5. Internet Access Service

This chapter presents the state of the Internet Access Service by the end of 2008.

Below is a summary of the main aspects of this service's evolution during 2008.

Main aspects of evolution in 2008

• In 2008, there was an exponential growth in mobile broadband. By the end of the year there were about 2.4 millions users of active accesses to mobile broadband Internet, of which 1.16 million were actually used during December.

Among the EU countries that belong to the OECD, Portugal recorded the lowest growth in the penetration rate of fixed broadband during 2008. As a result of the 2008 performance, Portugal now ranks 21st in the EU27 ranking.

However, when adding to fixed broadband the types of access to mobile broadband Internet that are closer to fixed broadband (cards/modem) – a mode of access where Portugal ranks 3rd at the EU level, – broadband penetration (fixed + mobile) reaches 25 per 100 inhabitants, a result which makes Portugal rank 13th in the EU ranking.

• During 2008 a Cabo/Zon completed the acquisition of companies Bragatel, Pluricanal Leiria, Pluricanal Santarém and TVTel. These operations received the final approval of the Competition Authority on 24 November 2008. Due to these acquisitions and to the own activity of the previously existing business units, ZON/TV Cabo's customer share increased 3.4 per cent during the 4Q08.

PT Group continues, however, to be this service's main operator, although its customer share (42 per cent), stands below the European average (46 per cent).

• Some operators upgraded their networks by installing the EuroDOCSIS 3.0 standard on cable networks, and launched new Internet access retail offers using optical fibre. This type of de offer recorded a considerable growth, representing 9 per cent of all broadband offers available at the end of the year.

The number of broadband offers included in multiple play bundles also increased. Bundle broadband offers now represent 56 per cent of the overall amount. 1 in each 4 broadband offers is included in triple-play offers.

By the end of 2008, the main speeds were 4 Mbps and 18 Mbps. The offers with higher transmission speeds are based on optical fibre or coaxial cable using EuroDOCSIS 3.0 (as from 2009).

• Consumers' perception of broadband service quality is generally positive.

The Internet Access Service Offer

The Internet Access Service may be provided over different platforms and technologies, and it is provided at different bit rates, which translate into providing narrow band or broadband services.

In the case of fixed Internet access, the service is provided by entities with a general authorization. In the case of mobile broadband Internet, operators have a license for the provision of 3rd generation mobile services, or a general authorization in the case of mobile virtual operators using a third party network[75].

The services provided and their evolution in 2008 are described in detail below. The entities providing these services in Portugal are also presented.

Internet access platforms and technologies
These are the main Internet access platforms and technologies currently available:

• Access using DSL technologies (Digital Subscriber Lines or xDSL) – This technology uses sophisticated modulation systems to increase data bit rate over copper wires, using

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[75] See Regulatory framework of the activity of mobile virtual network operators, available at http://www.anacom.pt/template31.jsp?categoryId=234406.

frequencies that are not used by the voice signal and enabling it to provide broadband services. The fact that voice and data are carried in different frequencies gives these technologies the ability to perform both types of communication simultaneously, with the Internet connection being "always on". This technology is provided in pre-defined areas, where access to a connection with the minimum physical requirements is possible[76].

There are different xDSL variations, of which the most common one is ADSL (Asymmetric DSL)[77]. Regarding data bit rates, ADSL offers available in Portugal vary between 256 kbps and 24 Mbps. Besides ADSL, there are also other modes, such as VDSL[78] (Very-high-speed DSL).

• Co-axial cable access – co-axial cable is the first type of cable used by the cable television distribution industry. Its composition enables the provision of broadband services, and a smaller exposure to electrical and radio interferences. Internet access over cable television distribution networks, with the use of a cable modem, enables higher access bit rates. These connections' maximum bit rates are similar to those of an ADSL access, both downstream and upstream. In order for the Internet service to be provided over this type of network, the latter has to stand bi-directionality, i.e., it has to be able to both send and receive data (the overwhelming majority of cabled households enjoy this feature).

• With the installation of standard EuroDOCSIS 3.0 (Data Over Cable Service Interface Specification) on the cable TV distribution systems where bi-directionality already existed, it is possible for service providers to offer high speed data transmission services[79], and offers have been launched in 2009 with a theoretical download speed of 100 Mbps.

• Access using third generation mobiles – The 3rd generation of mobile services made it possible to materialize convergences between fixed communications and mobile communications, and between electronic communications and multimedia, thus drawing mobile networks closer to the capacity of fixed networks and giving mobile users access to broadband multimedia services. Among the third generation mobile systems, UMTS stands out. It is identified with the European standard of the global standard family of international mobile communications systems (IMT2000). UMTS technology uses the WCDMA[80] transmission mode, which is based on multiple accesses by code division.

• These standards' evolution lead to the development of standards HSDPA (High Speed Downlink Packet Access) and HSUPA (High Speed Uplink Packet Access) which, through updates to the software used on UMTS networks, enable maximum theoretical speeds of 14 Mbps for download speed and 5.8 Mbps for upload speed. Current commercial offers are characterized by download speeds up to 7.2 Mbps and upload speeds up to 1.4 Mbps.

• Access using optical fibre (FTTx) – The network architectures that fully or partially replace the traditional network of copper access or co-axial cable access by optical fibre are named FTTx (Fibre to the x). Depending on the network access point reached by the optical fibre, it can be FTTN – Fibre to the Node, FTTC – Fibre to the Cabinet, FTTB – Fibre to the Building and FTTH – Fibre to the Home. These solutions are then complemented by traditional means, such as the copper wire or the co-axial cable, and with previously mentioned standards such as, for example, DOCSIS or VDSL2. In the most common case, where optical fibre is shared by several users, optical fibre networks use two types of optical distribution networks: Active Optical Networks (AON), which make it possible to send each signal directly to a specific user, or Passive Optical Networks (PON), which broadcast the signal and use encryption to guarantee that a given signal is only received by the user to which it is directed.

This mode of access will be the main support to the designated Next Generation Network (NGN) which enables the provision of high speed data transmission services (typically 100 Mbps, being able to surpass 1 Gbps).

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[76] All the national territory covered by the switched fixed telephone network has the potential for this type of service, except in the case of technical constraints.

[77] Digital technology transforming analogue or ISDN telephone lines into greater capacity lines, making Internet Access possible at much higher speeds. Data transmission is made asymmetrically, i.e. the downstream is faster than the upstream, which is currently at around 1 Mbps, and bandwidth is managed in an intelligent way. It makes it possible to simultaneously use the Internet and the traditional telephone line (for voice, fax service). An ADSL line has three data channels: a downstream high bit rate channel. (1.5 to 8Mbps), a duplex upstream medium throughput channel (16 to 640kbps) and a channel for the telephone service

[78] Mode that enables bit rates up to 100 Mbps (VDSL2) at distances below 300 m.

[79] EuroDOCSIS 3.0 enables downstream speeds from 200 Mbps up and upstream speeds of 100 Mbps.

[80] Broadband Access system which access discipline to the various users shares the same frequency band through different codes assigned to each one of them.

• Access using a dial-up connection – The first offers of narrow band Internet access services used switched (dial-up) type connections available to any subscriber with a fixed telephone line and a modem, just sufficing that they become a customer of one (or several) ISP. Packages within this mode have a maximum bit-transfer rate of 64 kbps (narrow band). ISDN access enables higher bit rates, and the integration of voice and data into one single access. ISDN accesses can be basic[81] or primary[82]. This access mode, the main one at first, currently presents a low and decreasing rate of Internet accesses.

• Other access modes – Other technological suites that can be used to access the Internet are worth mentioning, namely: access over dedicated connections, access over FWA (Fixed Wireless Access) and CDMA (Code Division Multiple Access) radio links, access over power line cables (PLC – Power Line Circuit), access over local radio networks and access over satellite links.

Geographic availability of this service
In 2008, the Internet Access Service was available in practically the entire Portuguese territory.

Dial-up Access, particularly, is available in the entire public switched telephone network.

The availability of the broadband offers depends on the availability of public switched network's exchanges equipped with DSLAMs (Digital Subscriber Line Access Multiplexers), on the availability of broadband-enabled cable TV distribution networks, or on existing 3G network coverage

Concerning ADSL, at the end of the fourth quarter of 2008, there were 1,853 exchanges equipped with DSLAMs in Mainland Portugal, corresponding to the entire coverage of possible areas for ADSL provision, such as in the 4th quarter of 2006.

These infrastructures are concentrated in the Greater Lisbon and Greater Porto areas, in the northern coastline and in Algarve. Inland, exchanges density is lower, as occurs with population density.

It should be underlined that there are exceptional cases when it is not possible to provide ADSL services over a given loop, due to its physical characteristics (namely its length, section and its state of conservation).

[81] Basic Access (Basic Rate Access 2B+D) – Customer access to ISDN using a copper pair and providing two 64kbps channels (B1 and B2 channels) for voice and data transfer, and a 16kbps D channel for signalling, package data transfer and telemetry. The overall bit rate is 192kbps.
[82] Primary Access – 30B+D Access to the ISDN, with a global 2Mbps throughput. Both the 30 B voice/data channels and the D signalling channel carry 64kbps

Distribution of exchanges with DSLAM and population density per municipality (Mainland Portugal)
Graph 5.1

△ PTC exchanges with DSLAM – 4th quarter 2008

Population density (inhabitants/km²)

- ● 250 a 8000
- ● 100 a 250
- ● 50 a 100
- ● 25 a 50
- ○ 0 a 25

Source: ICP-ANACOM.
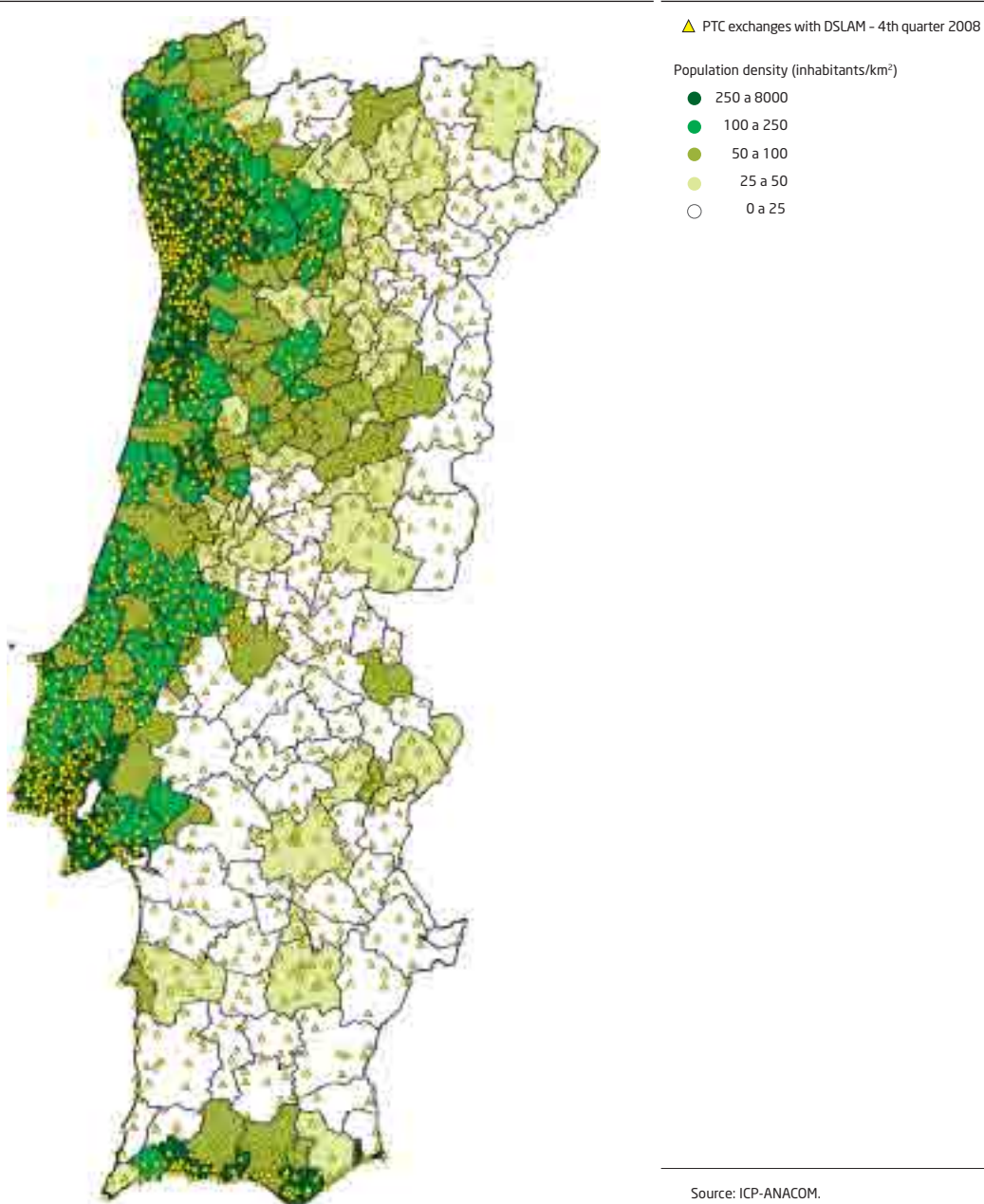
Distribution of exchanges and population density per municipality (Autonomous Regions)
Graph 5.2

