28	0.39	0.23	0.30	0.31	0.16	0.17	0.15	0.04	-0.03	-0.07	-0.04
Greece	-0.26	-0.42	-0.64	-0.71	-0.05	-0.20	-0.13	-0.17	-0.01	-0.09	-0.06	-0.29
Hungary	-1.08	-0.79	-0.68	-0.74	0.41	1.70	2.83	2.83	4.16	3.50	3.09	2.73
Iceland	-0.91	-0.98	-1.04	-1.05	-1.41	-1.05	-0.92	-0.87	-0.68	-0.73	-0.51	-0.76
Ireland	0.33	0.35	0.27	0.52	-0.02	-0.55	-0.26	-0.30	-0.41	-0.49	-0.56	-0.42
Italy	-0.15	-0.31	-0.38	-0.45	-0.49	-0.24	-0.35	-0.37	-0.60	-0.43	-0.31	-0.25
Japan	0.64	0.67	0.41	0.33	0.34	0.32	0.08	0.15	0.11	0.03	-0.05	-0.23
Korea	0.25	0.32	0.58	1.04	1.03	2.28	2.88	3.42	3.74	3.30	2.46	3.30
Luxembourg	..	..	..	-0.09	0.41	0.88	0.85	-0.06	-0.28	-0.42	-0.32	0.59
Mexico	0.29	0.34	0.54	0.78	1.26	1.52	1.43	0.95	1.09	1.19	0.95	0.76
Netherlands	-0.11	-0.19	-0.26	-0.48	-0.41	-0.55	-0.40	-0.24	-0.38	-0.41	-0.20	-0.43
New Zealand	-1.04	-0.91	-0.95	-1.21	-1.39	-1.03	-0.60	-0.68	-0.91	-0.88	-0.78	-0.80
Norway	-0.56	-0.51	-0.47	-0.75	-0.90	-0.78	-0.66	-0.68	-0.75	-0.62	-0.65	-0.68
Poland	-0.71	-0.86	-0.93	-1.17	-1.27	-1.18	-0.93	-0.85	-0.70	-0.65	-0.59	-0.63
Portugal	-0.40	-0.58	-0.76	-0.74	-0.66	-0.67	-0.65	-0.58	-0.58	-0.52	-0.50	-0.59
Slovak Republic	..	-0.92	-0.76	-0.50	-0.43	-0.51	-0.65	-0.62	-0.57	-0.53	-0.40	-0.44
Spain	-0.53	-0.30	-0.40	-0.73	-0.82	-0.49	-0.41	-0.38	-0.56	-0.63	-0.62	-0.70
Sweden	2.44	3.13	3.37	4.36	4.46	1.79	2.17	1.88	1.89	1.90	1.42	1.63
Switzerland	-0.21	-0.29	-0.34	-0.45	-0.50	-0.33	-0.36	-0.38	-0.40	-0.37	-0.38	0.28
Turkey	-0.34	-0.58	-1.01	-2.16	-1.83	-0.81	-0.53	-0.54	-0.67	-0.68	-0.65	-0.71
United Kingdom	0.20	0.11	0.74	0.54	0.64	1.32	1.64	0.59	-0.13	1.26	3.09	-0.48
United States	0.35	0.47	0.38	0.28	0.01	0.03	-0.12	-0.25	-0.23	-0.35	-0.36	-0.40
OECD	0.21	0.27	0.26	0.23	0.25	0.25	0.26	0.15	0.08	0.12	0.17	-0.03

Source: OECD, ITCS database.