⚠ PTC exchanges with DSLAM – 4th quarter 2008

Population density (inhabitants/km²)

- ● 250 a 8000
- ● 100 a 250
- ● 50 a 100
- ● 25 a 50
- ○ 0 a 25

Autonomous Region of the Azores

Autonomous Region of Madeira

Source: ICP-ANACOM.
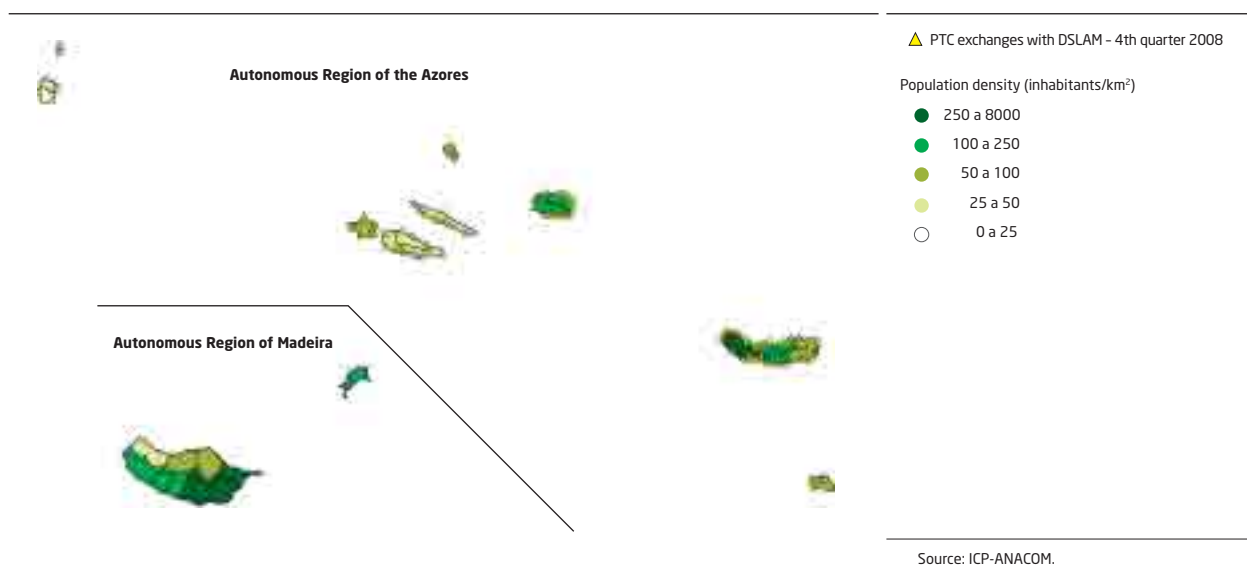
In 2008, according to the European Commission, the DSL coverage – service availability – in Portugal was the 12th highest among the 27 EU countries. In rural areas, DSL coverage in Portugal ranks the same, 6.1 percent above the EU27 average.

It should also be mentioned that coverage in Portugal (95 per cent) is above the EU27 average, which is 92.5 per cent. The EU 27 average in rural areas is 79.9 per cent, while in Portugal it is 86 per cent[83].

[83] According to the methodology of the study promoted by the Commission, all the inhabitants of the parish ("Nut5") where the exchange is located are considered to be covered. Thus, although all exchanges have DSLAM, the percentage of the population covered is below 100 per cent. See
http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/broadband_methodology_06_2007.pdf

DSL coverage in EU27
Graph 5.3

Country	Total coverage
Luxembourg	100.0
Denmark	100.0
Belgium	100.0
United Kingdom	99.6
Netherlands	99.0
Malta	99.0
France	98.5
Sweden	97.8
Finland	96.0
Germany	95.7
Portugal	95.0
Italy	94.0
Slovenia	92.2
Austria	92.0
Spain	91.0
Hungary	91.0
Ireland	89.2
Lithuania	87.9
Latvia	87.0
Greece	86.3
Estonia	85.0
Czech Republic	85.0
Cyprus	79.6
Slovak	73.9
Poland	64.0
Romania	n.d.
Bulgaria	n.d.

Country	Coverage in rural areas
Luxembourg	100.0
Denmark	100.0
Belgium	100.0
Netherlands	99.0
France	96.7
United Kingdom	96.1
Finland	91.0
Sweden	90.0
Spain	88.0
Germany	87.5
Portugal	86.0
Slovenia	85.5
Italy	81.7
Austria	80.6
Hungary	80.0
Czech Republic	75.0
Ireland	73.3
Estonia	73.0
Lithuania	67.5
Latvia	65.0
Greece	50.0
Poland	42.5
Slovak	38.5
Romania	0.0
Cyprus	0.0
Bulgaria	0.0
Malta	n.d.

Legend:
- Total coverage
- Coverage in rural areas

Unit: %
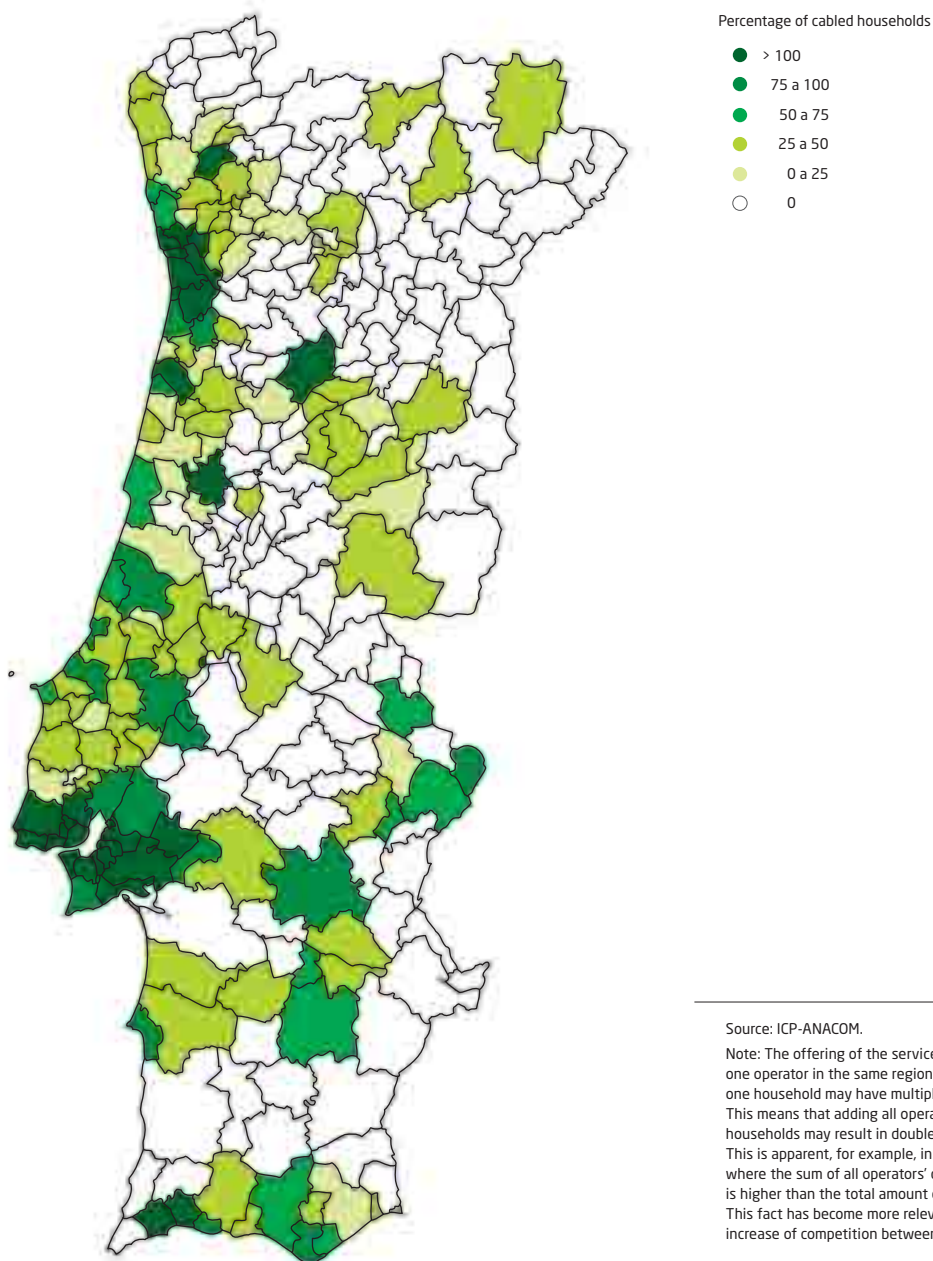Source: IDATE, Broadband Coverage in Europe, DGINFSO, December 2008.

Regarding broadband Internet access using cable modem, cable distribution networks in Mainland Portugal are focused on the Greater Lisbon and Greater Porto regions.

In the case of the autonomous regions, Madeira had a ratio of cabled households above 77 per cent, whereas in the Azores this indicator reaches 54 per cent. These figures can be explained by the protocols among the Government of the Republic, the Regional Governments, ICP-ANACOM and the only cable television distribution network operator in both the autonomous regions. These protocols aimed at ensuring the necessary conditions for the citizens of the autonomous regions to have access, for free or with monthly fee[84], to the broadcasts of the general free-to-air channels available in Mainland Portugal, namely RTP1, RTP2, SIC and TVI, besides RTP Açores and RTP Madeira, respectively in each of the autonomous regions. The protocol in force in Madeira was signed on 6 August 2004 and the protocol regarding the Autonomous Region of the Azores was signed on 5 November 2005, and remained in force for a year.

[84] Those joining the service could have to pay a given value for the box.
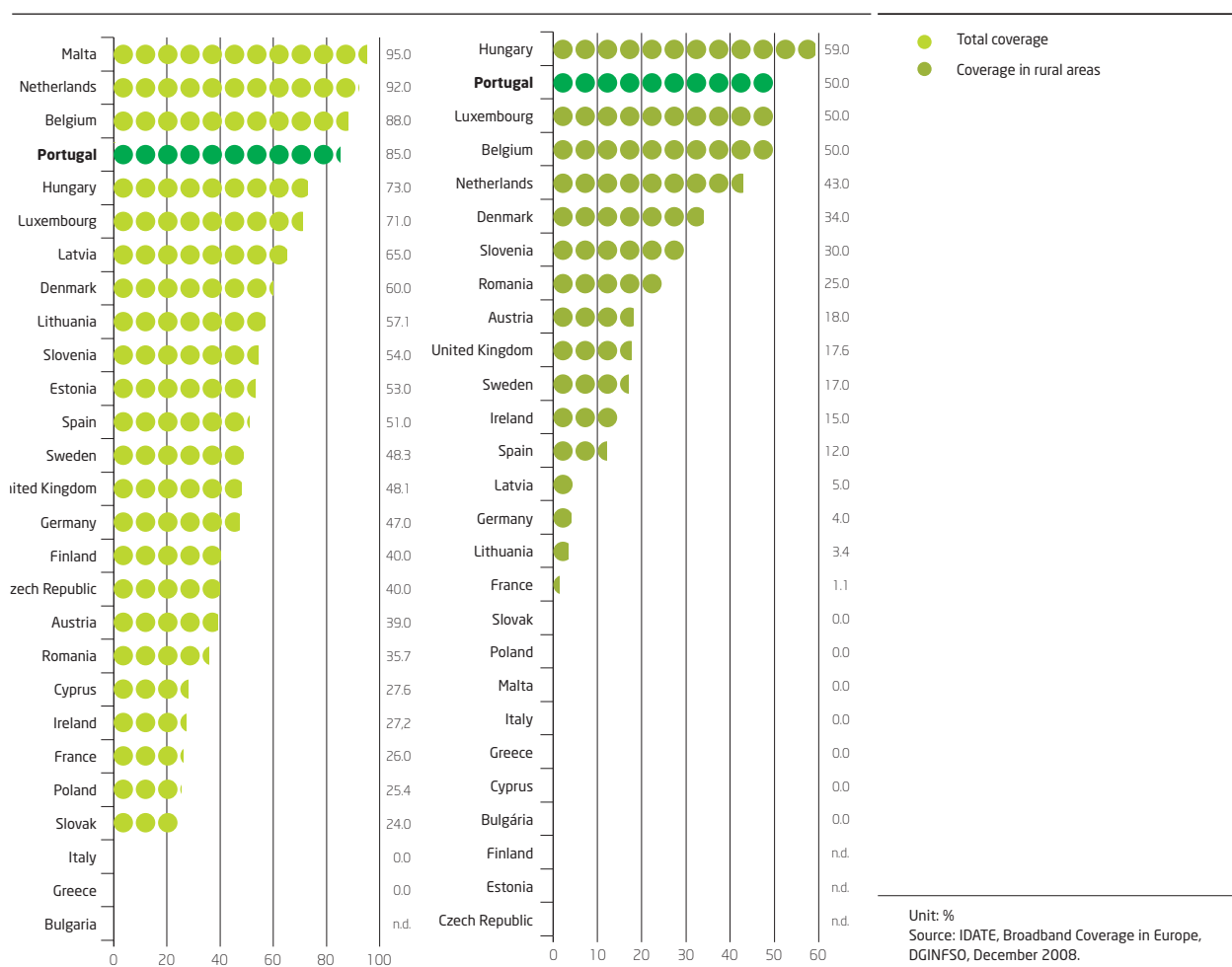
Distribution of the overall cabled households by all operators in proportion to total households per municipality (Mainland Portugal)
Graph 5.4

Percentage of cabled households

● > 100
● 75 a 100
● 50 a 75
● 25 a 50
● 0 a 25
○ 0

Source: ICP-ANACOM.