StatLink http://dx.doi.org/10.1787/627022014141

ISBN 978-92-64-05983-2
OECD Communications Outlook 2009
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Glossary

. .	Data not available
2G	Second generation of mobile communications technology
3G	Third generation of mobile communications technology
ACMA	Australian Communications and Media Authority
ACCC	Australian Competition and Consumer Commission
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)
ccTLD	Country code top level domain
CDMA	Code division multiple access
CIS	Commonwealth of Independent States
CPE	Customer premises equipment
CPI	Consumer price index
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
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
HFC	Hybrid fibre coaxial
HICP	Harmonised indices of consumer prices
HS	Harmonised system
HTML	Hypertext mark-up language
HTTP	Hypertext transfer protocol
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and communication technology
IEEE (802 Standards)	Institute of Electrical and Electronics Engineers
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
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
Mbit/s	Megabits per second (Mbps)
MDF	Main distribution frames
MiTT	Minutes of international telecommunication traffic
MMS	Multimedia messaging service
MVNO	Mobile virtual network operators

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NVoD	Near video on demand
NRAs	National regulatory authorities
OCN	Open computer network
OFCOM	Office of Communications (United Kingdom)
P2P	Peer-to-peer
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
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

VoD	Video on demand
VoBB	Voice over broadband
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

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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
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
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
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
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
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
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
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
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
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
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
Hungary	78.99	91.93	105.16	125.68	152.65	186.79	214.40	237.15	282.18	286.49	257.89	224.31	202.75	199.58	210.39	183.63
Iceland	57.55	67.60	69.94	64.69	66.50	70.90	70.96	72.34	78.62	97.42	91.66	76.71	70.19	62.98	70.20	64.09
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
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
Japan	126.65	111.20	102.21	94.06	108.78	120.99	130.91	113.91	107.77	121.53	125.39	115.93	108.19	110.22	116.30	117.75
Korea	781	803	803	771	804	951	1 401	1 189	1 131	1 291	1251	1192	1145	1024	955	929
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
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
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
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
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
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
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
Slovak Republic	0.00	30.77	32.04	29.71	30.65	33.62	35.23	41.36	46.04	48.35	45.33	36.77	32.26	31.02	29.70	24.69
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
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
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
Turkey	6 872	10 985	29 609	45 845	81 405	151 865	260 724	420 000	630 000	1 230 000	1 510 000	1 500 000	1 430 000	1.34	1.43	1.30
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
United States	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/10.1787/627105277518