Note: The offering of the service by more than one operator in the same region implies that one household may have multiple cabling. This means that adding all operators' cabled households may result in double counting. This is apparent, for example, in the Lisbon region, where the sum of all operators' cabled households is higher than the total amount of households. This fact has become more relevant with the increase of competition between operators.

According to the European Commission, cable TV network coverage in Portugal (85 per cent of the population) stands clearly above the EU average (37.4 per cent). In rural areas, Portugal has the highest coverage of all the EU27 (50 per cent versus an 8.6 per cent average).

Cable modem coverage in EU27
Graph 5.5

Total coverage		Coverage in rural areas	
Malta	95.0	Hungary	59.0
Netherlands	92.0	**Portugal**	50.0
Belgium	88.0	Luxembourg	50.0
Portugal	85.0	Belgium	50.0
Hungary	73.0	Netherlands	43.0
Luxembourg	71.0	Denmark	34.0
Latvia	65.0	Slovenia	30.0
Denmark	60.0	Romania	25.0
Lithuania	57.1	Austria	18.0
Slovenia	54.0	United Kingdom	17.6
Estonia	53.0	Sweden	17.0
Spain	51.0	Ireland	15.0
Sweden	48.3	Spain	12.0
United Kingdom	48.1	Latvia	5.0
Germany	47.0	Germany	4.0
Finland	40.0	Lithuania	3.4
Czech Republic	40.0	France	1.1
Austria	39.0	Slovak	0.0
Romania	35.7	Poland	0.0
Cyprus	27.6	Malta	0.0
Ireland	27.2	Italy	0.0
France	26.0	Greece	0.0
Poland	25.4	Cyprus	0.0
Slovak	24.0	Bulgária	0.0
Italy	0.0	Finland	n.d.
Greece	0.0	Estonia	n.d.
Bulgaria	n.d.	Czech Republic	n.d.

Unit: %
Source: IDATE, Broadband Coverage in Europe, DGINFSO, December 2008.
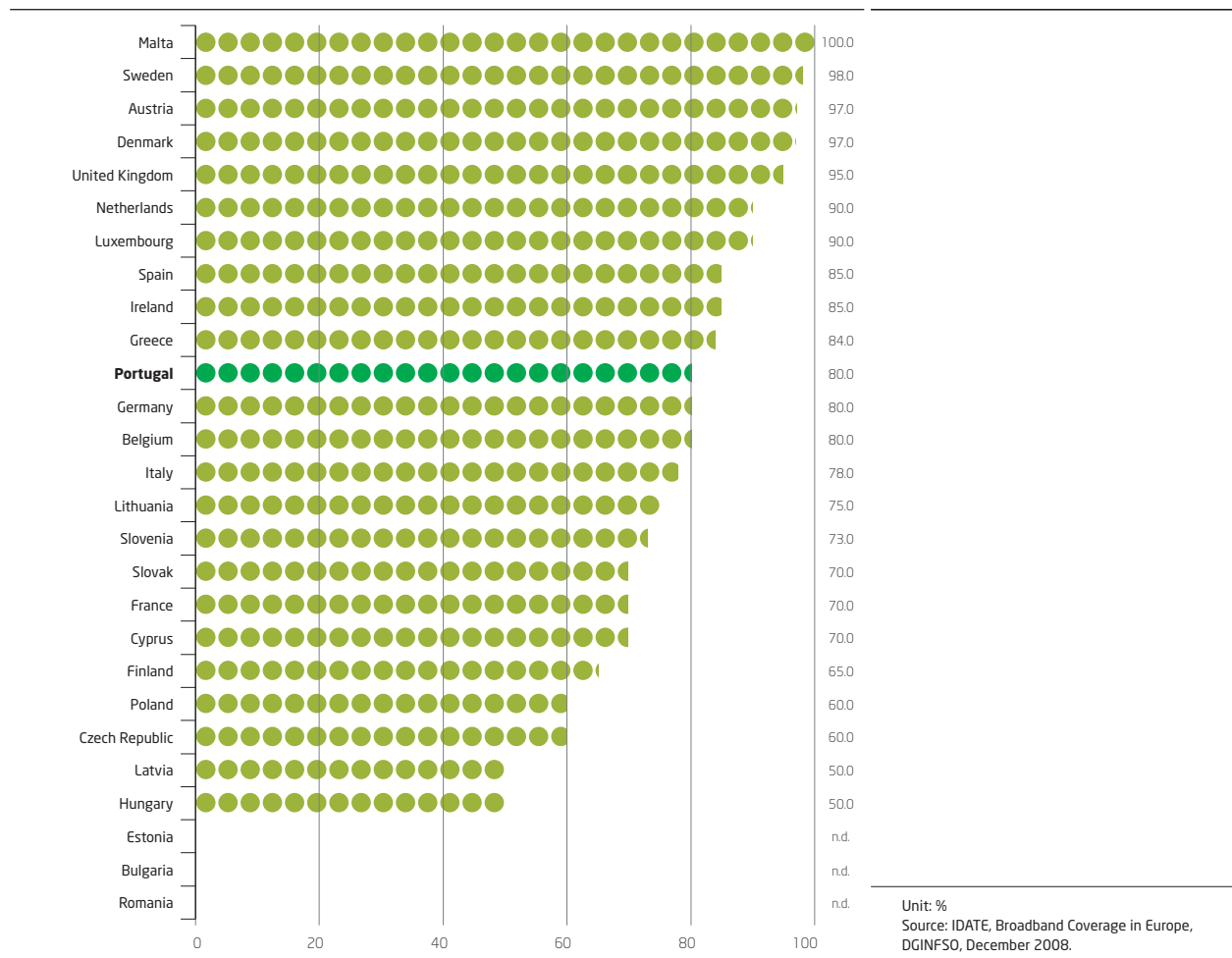
Considering the previously-presented data, fixed broadband coverage density follows the territory's population density.

Mobile broadband is available in areas where 3rd generation mobile networks are available. According to the European Commission, 2007 coverage in Portugal was 80 per cent – above the EU27 average (77 per cent) and the UE15 average (83 per cent)[85].

3G Coverage in EU27
Graph 5.6

Country	Value
Malta	100.0
Sweden	98.0
Austria	97.0
Denmark	97.0
United Kingdom	95.0
Netherlands	90.0
Luxembourg	90.0
Spain	85.0
Ireland	85.0
Greece	84.0
Portugal	80.0
Germany	80.0
Belgium	80.0
Italy	78.0
Lithuania	75.0
Slovenia	73.0
Slovak	70.0
France	70.0
Cyprus	70.0
Finland	65.0
Poland	60.0
Czech Republic	60.0
Latvia	50.0
Hungary	50.0
Estonia	n.d.
Bulgaria	n.d.
Romania	n.d.

Unit: %
Source: IDATE, Broadband Coverage in Europe, DGINFSO, December 2008.

[85] See 3G coverage data on Chapter 4 on this regard.

The Internet Access Service providers

At the end of 2008 there were in Portugal 54 registered and qualified entities entitled to provide the fixed Internet Access Service and three entities licensed for the provision of mobile Internet access. These entities are also known as ISP – Internet Service Providers.

Of all ISPs legally qualified to provide the Internet access service, 37 were active.

The following table shows the evolution of the amount of entities with a license to provide this service, the entries and exists in/from the market place during the year standing out.

**Internet Access Service Providers in 2008 – fixed
Table 5.1**

Name	Beginning	Entries	Exits	End
4 Great Wireless Broadband Solutions, S.A. (4G WING)		X		NA
ADIANIS – Telecomunicações & Multimedia, S.A.	NA			NA
AR Telecom – Acessos e Redes de Telecomunicações, S.A.	A			A
AT & T – Serviços de Telecomunicações, Soc. Unip., Lda.[86]	NA			NA
BRAGATEL – Companhia de Televisão por Cabo de Braga, S.A.	A			A
BROADNET Portugal, S.A.	A			A
BT Portugal – Telecomunicações, Unipessoal, Lda.[86]	NA			NA
CABOVISÃO – Sociedade de Televisão por Cabo, S.A.	A			A
CGEST, S.A.		X		NA
CGPT, Lda.		X		NA
CLARA.NET Portugal – Telecomunicações, S.A.	A			A
COLT Telecom – Serviços de Telecomunicações, Unipessoal, Lda.	A			A
CORED – Comunicações e Serviços em Rede, S.A.		X		NA
CYCLOP NET – Informática e Telecomunicações, Lda.	A			A
EQUANT Portugal, S.A.	A			A
FLEXIMEDIA – Serviços e Meios Inf. e Comunicação, Lda.	A			A
GLOBAL CROSSING PEC Espana S.A.	NA			A
HSIA Hospitality Services Portugal, S.A.	A			A
IPTV TELECOM – Telecomunicações, Lda.	NA			A
MEDIA CAPITAL – Telecomunicações, S.A.	A	X		
MINHOCOM, Gestão de Infra-estruturas de Telecomunicações, EIM		X		NA
MONEYCALL – Serviços de Telecomunicações, Lda.		X		A
NETACESSO – Serviços Internet e Multimédia, Lda.	NA			NA
NETCONEXION, LDA.		X	NA	
NEUVEX – Telecomunicações, Marketing e Inform., Lda.	A		X	

86 Entity entitled to provide the Internet access service, but with apparent activity in Other Data Transmission Services (ODTS) only.

[continues] Name	Beginning	Entries	Exits	End
NFSI – Soluções Internet, Lda.	A			A
NORTENET – Sistemas de Comunicação, S.A.	A			A
ONITELECOM – Infocomunicações, S.A.	A			A
ORBIRECURSO – Comunicações, Unipessoal, Lda.		X		NA
PLURICANAL LEIRIA – Televisão por Cabo, S.A.	A			A
PLURICANAL SANTARÉM – Televisão por Cabo, S.A.	A			A
PT Acessos de Internet WI-FI, S.A./ TMN – Telecomunicações Móveis Nacionais, S.A.[87]	A			A
PT Comunicações, S.A.	A			A
PT PRIME – Soluções Empresariais de Telecomunicações e Sistemas, S.A.	A			A
PT.COM – Comunicações Interactivas, S.A.[88]	A		X	
RADIOMÓVEL – Telecomunicações, S.A.	NA			NA
REFER Telecom – Serviços de Telecomunicações, S.A.	A			A
ROBOT – Telecomunicações, Projectos e Serviços, Lda.	A			A
SEMCABO – Soluções em Redes Informáticas. Lda.	A			A
SONAECOM – Serviços de Comunicações, S.A.[89]	A			A
STV – Sociedade de Telecomunicações Vale do Sousa		X		NA
T – SYSTEM ITC Iberia, S.A. (Soc. Unipersonal) – (Sucursal em Portugal)	NA			NA
TELE LARM Portugal – Transmissão de Sinais, Lda.		X		A
TELEMILÉNIO, Telecomunicações, Sociedade Unip., Lda. (TELE2)	A			A
TELVENT Portugal, S.A.		X		NA
TRANSIT Telecom, Sociedade Unipessoal, Lda.		X		NA
TVTEL Comunicações, S.A.	A			A
UNITELDATA – Telecomunicações, S.A.		X		A
VALICOM, Gestão de Infra-estruturas de Telecomunicações, EIM		X		NA
VERIZON Portugal, Sociedade Unipessoal, Lda.	A			A
VIPVOZ – Serviços de Telecomunicações Digitais, Lda.	A			A
VODAFONE Portugal – Comunicações Pessoais, S.A.	A			A
WING Global Communications, S.A. (WGC)		X		A
WORLDBROKER Telecomunicações – Sociedade de Telecomunicações e Multimédia, Lda.	A			A
ZON – TV Cabo Açoreana, S.A.	A			A
ZON – TV Cabo Madeirense, S.A.	A			A
ZON – TV Cabo Portugal, S.A.	A			A
Total active	**34**			**37**
Total not active	**7**			**17**
Overall total	**42**	**16**	**2**	**54**

Legend: A – Active   NA – Not Active
Source: ICP-ANACOM.

[87] Following the Merger process incorporating PT Wi-Fi within TMN, on 11 December 2008, all rights and obligations of PT Wi-Fi became under the juridical scope of TMN.
[88] Following the Merger process incorporating PT.Com within PT Comunicações, on 10 March 2008, all rights and obligations of PT.Com became under the juridical scope of PT Comunicações..
[89] Following the Novis/Optimus merger process, Novis Telecom, S.A. changed its name to Sonaecom – Serviços de Comunicações, S.A.

Among the above-mentioned providers, the following ones provide the Internet service using dial-up connections:

Internet Access Service Providers with dial-up offers
Table 5.2

AR Telecom – Acessos e Redes de Telecomunicações, S.A.
BROADNET Portugal, S.A.
CLARA.NET Portugal – Telecomunicações, S.A.
FLEXIMEDIA – Serviços e Meios Inf. e Comunicação, Lda.
NORTENET – Sistemas de Comunicação, S.A.
ONITELECOM – Infocomunicações, S.A.
PT Comunicações, S.A.
PT PRIME – Soluções Empresariais de Telecomunicações e Sistemas, S.A.
SONAECOM – Serviços de Comunicações, S.A
TELEMILÉNIO, Telecomunicações, Sociedade Unipessoal, Lda. (TELE2)
UNITELDATA – Telecomunicações, S.A.
VODAFONE PORTUGAL – Comunicações Pessoais, S.A.

Source: ICP-ANACOM.

The following table lists the cable television distribution operators providing broadband Internet services using cable modems at the end of 2008.

Cable distribution network operators providing internet access service
Table 5.3

BRAGATEL – Companhia de TV por Cabo de Braga, S.A.
CABOVISÃO – Sociedade de Televisão por Cabo, S.A.
PLURICANAL LEIRIA – Televisão por Cabo, S.A.
PLURICANAL SANTARÉM – Televisão por Cabo, S.A.
TVTEL Comunicações, S.A.
UNITELDATA – Telecomunicações, S.A.
ZON – TV Cabo Açoreana, S.A.
ZON – TV Cabo Madeirense, S.A.
ZON – TV Cabo Portugal, S.A.

Source: ICP-ANACOM.

It should be mentioned that ZON Multimédia acquired the companies of the Parfitel Group (Bragatel, Pluricanal Leiria and Pluricanal Santarém), as well as TV Tel. These operations received the final approval from the Competition Authority on 24 November 2008.

Providers offering broadband Internet services over ADSL accesses are shown on the table below.

Internet Access Service providers with ADSL access offers
Table 5.4

AR Telecom – Acessos e Redes de Telecomunicações, S.A.
CLARA.NET Portugal – Telecomunicações, S.A.
COLT Telecom – Serviços de Telecomunicações, Unipessoal, Lda.
EQUANT Portugal, S.A.
HSIA Hospitality Services Portugal, S.A.
MONEYCALL – Serviços de Telecomunicações, Lda.
NFSI – Soluções Internet, Lda.
NORTENET – Sistemas de Comunicação, S.A.
ONITELECOM – Infocomunicações, S.A.
PT PRIME – Soluções Empresariais de Telecom. e Sistemas, S.A.
PT Comunicações, S.A.
ROBOT – Telecomunicações, Projectos e Serviços, Lda.
SONAECOM – Serviços de Comunicações, S.A
TELE LARM Portugal – Transmissão de Sinais, Lda.
TELEMILÉNIO, Telecomunicações, Sociedade Unipessoal, Lda. (TELE2)
TMN – Telecomunicações Móveis Nacionais, S.A.
VIPVOZ – Serviços de Telecomunicações Digitais, Lda.
VODAFONE PORTUGAL – Comunicações Pessoais, S.A.
WORLDBROKER Telecomunicações – Sociedade de Telecomunicações e Multimédia, Lda.
ZON – TV Cabo Portugal, S.A.

Source: ICP-ANACOM.

Regarding the FWA technology, the following table shows the licensed providers who provided Internet Access Services during 2008 using this technology.

Internet Access Service Providers with FWA offers
Table 5.5

AR Telecom – Acessos e Redes de Telecomunicações, S.A.
ONITELECOM – Infocomunicações, S.A.

Source: ICP-ANACOM.

The following tables further present the broadband internet access providers using other fixed technologies, such as optical fibre and leased lines.

Internet Access Service Providers with optical fibre offers
Table 5.6

AR Telecom – Acessos e Redes de Telecomunicações, S.A.
COLT Telecom – Serviços de Telecomunicações, Unipessoal, Lda.
HSIA Hospitality Services Portugal, S.A.
PLURICANAL LEIRIA– Televisão por Cabo, S.A.
PT PRIME – Soluções Empresariais de Telecom. e Sistemas, S.A.
REFER TELECOM – Serviços de Telecomunicações, S.A.
SONAECOM – Serviços de Comunicações, S.A
TVTEL Comunicações, S.A.
UNITELDATA – Telecomunicações, S.A.
VERIZON Portugal, Sociedade Unipessoal, Lda.

Source: ICP-ANACOM.

Internet Access Service Providers – other technologies (fixed)
Table 5.7

AR Telecom – Acessos e Redes de Telecomunicações, S.A.
BROADNET Portugal, S.A.
CLARA.NET Portugal – Telecomunicações, S.A.
COLT Telecom – Serviços de Telecomunicações, Unipessoal, Lda.
FLEXIMEDIA – Serviços e Meios Inf. e Comunicação, Lda.
EQUANT Portugal, S.A. (Orange)
GLOBAL CROSSING PEC Espana S.A.
HSIA Hospitality Services Portugal, S.A.
NFSI – Soluções Internet, Lda.
NORTENET – Sistemas de Comunicação, S.A.
ONITELECOM – Infocomunicações, S.A.
PT PRIME – Soluções Empresariais de Telecom. e Sistemas, S.A.
PT Comunicações, S.A.
REFER Telecom – Serviços de Telecomunicações, S.A.
ROBOT – Telecomunicações, Projectos e Serviços, Lda.
SONAECOM – Serviços de Comunicações, S.A
TMN – Telecomunicações Móveis Nacionais, S.A.
VERIZON Portugal, Sociedade Unipessoal, Lda.
VODAFONE Portugal – Comunicações Pessoais, S.A.

Source: ICP-ANACOM.

It is worth pointing out that, besides the mentioned providers, operators with national licenses for the International Mobile Telecommunications Systems (IMT2000/UMTS) are also active) are also active.

MTS providers
Table 5.8

Optimus Telecomunicações, S.A.
TMN – Telecomunicações Móveis Nacionais, S.A..
Vodafone Portugal – Comunicações Pessoais, S.A.

Source: ICP-ANACOM.

Already in 2009, new mobile broadband offers were released by ZON Group.

The structure of the (fixed) Internet Access

Several operations took place or were announced during the latest years that affected the structure of these services' offer.

On one hand, PT Multimédia's (TV Cabo/ZON) spin-off, promoted by PT Group, took place, still in 2007, following an unsuccessful public purchase offer launched by Sonaecom over PT. On the other hand, there was the acquisition of Tele 2 and of Onitelecom's residential business by Sonaecom.

As a result of the above-mentioned spin-off, which took place in November 2007, PT Group's broadband customer share reached 40 per cent, 30.6 per cent less than a year before (if the spin-off effect was not considered, PT Group's share would have decreased 4.1 per cent in 2007).

In 2008 a ZON Multimédia acquired the companies of Parfitel Group (Bragatel, Pluricanal Leiria and Pluricanal Santarém), as well as TV Tel, under the above-mentioned terms.

PT Group's broadband customer shares
Table 5.9

	2004	**2005**	**2006**	**2007**	**2008**
ADSL access customers	90.8%	83.8%	73.7%	68.3%	71.7%
Cable modem access customers	73.6%	70.8%	66.7%	0.0%	0.0%
Other access technologies customers	44.9%	45.3%	19.7%	6.9%	3.6%
Total customers	**82.0%**	**78.2%**	**70.9%**	**40.3%**	**41.6%**

Source ICP-ANACOM.

After the spin-off, the incumbent operator's share in Portugal became lower than the European average (46 per cent in 2007 and 2008).

Access shares of the incumbent operator in the Internet Access Service using broadband in the EU27 during the 4th quarter of 2008
Graph 5.7

Unit: %
Source: European Commission, Progress report on the single European market in electronic communications in 2008 (14th Report).
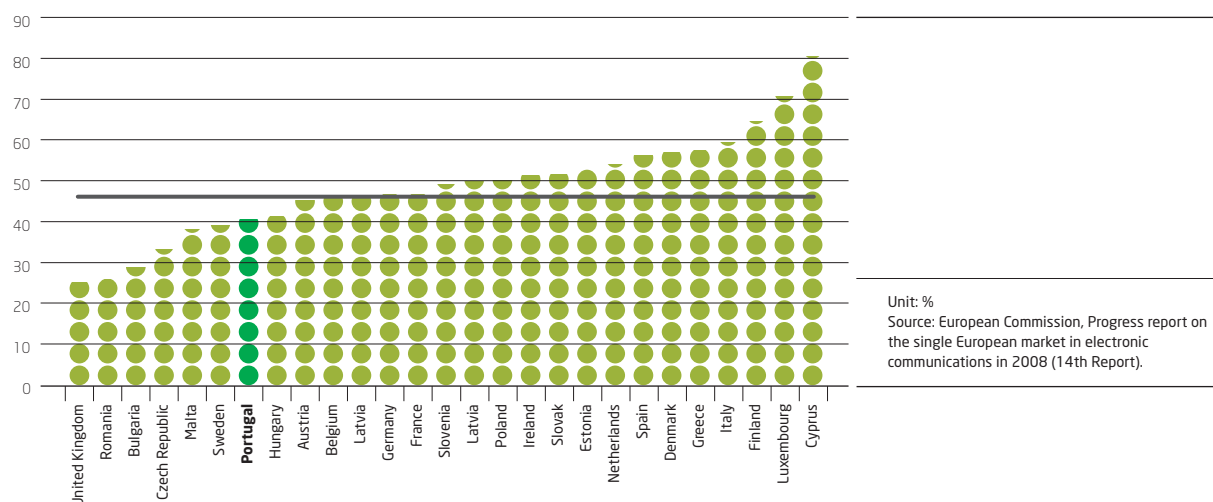
PT Group's share has not been constant over time. At a first stage, broadband was provided over cable modem, a period when Cabovisão and TV Cabo were the main operators. Further to the launch of ADSL, PT Group achieved an even greater predominance: PT Group's customer share increased about 16 per cent between 2001 and 2004.

This trend reversed in 2005, due to ICP-ANACOM's interventions in the Internet access wholesale offers, namely in LLU. About 69 thousand broadband loops were unbundled in 2005. In 2006 the amount was about 120 thousand, in 2007 there were about 95 thousand, and in 2008 there were 13 thousand new unbundled broadband loops. At the end of that year, the cumulative amount of unbundled broadband loops was 196 thousand unbundled accesses – about 30 per cent of all ADSL accesses. By using this means, new operators reached consumer's households directly and developed more competitive voice and broadband offerings.