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
Australia	1.36	1.34	1.33	1.32	1.32	1.32	1.31	1.30	1.31	1.33	1.34	1.35	1.37	1.39	1.41	1.43
Austria	0.92	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.9	0.92	0.90	0.88	0.87	0.87	0.87	0.87
Belgium	0.90	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.89	0.89	0.87	0.88	0.90	0.90	0.90	0.90
Canada	1.23	1.22	1.21	1.21	1.21	1.21	1.19	1.19	1.23	1.22	1.23	1.23	1.23	1.21	1.2	1.21
Czech Republic	7.79	9.21	10.23	11.05	11.94	12.70	13.89	14.14	14.23	14.22	14.32	14.02	14.27	14.40	14.30	14.28
Denmark	8.71	8.57	8.52	8.46	8.43	8.43	8.39	8.47	8.42	8.46	8.30	8.53	8.39	8.52	8.58	8.58
Finland	0.98	0.98	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.00	1.01	0.97	0.98	0.97	0.99
France	1.01	1.01	1.00	0.99	0.99	0.97	0.97	0.96	0.94	0.92	0.90	0.94	0.94	0.92	0.91	0.91
Germany	0.99	1.00	1.01	1.00	0.99	0.99	0.99	0.97	0.97	0.96	0.94	0.92	0.90	0.89	0.88	0.88
Greece	0.44	0.49	0.53	0.57	0.60	0.63	0.66	0.68	0.68	0.67	0.66	0.69	0.69	0.70	0.70	0.710
Hungary	35.72	42.35	49.56	61.55	73.04	84.98	94.15	101.07	108.02	110.61	114.88	120.44	126.13	128.51	129.94	135.09
Iceland	72.26	71.93	72.28	72.96	74.87	74.41	77.21	79.68	84.42	88.89	91.34	94.42	94.12	97.06	104.94	108.16
Ireland	0.79	0.82	0.81	0.82	0.83	0.85	0.88	0.93	0.96	0.99	1.00	1.01	1.00	1.02	1.01	0.99
Italy	0.74	0.75	0.77	0.79	0.81	0.82	0.81	0.82	0.82	0.81	0.85	0.85	0.87	0.88	0.87	0.87
Japan	185.6	182.4	178.8	174.3	170.1	168.3	166.5	162.0	154.9	149.4	143.8	139.7	134.3	129.6	124.5	120.3
Korea	597.2	620.9	655.7	690.0	711.8	732.4	766.6	754.9	748.8	757.1	769.8	795.6	794.2	788.9	762.0	751.5
Luxembourg	0.90	0.93	0.94	0.95	0.95	0.96	0.95	0.94	0.94	0.95	0.93	0.94	0.92	0.92	0.92	0.92
Mexico	1.91	2.04	2.17	2.93	3.76	4.35	4.96	5.63	6.11	6.31	6.55	6.82	7.12	7.13	7.22	7.26
Netherlands	0.92	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.89	0.91	0.90	0.93	0.91	0.90	0.89	0.89
New Zealand	1.47	1.47	1.46	1.46	1.47	1.45	1.45	1.43	1.45	1.47	1.47	1.50	1.51	1.54	1.52	1.54
Norway	9.28	9.27	9.06	9.15	9.04	9.08	9.38	9.33	9.14	9.18	9.11	9.11	8.98	8.84	8.89	8.91
Poland	0.55	0.7	0.94	1.17	1.36	1.52	1.66	1.74	1.84	1.86	1.83	1.84	1.86	1.90	1.89	1.93
Portugal	0.58	0.61	0.64	0.65	0.66	0.67	0.69	0.70	0.70	0.71	0.71	0.71	0.72	0.71	0.70	0.70
Slovak Republic	9.65	10.88	12.09	13.02	13.34	13.70	14.16	15.08	15.86	15.71	15.90	16.71	17.23	17.2	17.26	16.98
Spain	0.66	0.68	0.69	0.71	0.72	0.72	0.72	0.73	0.74	0.74	0.73	0.75	0.76	0.77	0.76	0.74
Sweden	9.10	9.16	9.22	9.35	9.24	9.30	9.37	9.29	9.15	9.35	9.35	9.33	9.09	9.24	9.16	9.03
Switzerland	2.02	2.02	2.00	1.98	1.94	1.89	1.88	1.87	1.85	1.84	1.77	1.77	1.75	1.74	1.70	1.65
Turkey	3 785	6 201	12 542	22 979	39 815	71 529	124 109	191 716	274 412	430 136	618 281	850 000	900 000	0.87	0.90	0.93
United Kingdom	0.62	0.62	0.62	0.62	0.63	0.62	0.63	0.64	0.64	0.63	0.63	0.63	0.61	0.65	0.65	0.67
United States	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.