**Evolution in the number of unbundled broadband accesses
Graph 5.8**

Unit: thousand accesses.
Source: ICP-ANACOM.
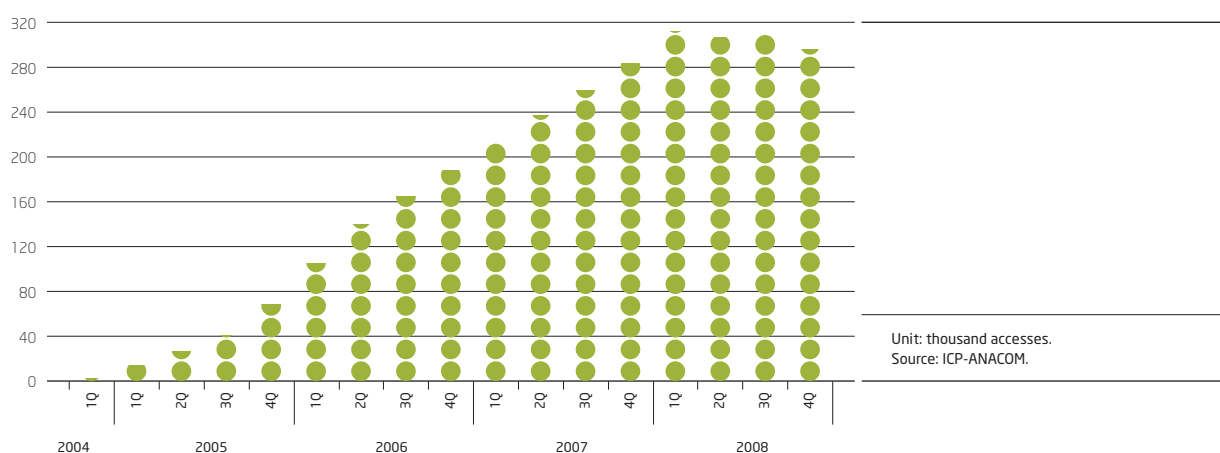
At the same time, the increasing coverage of the Rede ADSL PT wholesale offer (bitstream access) contributed, together with other factors, to a strong increase in broadband penetration, as well as to the launch of new offerings with higher bit rates. Rede ADSL PT stands for about 78 per cent of all ADSL accesses

During 2008, evolution in the customer shares of the several market operators had considerable changes.

Due to the acquisition of the Parfitel Group companies and of TV Tel, and to the own activity of the previously existing business units, ZON/TV Cabo's customer share increased 4.8 per cent versus 2007. On the other hand, the merger of PT.Com – Comunicações Interactivas, S.A. (PT.Com) with PT Comunicações, changed the distribution of shares within the PT Group.

Sonaecom, after a 6.4 per cent increase in 2007, suffered a considerable reduction in its market share, of about 4 per cent, during 2008.

Evolution in broadband access customer shares
Table 5.10

Service providers	2007	2008
PT Group	**40.3%**	**41.6%**
PT.COM	38.4%	–
TV Cabo	–	–
PT Prime	0.5%	0.5%
CaboTV Madeirense	–	–
CaboTV Açoreana	–	–
PT Wi-Fi	0.1%	0.1%
PT Comunicações	1.3%	41.0%
ZON Multimedia Group	**26.5%**	**31.3%**
TV Cabo/ZON	24.2%	26.5%
CaboTV Madeirense	1.6%	1.6%
CaboTV Açoreana	0.5%	0.8%
TVTel	–	1.7%
Bragatel	–	0.4%
Pluricanal Leiria	–	0.2%
Pluricanal Santarém	–	0.1%
Alternative Providers	**33.2%**	**27.1%**
Cabovisão	10.9%	9.3%
Sonaecom	16.4%	12.5%
Sonaecom	15.6%	11.9%
Tele2	0.8%	0.6%
AR TELECOM	1.1%	1.5%
TV TEL	2.0%	–
Vodafone	0.9%	2.8%
ONITELECOM	0.4%	0.1%
Other alternative providers	1.5%	0.9

Source: ICP-ANACOM.

Thus there are 4 entities with significant shares operating in the (fixed) broadband Internet access service markets: PT Group, Cabo TV/ZON Group, Sonaecom and Cabovisão.

The following graph presents the evolution of quarterly marginal shares of fixed broadband access subscribers.

According to the available data, during the 4th quarter of 2008 and in net terms, about 77 per cent new fixed broadband customers[90] subscribed the services of PT Group operators, particularly due to the expansion connected to PT Comunicações' MEO service.

Evolution in fixed broadband subscriber quarterly marginal shares
Graph 5.9

Legend: PT Group; Alternative providers

Year	Quarter	PT Group	Alternative providers
2001	2Q	68.1	31.9
2001	3Q	65.7	34.3
2001	4Q	58.3	41.7
2002	1Q	58.1	41.9
2002	2Q	74.1	25.9
2002	3Q	71.7	28.3
2002	4Q	81.6	18.4
2003	1Q	83.1	16.9
2003	2Q	89.6	10.4
2003	3Q	84.8	15.2
2003	4Q	87.4	12.6
2004	1Q	87.9	12.1
2004	2Q	86.7	13.3
2004	3Q	93.9	6.1
2004	4Q	83.9	16.1
2005	1Q	85.6	14.4
2005	2Q	64.1	35.9
2005	3Q	66.4	33.6
2005	4Q	60.0	40.0
2006	1Q	37.1	62.9
2006	2Q	27.3	72.7
2006	3Q	44.0	56.0
2006	4Q	54.1	45.9
2007	1Q	52.0	48.0
2007	2Q	47.2	52.8
2007	3Q	53.2	46.8
2007	4Q	100.0	100.0
2008	1Q*	10.0	90.0
2008	2Q	57.8	42.2
2008	3Q*	100.2	-0.2
2008	4Q	77.4	22.6

Unit: %
Source: ICP-ANACOM.

Note: During the 4Q07 there was an overall decrease in the number of broadband customers, while the alternative operators (overall and in net terms) were the only ones contributing to the increase in the number of customers, in net terms. A similar situation occurred during the 3T08, although both types of operators inverted their roles.

Analysing the evolution of market shares by access technology shows that, in spite of the alternative providers' growth in ADSL, in 2008, PT Group continued to increase its customer share for this access technology, which is mainly explained by the evolution of the MEO service. In 2008, PT Group's ADSL customer share increased 3.5 per cent, giving it a 71.7 per cent share.

[90] These new customers correspond to new contracts from providers in net terms, and not necessarily to new customers to the service (i.e. these new customers may have previously been customers of another provider).
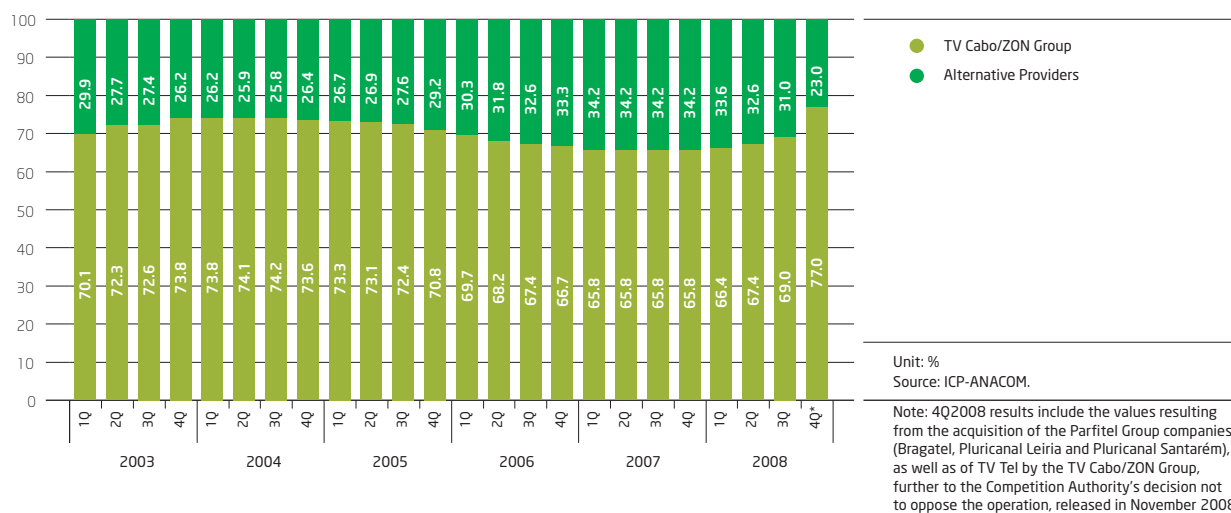
Evolution in ADSL access subscriber shares
Graph 5.10

Unit: %
Source: ICP-ANACOM.
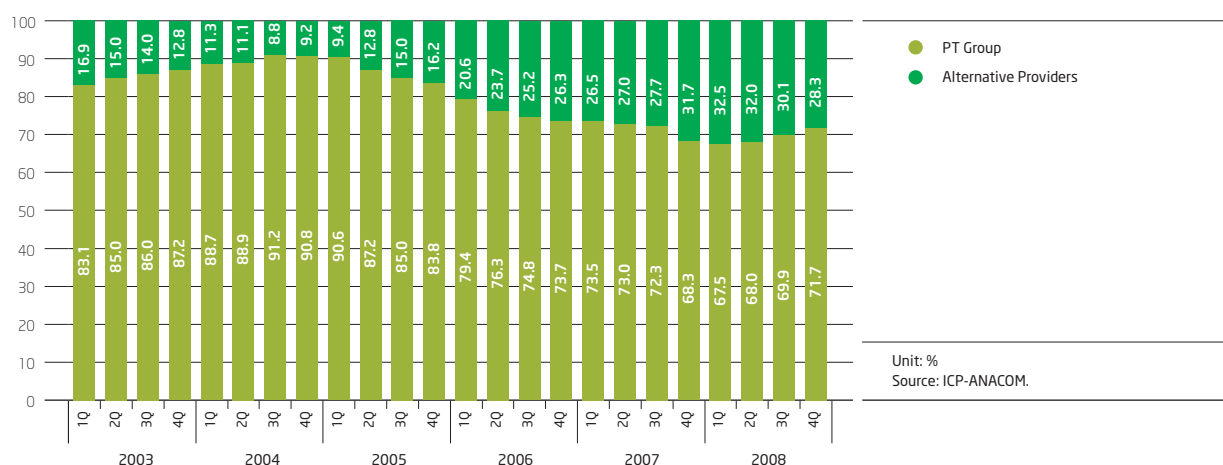
The competitive position of the companies operating this technology has, however, had rapid changes since the beginning of 2005. During this period, PT Group's share decreased 16 per cent, and during 2007 about 50 per cent of new customers chose the services of alternative operators. However, this trend reversed on the 2nd quarter of 2008.

Concerning cable modem access, ZON Group's share in 2008 recorded the largest growth, 11.2 per cent more than at the end of the previous year, of which 6 per cent resulted from the acquisitions made during this year.

Evolution in cable modem access subscriber shares
Graph 5.11

Unit: %
Source: ICP-ANACOM.

Note: 4Q2008 results include the values resulting from the acquisition of the Parfitel Group companies (Bragatel, Pluricanal Leiria and Pluricanal Santarém), as well as of TV Tel by the TV Cabo/ZON Group, further to the Competition Authority's decision not to oppose the operation, released in November 2008.

It should be noted that with the acquisitions of the Parfitel Group companies and of TV Tel, ZON Group now competes in this technology with only two operators, one of them being Cabovisão, which has been loosing its share and customers.

Concerning dial-up, PT Group's share at the end of 2008 reached about 72 per cent, 11 per cent more than in 2007. This share's increase mainly reflects the fast reduction in the amount of customers of this type of access (58 per cent less in regards to 2007), and the operators' stake on (Local Loop Unbundling) LLU-based business models.

Optical fibre starts to show as an alternative technology in regards to ADSL and cable modem, while PT Group's share was only 14 per cent at the end of 2008. In this technology, Sonaecom is responsible for 47 per cent of the market.

Regarding other technologies – namely leased lines and FWA – PT Group's share has considerably decreased. In fact, these accesses' small amount, together with the considerable growth of FWA, implies that currently PT Group's share is only 2.6 per cent.

The evolution of the existing commercial offers in Portugal during 2008
The Internet Access Service offer is characterized by diversity, concerning technologies, transmission speeds, and the offers' dynamics. During 2008, operators modified their offers by decreasing the prices of the existing offers or upgrading the provided speeds.
Multiple play bundle offers have proliferated.

Evolution occurred in fixed-location offers
Regarding offers at a fixed location, by the end of 2008 there were around 120 different offers, slightly less that the figure recorded in the previous year.

In 2008, Internet access was mainly provided via access modes ADSL, cable modem access and access via 3rd generation mobile networks.

As shown on the following graph, the number of offers using cable modem became the majority among the fixed-location access offers. This is the net result of the rearrangement of the offers of the several operators and providers, including the consolidation of the offer by a few smaller-sized ADSL providers.

Number of broadband offers available in Portugal by the end of each year
Graph 5.12

Unit: %
Source: ICP-ANACOM.