StatLink http://dx.doi.org/10.1787/627124060271

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
Australia	322 130	313 016	355 188	383 810	426 327	427 684	382 238	416 166	400 734	381 199	424 823	546 332	660 031	738 515	786 221	943 477
Austria	189 789	188 559	203 546	239 196	233 961	206 157	212 057	210 616	190 394	189 731	206 460	250 901	287 385	305 566	321 618	371 010
Belgium	230 893	221 213	241 560	284 633	274 544	248 521	255 080	253 455	230 955	231 146	252 502	308 681	357 567	377 640	397 779	458 790
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	1 134 402	1 283 619	1 435 183
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	142 285	173 990
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	273 719	310 274
Finland	110 721	87 421	100 117	131 392	128 906	123 708	130 123	130 582	121 350	124 882	135 825	163 815	187 841	196 338	208 761	246 108
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	1 791 912	2 049 599	2 157 566	2 259 328	2 591 962
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	2 804 000	2 901 875	3 319 041
Greece	111 723	105 145	112 523	131 699	138 587	136 108	136 090	140 172	127 365	130 589	148 666	192 596	229 446	247 056	266 509	312 575
Hungary	38 261	39 641	42 629	45 878	46 383	46 960	48 322	49 343	47 943	53 301	66 620	84 325	102 073	110 218	113 053	138 426
Iceland	6 976	6 127	6 295	7 018	7 331	7 423	8 292	8 742	8 697	7 923	8 909	10 970	13 231	16 295	16 634	19 962
Ireland	53 993	50 857	55 340	67 259	74 425	81 017	88 394	96 445	95 982	104 410	122 844	156 676	183 920	202 710	221 608	261 100
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	2 116 322
Japan	3 767 119	4 323 930	4 760 314	5 247 588	4 635 612	4 258 609	3 856 412	4 368 612	4 667 253	4 095 447	3 918 273	4 229 225	4 606 049	4 552 118	4 362 552	4 380 508
Korea	329 886	362 136	423 434	517 118	557 644	516 283	345 432	445 399	511 658	481 896	546 934	608 148	680 491	791 427	888 200	969 792
Luxembourg	15 330	15 747	17 540	20 699	20 516	18 451	19 350	21 156	20 184	20 154	22 634	29 027	33 875	37 796	42 401	49 696
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	757 953	843 974	945 582	1 019 183
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	674 911	776 803
New Zealand	40 752	44 330	52 036	61 461	67 559	67 287	55 284	58 005	52 685	52 366	60 646	81 252	98 777	110 457	107 389	130 552
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	388 585
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	421 587
Portugal	103 412	91 096	95 102	113 517	117 543	112 526	118 331	121 481	112 174	115 454	127 768	155 710	177 936	186 404	194 308	223 451
Slovak Republic	..	13 584	15 719	19 717	21 378	21 561	22 425	20 604	20 446	21 108	24 520	33 270	42 221	47 894	55 872	75 042
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	1 227 879	1 439 171
Sweden	267 773	202 234	217 510	253 823	276 020	252 556	253 093	257 139	245 632	225 186	248 538	310 896	357 138	366 160	393 061	453 236
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	370 511	389 633	426 785
Turkey	213 876	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	658 759
United Kingdom	1 078 554	963 433	1 052 411	1 147 746	1 201 414	1 337 510	1 442 850	1 470 879	1 452 926	1 454 054	1 575 810	1 868 436	2 182 900	2 277 282	2 447 889	2 802 084
United States	6 286 800	6 604 300	7 017 500	7 342 300	7 762 300	8 250 900	8 694 600	9 216 200	9 764 800	10 075 900	10 417 600	10 908 000	11 630 900	12 364 100	13 116 500	13 741 600
OECD	20 427 136	20 693 926	22 088 419	24 217 070	24 388 603	23 984 022	24 119 082	25 372 201	25 769 672	25 541 299	26 735 933	30 017 407	33 344 965	35 274 999	37 105 101	40 655 053

Source: OECD Main Economic Indicators.