The
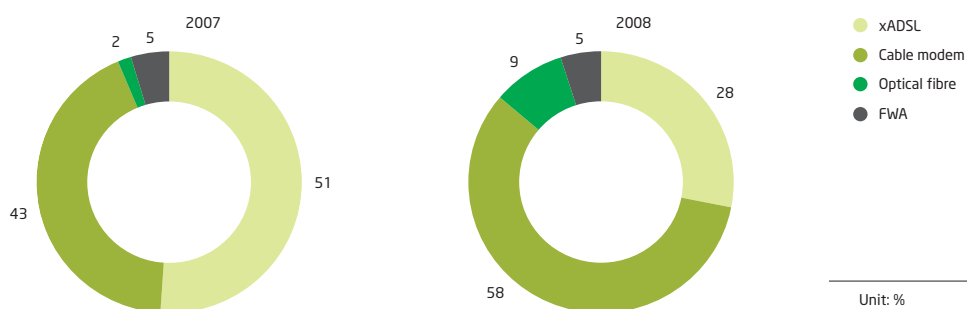
Concerning the broadband Internet access offers using cable modem, some operators also upgraded their networks by installing the EuroDOCSIS 3.0 standard, which enables download speeds similar to the speeds of the commercial offers that use optical fibre. The commercial launch of the offers using EuroDCOSIS 3.0 happened already in early 2009.

On the other hand, by initiative of alternatives providers, new retail offers were released for Internet access using optical fibre. This type of offers recorded a considerable growth, standing for 9 per cent of all broadband offers available at the end of the year.

The number of broadband offers included in multiple play bundles also increased. Broadband offers included in bundles increased 37 per cent, now representing 56 per cent of the overall amount (during the previous year this type of offers represented about 39 per cent). About 1 in each 4 broadband offers is included in triple-play offers.

Number of broadband offers available in Portugal within bundles
Graph 5.13

Unit: %
Source: ICP-ANACOM.
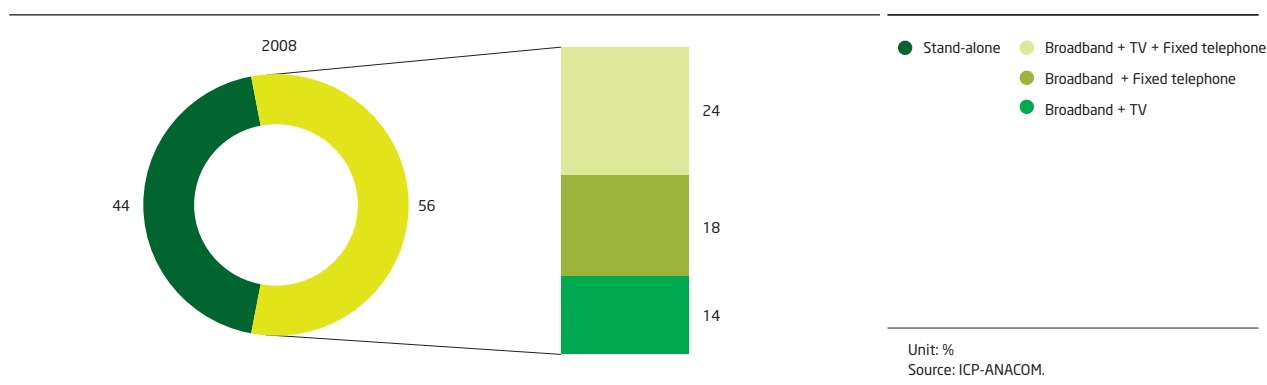
Regarding download speeds, there were major modifications in the main speeds available. The main speeds available in 2007 were 2 Mbps and 8 Mbps, At the end of 2008, the main speeds were 4 Mbps and 18 Mbps.

Distribution of fixed broadband offers by transmission speed in Mbps
Graph 5.14

Unit: %
Source: ICP-ANACOM.
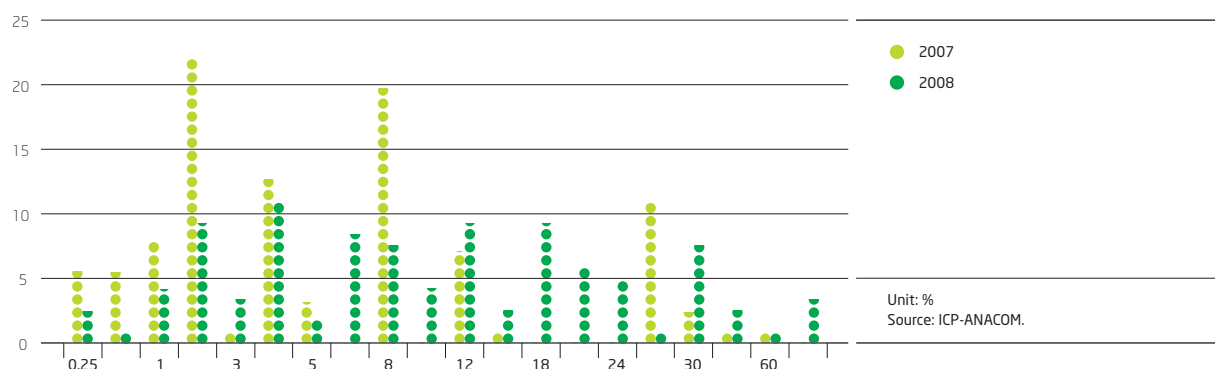
On the other hand, the information available seems to suggest there were upgrades in the speeds provided by the operators. For example, the previous 2 Mbps offers would now be 6 Mbps, and the 8 Mbps would now be 18 Mbps.

Variation rate of the number of fixed broadband offers per download speed in Mbps
**Graph 5.15**
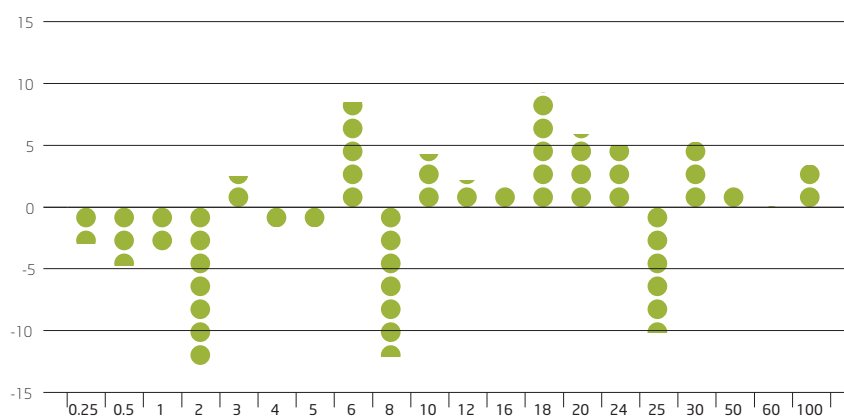
Source: ICP-ANACOM.

The number of offers with speeds equal to or above 18 Mbps also increased. The offers with higher transmission speeds are based on optical fibre or co-axial cable using EuroDOCSIS 3.0 (as from 2009).

The following graph presents the offer intervals available in the EU countries belonging to the OECD, in terms of download speeds. Only 4 of the countries under consideration continue to provide speeds below 512 kbps.

In most countries, the lowest speed offers are at least 1 Mbps.

Fixed broadband speed intervals advertised by providers, in September 2008
Graph 5.16
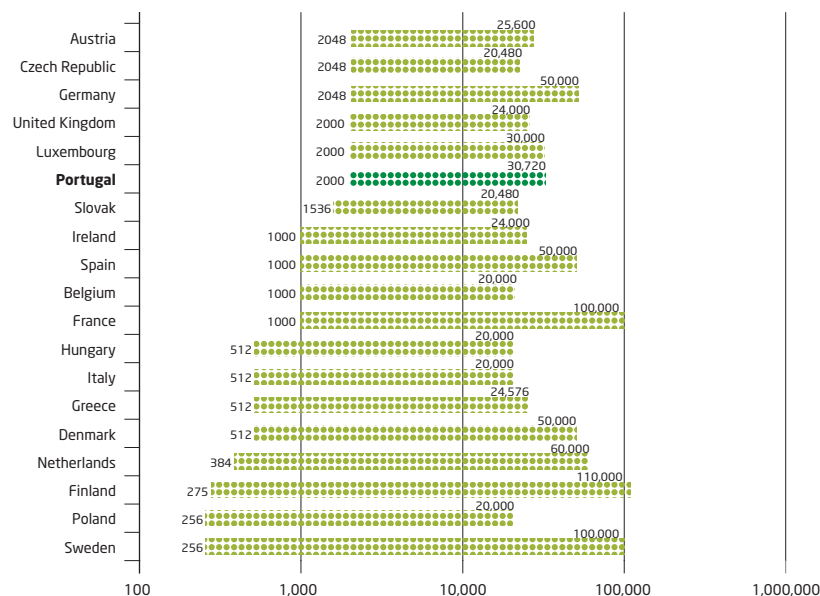
Unit: kbps
Source: OCDE, Communications Outlook 2008.

Regarding upstream speeds in Portugal, the maximum theoretical speeds advertised increased, the 1 Mbps speed being the most common.

Lastly, it should be referred that about 27 per cent of broadband offers did not include traffic.

Evolution occurred in mobile broadband offers

The number of mobile broadband offers increased between mid-2007 and the end of 2008. However, it represents about 10 per cent of all fixed broadband offers.

The maximum download speeds provided suffered considerable upgrades. By the end of 2008, the maximum download speed offered was 7.2 Mbps and the lowest speed was 1 Mbps. In mid 2007, the maximum speed was 3.6 Mbps while the minimum was 384 Kbps.

Mobile broadband offers available in Portugal per maximum download speed
Graph 5.17

2007

2008

- 384 Kbps
- 640 Kbps
- 3,6 Mbps
- 1 Mbps
- 2 Mbps
- 4 Mbps
- 7,2 Mbps

Unit: %
Source: ICP-ANACOM.
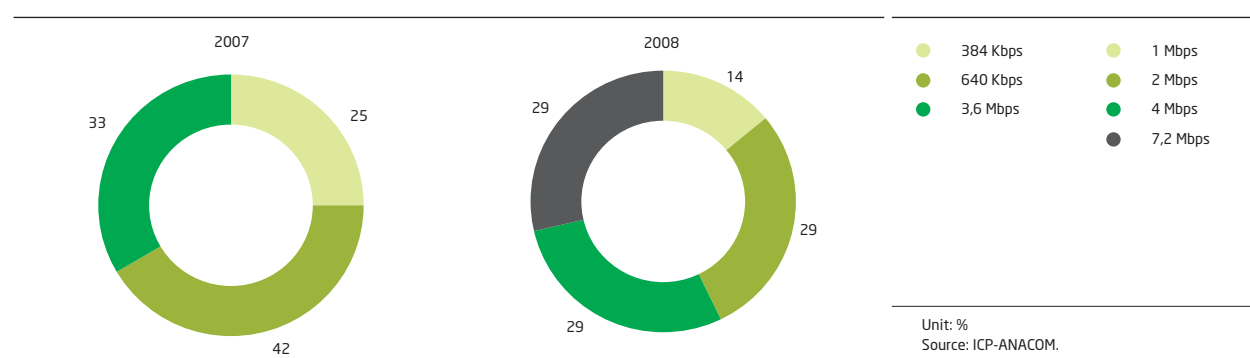
The implementation of HSUPA was announced at the end of 2007, which already had an impact on the increase of upload speeds during 2008. The maximum upload speed advertised in 2008 was 1.4 Mbps.

The following graph presents the offer intervals available in the EU countries belonging to the OECD, in terms of upload speeds. Only 4 of the countries under consideration continue to provide speeds below 1 Mbps.

In most countries, the lowest speed offers are at least 1 Mbps, and the maximum limits are 7.2 Mbps.

Mobile broadband speed intervals advertised by providers, in September 2008
Graph 5.18

Unit: kbps
Source: OCDE, Communications Outlook 2008.
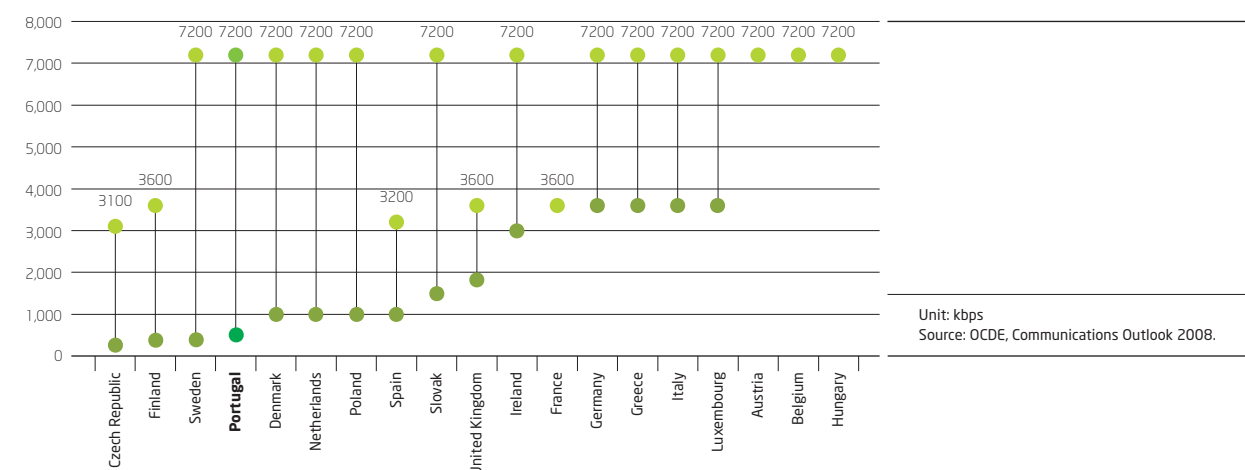
Regarding traffic limits, the advertised limits continue to stand in the 1 GB to 6 GB interval, with some adjustments having been made in the offers. Offers with 6 GB limits are now the majority.

The average traffic included in the mobile broadband offers in 7 European countries is only of 4.7 GB per month, while for fixed broadband this value is 27 GB, among 11 countries.

Average traffic included in mobile broadband offerings, per country
Graph 5.19

Unit: MB
Source: OCDE, Communications Outlook 2008.

Within the scope of mobile broadband, tests were announced and launched already in 2009 regarding HSPA+, which used the most recent 64QAM (Quadrature Amplitude Modulation) modulation techniques, enabling mobile Internet browsing at a theoretical speed up to 21.6 Mbps. Maximum theoretical speeds may reach 28.8 Mbps with the MIMO (Multiple Input Multiple Output) feature, which uses several antennas on base stations and on data equipment.

Femtocells tests were also announced, making it possible to amplify the communications signal indoors, by using equipment placed on the customers' premises.

Broadband Internet Access Service price level
Regarding the price level of fixed broadband, we following present international comparisons for minimum broadband monthly fee, typical broadband offer monthly fee (with the largest number of subscribers), incumbent operators' offers, and bundle offers.

The elaboration and reckoning of a broadband price index presents some difficulties, not only due to the large number of variables involved (connection prices, monthly fees, usage prices, traffic limits, offers with different download and upload speeds, offers with different services and features including multiple play, the numerous promotions and discounts, many operators, different coverage levels, different access platforms, different quality of service levels, etc...), but also due to the permanent update of the offers and the difficulty to draw a usage profile that represents the consumption of several types of users. There is an added complexity to this process when considering international comparisons, due to the difficulty in collecting comparable information and to issues related to the possible use of purchasing power parities.

The complexity of this process implies the definition of simplified hypotheses which may bias the final result.

Therefore, on this Chapter, we chose to present several international comparison studies, with different methodologies and promoters, thus trying to eliminate the biases that may be contained in some of the individual studies.

Minimum broadband monthly fee
Regarding the price level of fixed broadband and according to the available information[91]:

• In June 2008, the minimum broadband price in Portugal stood about 6 per cent above the average of the considered countries. It was similar to the minimum price charged in the Netherlands and in France, although it stood above the prices charged in Germany, Italy end Belgium. The null price offered by provider Sky broadband (United Kingdom) to its TV service customers should be noted. If this offer were not considered, the price charged in Portugal would stand below the average. The minimum price charged by the incumbent operator in Portugal was the 3rd lowest one.

(It should be mentioned that these offers do not necessarily have the same download speeds, and it's possible that lower prices correspond to lower speeds).

Minimum broadband monthly fee – June 2008
Table 5.11

Country	Minimum price		Minimum price – Incumbent. operator	
	Price	Ranking	Price	Ranking
Germany	8,53	4	15,03	2
Austria	14,58	10	24,92	13
Belgium	11,56	6	16,53	6
Denmark	10,62	5	16,52	3
Spain	18,90	13	18,90	10
France	12,46	8	20,82	11
Netherlands	12,61	9	16,76	7
Ireland	15,66	11	16,52	3
Italy	8,29	2	8,29	1
Luxembourg	17,30	12	22,61	12
Portugal	**12,31**	**7**	**16,52**	**3**
United Kingdom	0,00	1	17,21	9
Sweden	8,41	3	16,91	8
Total/Average Portugal excluded	**11,58**		**17,58**	
% deviation of Portugal versus average	**6.4%**		**-6.1%**	

Unit: Euros VAT excluded
Source: ICP-ANACOM.

[91] Sample made up of 621 offers by ISP of 13 EU15 countries. This analysis did not include Greece, due to the low implementation of the service in this country, and Finland, due to difficulties in collecting data. For each of the analyzed countries, the ISPs standing for at least 70-80 per cent of the market were identified. This was made further to consultation of European Commission documents, national regulators' sites, reports and accounts of some operators and press articles. In some cases, the ISPs' market shares were impossible to determine and Internet search engines were then used. All items of the selected offers were collected. However, it was assumed that the decision to join broadband would be incremental (i.e. the cable modem broadband subscriber already has CATV, the ADSL broadband subscriber already is a FTS customer, etc.), and that the new subscriber would pick the options that would lower its monthly fee (i.e. if there are discounts for payment by wire transfer, the subscriber would chose to pay by wire transfer). During the result reckoning procedure, offerings with downstream bit rates below 256 kbps and were excluded. It should be mentioned that the results presented regard only the monthly subscription fee (non-promotional figures).Besides discounts and promotions, the survey also did not take into account the following variables: installation and subscription prices; equipment prices (not included in the offering), traffic limits; upstream bit rate, number of mailboxes, space for mailbox, space for own site, software offers, equipment offers (e.g. MP3 player); offer of multimedia applications; training courses; offers linked to PC sales. The data collection procedure was carried out in June 2008.
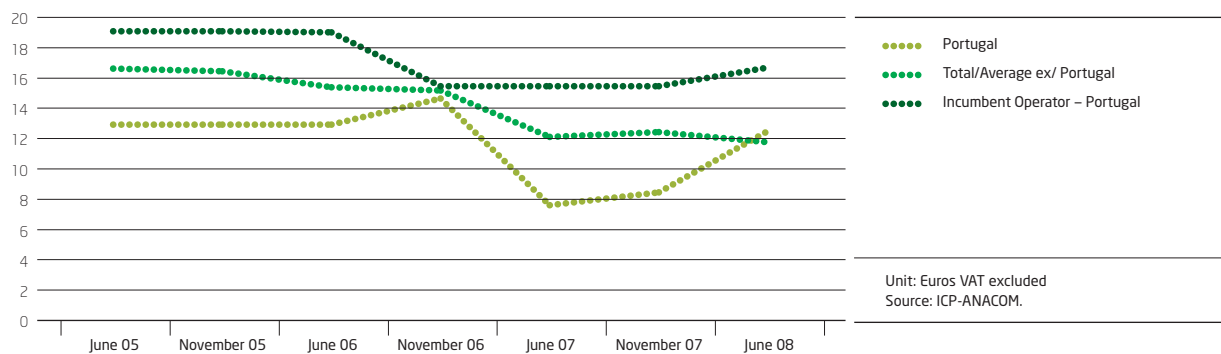
- During the two latest years there was a decreasing trend of the minimum broadband prices in the countries under review. In Portugal however, after a drop in June 2007, minimum prices recorded an increase.

Initially, the lowest minimum price charged in Portugal was of different offers by the same alternative operator, using cable modem. In November 2006 this operator terminated its 1 Mbps offer (considered the minimum price offer in June 2006) and created a new 2-Mbps offer, and for this reason, the minimum price in Portugal had a slight increase. By June 2007, this operator launched a lower bit rate offer, at lower prices, which was terminated in November 2007. In the meantime, the operator that provided the offer with the lowest monthly fee in November 2007 made a considerable upgrade to its offers, and adjusted the prices accordingly.

Therefore, the minimum broadband monthly fee is now above 12 Euros, which caused the price increase shown on the following graph. This is, however, a 4 Mbps offer – above the speeds previously considered -, and with a larger geographic coverage.

Evolution in the (fixed) Broadband Monthly fee
Graph 5.20

Portugal
Total/Average ex/ Portugal
Incumbent Operator – Portugal

Unit: Euros VAT excluded
Source: ICP-ANACOM.

- Considering the average of the minimum prices charged by the several ISP for the several transmission speeds, Portugal stands above the average for the offers with maximum download speeds of 1 Mbps, 8Mbps and 24 Mbps.

Average of minimum broadband prices per access speed – November 2008
Table 5.12

Country	256 Kbps		1 Mbps		2 Mbps		4 Mbps		8 Mbps		24 Mbps	
Germany	-		12.78	1	16.77	2	32.24	7	-		-	
Austria	-		-		18.18	4	49.92	8	23.25	3	-	
Belgium	-		16.50	3	26.07	9	24.91	4	29.75	6	22.29	1
Denmark	15.59	3	17.95	5	21.80	7	25.21	5	37.43	10	-	
Spain	-		24.74	8	28.00	10	-		-		-	
France	-		20.82	7	-		-		27.09	5	-	
Netherlands	-		-		-		21.61	2	47.58	11	50.42	3
Ireland	-		18.69	6	25.19	8	71.86	9	35.12	9	-	
Italy	-		-		-		-		20.79	2	-	
Luxembourg	-		-		20.90	6	23.43	3	34.13	8	-	
Portugal	13.97	2	25.12	9	17.86	3	18.47	1	29.81	7	50.50	4
United Kingdom	-		16.13	2	10.40	1	25.83	6	14.38	1	-	
Sweden	12.03	1	16.91	4	18.95	5	-		23.37	4	27.11	2
Average ex/ Portugal	**13.81**		**18.07**		**20.70**		**34.38**		**29.29**		**33.27**	
% deviation of Portugal vs. average	**1.2%**		**39.0%**		**-13.7%**		**-46.3%**		**1.8%**		**51.8%**	

Unit: Euros VAT excluded
Source: ICP-ANACOM.

Monthly fee of the typical broadband Internet access offer

According to the available information, the 8 Mbps offers were the most used in Portugal, by June 2008. As shown, the average monthly fee of the 8 Mbps offers in Portugal is about 2.5 per cent above the average of the considered countries.

8 Mbps monthly fees in June 2008
Table 5.13

Country	Minimum monthly fee	Average	Maximum monthly fee
Germany	–	–	–
United Kingdom	5.38	15.07	21.53
Italy	16.63	20.79	24.96
Austria	21.58	23.25	24.92
Sweden	19.46	23.71	27.11
France	25.00	27.09	29.18
Portugal	**20.65**	**29.67**	**45.37**
Belgium	29.75	29.75	29.75
Luxembourg	32.87	34.65	34.87
Ireland	35.12	35.12	35.12
Denmark	33.14	37.43	41.72
Netherlands	33.57	41.97	67.18
Spain	–	–	–
Average Portugal excluded	**25.25**	**28.89**	**33.63**
% deviation of Portugal vs. average	**-16.8%**	**2.5%**	**30.7%**
Ranking	**4**	**6**	**10**
No. of countries	**11**	**11**	**11**

Unit: Euros VAT excluded
Source: ICP-ANACOM.

Considering the variation interval[92] and the average of the 8 Mbps offerings in the considered countries, it can be concluded that only the maximum monthly fee charged in Portugal was above the average European levels.

[92] The variation interval shown does not take into account all prices in force in one country for each bit rate class, but only those of each ISP which are more competitive in a given country. More expensive offerings including extras (e.g. upload speeds or higher traffic limits), which could bias the results, are thus excluded.

Average variation interval of the 8 Mbps offering prices
Graph 5.21

Legend:
- Minimum monthly fee
- Average
- Maximum monthly fee

Unit: Euros per month (VAT excluded)
Source: ICP-ANACOM.
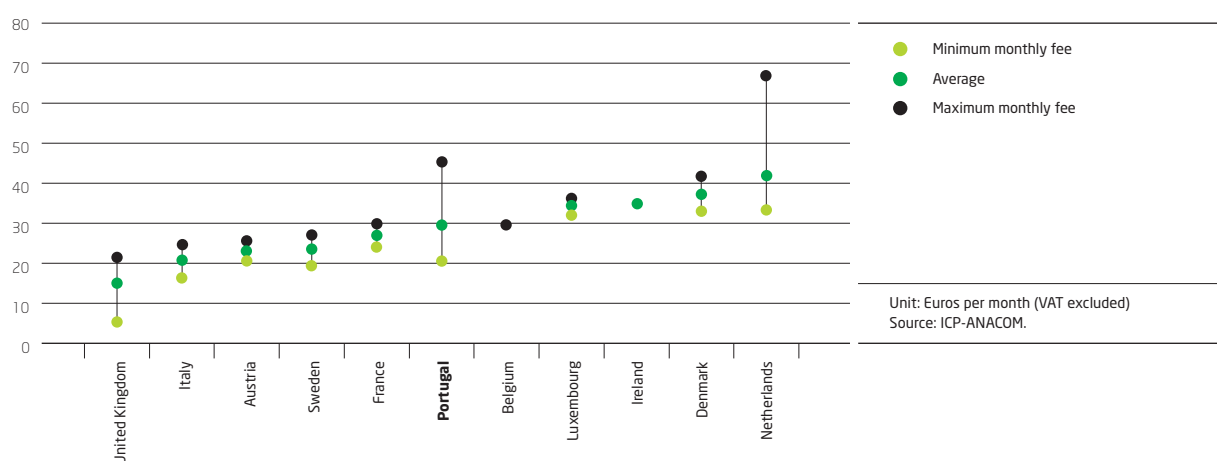
Between June 2005 and June 2008, the price of the 8 Mbps offers in Portugal, decreased about 36 per cent.