StatLink http://dx.doi.org/10.1787/627133784708

Annex Table A.4. **Total population**

Thousands

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	17 495	17 766	17 961	18 196	18 420	18 606	18 812	19 036	19 270	19 527	19 752	19 989	20 232	20 525	20 817	*20 817*
Austria	7 884	7 992	8 030	7 948	7 959	7 968	7 977	7 992	8 012	8 043	8 084	8 118	8 175	8 233	8 282	8 315
Belgium	10 045	10 086	10 116	10 137	10 155	10 180	10 203	10 222	10 246	10 281	10 330	10 373	10 417	10 474	10 543	10 622
Canada	28 377	28 703	29 036	29 302	29 611	29 907	30 157	30 404	30 689	31 021	31 373	31 676	31 995	32 312	32 649	*32 649*
Czech Republic	10 318	10 330	10 334	10 331	10 315	10 304	10 295	10 283	10 273	10 224	10 201	10 202	10 207	10 234	10 267	*10 267*
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
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	5 288
France	57 240	59 006	59 221	59 419	59 624	59 831	60 047	60 348	60 751	61 182	61 616	62 042	62 445	62 818	63 196	63 573
Germany	80 595	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	82 262
Greece	10 322	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	11 172
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
Iceland	261	264	266	267	269	271	274	277	281	285	288	289	293	296	304	311
Ireland	3 549	3 574	3 586	3 601	3 626	3 661	3 711	3 751	3 800	3 859	3 926	3 991	4 059	4 149	4 253	*4 253*
Italy	56 859	57 049	57 204	57 301	57 397	56 890	56 907	56 916	56 942	56 978	57 157	57 605	58 175	58 607	58 942	59 319
Japan	124 430	124 670	124 960	125 570	125 864	126 057	126 400	126 631	126 843	127 149	127 445	127 718	127 761	127 773	127 755	*127 755*
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
Luxembourg	395	398	404	410	416	421	426	432	439	442	446	452	458	465	473	480
Mexico	84 902	87 797	89 352	90 164	92 159	93 908	95 233	96 550	98 258	99 564	100 762	101 870	102 866	103 831	104 748	*104 748*
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	16 377
New Zealand	3 514	3 598	3 648	3 707	3 762	3 783	3 816	3 837	3 860	3 886	3 942	4 010	4 062	4 101	4 142	*4 142*
Norway	4 287	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
Poland	38 365	38 459	38 544	38 596	38 625	38 292	38 283	38 270	38 256	38 251	38 232	38 195	38 180	38 161	38 132	38 116
Portugal	9 833	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
Slovak Republic	5 307	5 325	5 347	5 363	5 374	5 383	5 391	5 396	5 401	5 380	5 379	5 379	5 382	5 387	5 391	*5 391*
Spain	39 011	39 096	39 166	39 223	39 279	39 583	39 722	39 927	40 264	40 721	41 314	42 005	42 692	43 398	44 068	44 874
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
Switzerland	6 875	6 989	7 037	7 081	7 105	7 081	7 096	7 124	7 164	7 204	7 256	7 314	7 364	7 415	7 459	7 509
Turkey	58 401	59 491	60 573	61 646	62 695	62 480	63 459	64 345	67 461	68 618	69 626	70 712	71 789	72 065	72 974	*72 974*
United Kingdom	58 006	57 672	57 797	57 928	58 043	58 314	58 475	58 684	58 886	59 113	59 322	59 554	59 834	60 218	60 587	60 783
United States	255 410	260 011	263 194	266 588	269 714	272 958	276 154	279 328	282 433	285 372	288 215	290 964	293 644	296 373	299 199	302 087
OECD	1 059 816	1 073 052	1 081 498	1 089 509	1 098 046	1 104 325	1 111 826	1 119 366	1 129 877	1 138 225	1 146 471	1 154 779	1 162 732	1 169 810	1 177 434	1 182 519
Chile	13 540	13 770	13 990	14 275	14 419	14 622	14 821	15 017	15 211	15 402	15 050	15 230	15 411	15 592	16 465	16 635
Estonia	1 544	1 517	1 499	1 484	1 469	1 458	1 450	1 442	1 439	1 430	1 355	1 351	1 335	1 329	1 325	1 335
Israel	5 215	5 393	5 585	5 619	5 759	5 905	5 984	6 104	6 270	6 508	6 636	6 766	6 862	6 900	6 847	6 928
Russia	148 806	148 673	148 440	148 189	147 947	147 691	147 398	147 030	146 560	145 985	145 327	144 618	143 899	143 500	142 537	142 499
Slovenia	1 996	1 991	1 989	1 988	1 986	1 985	1 993	1 989	1 990	1 995	1 996	1 997	1 981	1 967	1 966	2 002

Note : Data in italics are for 2006.

Source: OECD Annual Labour Force Statistics.

StatLink http://dx.doi.org/10.1787/627145043023

OECD PUBLISHING, 2, rue André-Pascal, 75775 PARIS CEDEX 16
PRINTED IN FRANCE
(93 2009 03 1) ISBN 978-92-64-05983-2 – No. 56825 2009

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ISBN 978-92-64-05983-2
93 2009 03 1 P

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