Price of the broadband Internet access service per usage profile

On the other hand, a study promoted by the European Commission in September 2008[93] compares the prices of broadband access within the EU countries. Monthly fees are grouped into 7 usage profiles.

Usage profiles used in the study promoted by the European Commission
Table 5.14

Baskets	Standardization parameters	
	Data volume (GB)	Hours/month
1. 144-512 Kbps (incl.)	1	20
2. 512-1024 kbps (incl.)	1	20
3. 1024-2048 kbps (incl.)	2	20
4. 2048-4096 kbps (incl.)	10	20
5. 4096-8192 kbps (incl.)	30	20
6. 8192 Kbps-20 Mbps (incl.)	30	20
7. 20 Mbps +	20	20

Source: European Commission, Broadband Internet Access Cost.

[93] European Commission, Broadband Internet Access Cost (BIAC) – Study carried out with offers available in April.

Prices are reckoned with PPP and include other costs beside the monthly fee, such as the installation costs, modem or router, and activation costs. Temporary discounts and promotions are not taken into account, namely the discounts for electronic invoicing and bank transfer.

For transmission speeds between 4 Mbps-8 Mbps, the interval including the offers most used in Portugal, the study promoted by the Commission analysed each country's minimum price offers, within the speed interval.
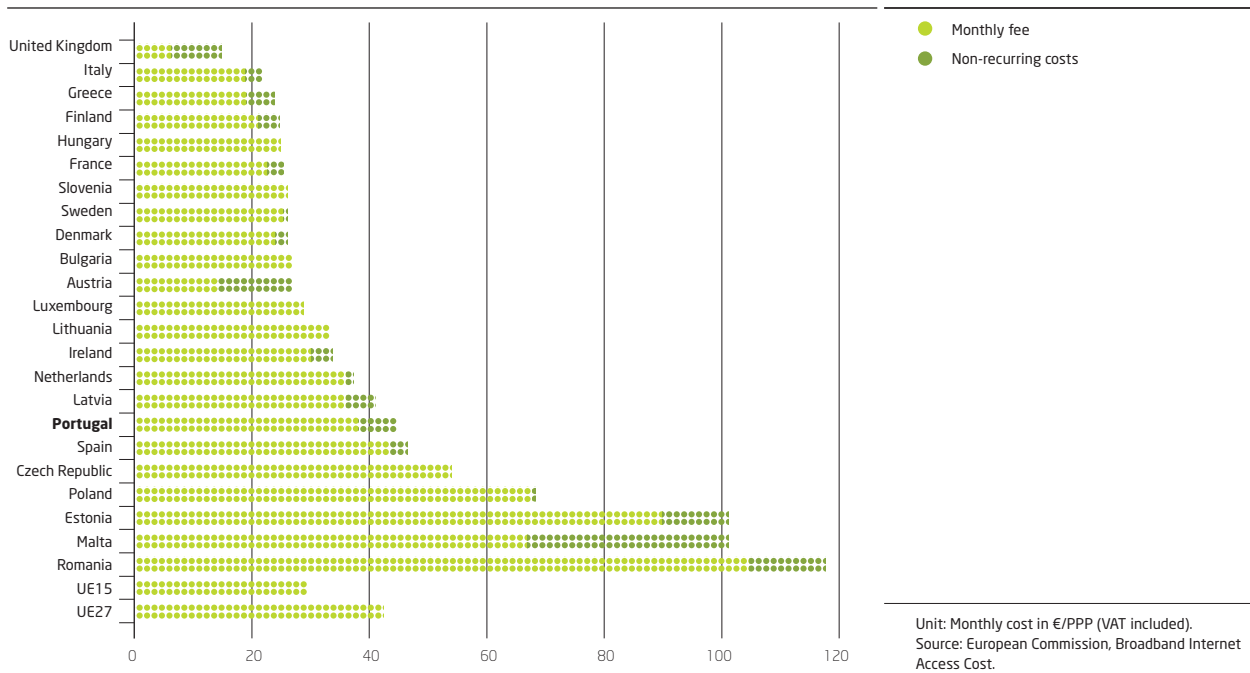
It should be noted that according to this study's methodology, the minimum price offer corresponds to the offer within a given speed interval. Even if there are lower price offers with speeds above the interval, they are not considered.

The offer considered for Portugal corresponds to a ZON offer, with a transmission speed of 6 Mb and unlimited traffic.

As shown on the following graph, Portugal stands slightly above the EU27 average and about 52 per cent above the UE15 average.

Cheapest offers: "4096-8192 (incl.) basket, 30 GB
Graph 5.22

Unit: Monthly cost in €/PPP (VAT included).
Source: European Commission, Broadband Internet Access Cost.

Note: The United Kingdom's offer corresponds to an offer provided exclusively to Sky television customers. However, it was included in this study due to this ISP's high market share. Belgium, Cyprus, Germany and Slovak have no offers within the speed interval.

Non-recurring costs were omitted in 8 countries, which could change Portugal's ranking, since about 15 per cent of ZON offer's price corresponds to this type of cost (service activation and installation of the *netcabo* kit).

Incumbent operator's offers
Considering the importance that incumbent operators continue to have in terms of customer share and of the geographic availability of the service, the prices charged by PTC were compared with the offers of the other countries' incumbent operators, by access speed.

PTC's offers in September 2008
Table 5.15

Download/Upload (Kbps)	Monthly fee (€ VAT excluded)
256 / 128	(Tariff by minute)
2048 / 128	19.82
6016 / 512	24.70
16000 / 1024	35.28
24000 /1024	39.99

Source: ICP-ANACOM.

The study carried out by ICP- ANACOM shows that, contrary to the 2 Mbps and 6 Mbps offers, which present considerably low prices, the 8 Mbps, 16 Mbps and 24 Mbps offers stand above the average. However, it should be underlined that PTC's 8 Mbps offer is a Triple Play offer, while the offers considered in Denmark, Luxembourg and the United Kingdom only include Internet access.

Incumbent operator's minimum broadband monthly fees – June 2008
Table 5.16

Country	2 Mbps	6 Mbps	8 Mbps	16 Mbps	24 Mbps
Germany	17,68	22,10		26,53	
Austria	24,92		24,92		
Belgium	26,07				
Denmark	20,81	31,00	33,14		
France			25,00		
Netherlands		42,02	67,18		
Ireland	24,79				
Luxembourg	22,61		34,87		
Portugal	**16,52**	**20,58**	**45,37**	**29,40**	**45,04**
United Kingdom			17,21		
Sweden	19,46		23,71		27,96
% deviation of Portugal vs. average	**-26,0%**	**-35,1%**	**40,5%**		
Ranking	**-1 / 8**	**1 / 4**	**7 / 8**		

Unit: Euros VAT excluded
Source: ICP-ANACOM.

Considering the basic information used by Teligen (T-Connect) and comparing exclusively the monthly fees of the several PTC offers in September 2008[94] with similar offers of the EU15's incumbent operators, it is possible to conclude that the monthly fees of the 5 speeds under consideration stand below the average.

[94] All other variables affecting the price of the broadband offers, besides the download speed, were excluded

Residential ADSL monthly fee – incumbent operator
Table 5.17

Country	2 Mbps	6 Mbps	16 Mbps	24 Mbps
Austria	24.92			
Denmark	25.00	37.88		
Finland	26.98			40.16
Germany	25.63	29.94	34.25	
Greece	12.60			15.23
Luxembourg	4.35			
Portugal	16.38	20.41	29.16	33.05
Sweden	22.38			31.01
Average Portugal excluded	**20.26**	**33.91**	**34.25**	**28.80**
Portugal deviation from average	**-19%**	**-52%**	**-52%**	**-43%**

Unit: Euros VAT excluded
Source: ICP-ANACOM.

The monthly fee of the 6 Mbps offer is below the average and is lower than most monthly fees for 4 Mbps offers (not shown in the table), and even lower than 2 Mbps.

The price of the 16 Mbps offer is below the average. However, there are higher speeds offers (20 Mbps, 24 Mbps) in countries such as Greece and Italy, with lower monthly fees.

Prices of Internet access offers within bundles
The previously mentioned European Commission study analyses the prices of the Internet access offers included in bundles, namely in double-play bundles: Internet + fixed telephone and Internet + television; and triple-play: Internet + fixed telephone + television.

The study considers bundles to be all services offered and which originate a single invoice for the customer.
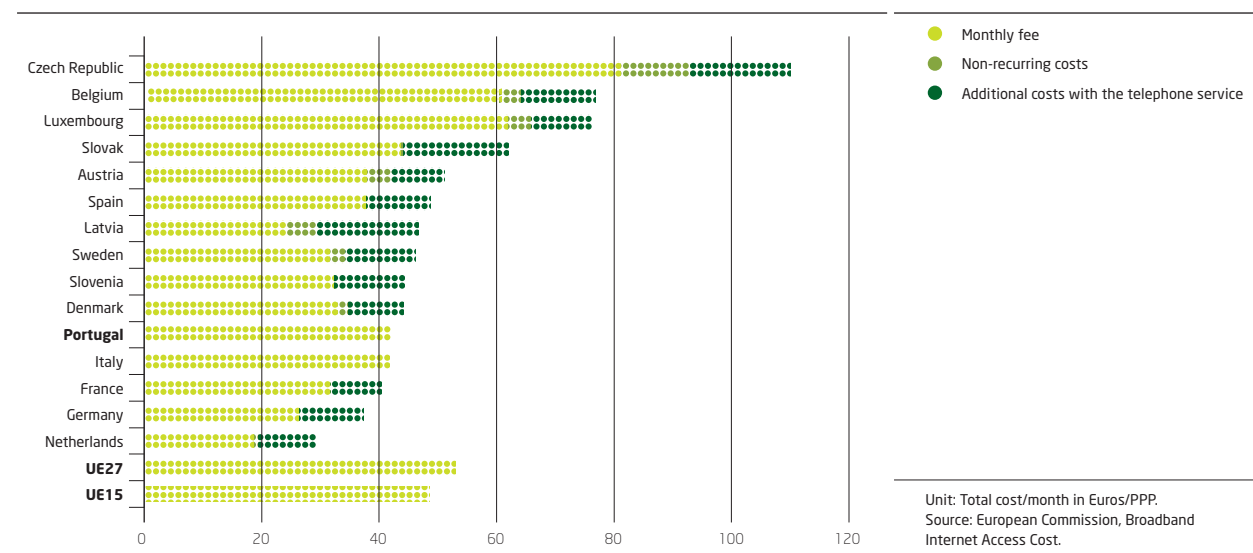
Comparing the prices of the double-play offers (Internet and fixed telephone), bundle offers in Portugal stand below the European average for download speeds above 8Mbps and above 20 Mbps. In the lower speeds, prices in Portugal are above the average.

Comparison of bundle offer prices [Internet+fixed telephone]
Table 5.18

Baskets	Portugal deviation vs. the EU27 average	Ranking
512-1024 (incl.)	13%	11
1024-2048 kbps (incl.)	15%	13
2048-4096 kbps (incl.)	19%	11
4096-8192 kbps (incl.)	9%	15
8192 Kbps-20 Mbps (incl.)	−21%	5
20 Mbps +	−8%	3

Source: European Commission, Broadband Internet Access Cost.

Minimum price of bundle offers "Internet+fixed telephone" – "8192-20Mbps (incl.) basket"
Graph 5.23

Legend:
- Monthly fee
- Non-recurring costs
- Additional costs with the telephone service

Unit: Total cost/month in Euros/PPP.
Source: European Commission, Broadband Internet Access Cost.

Concerning the price of Internet + television double-play offers, Portugal also stands above the EU27 average. [Note: the lowest speed offers considered for Portugal by the EC showed some mistakes and were thus excluded from the comparison. The values resulting showed deviations above 100% in regards to the average above.]

Comparison of prices of bundle offers (Internet+television)
Table 5.19

Baskets	Portugal deviation vs. the EU27 average	Ranking
8192 Kbps-20 Mbps (incl.)	-14%	5
20 Mbps +	-16%	1

Source: European Commission, Broadband Internet Access Cost.

The analysis considered an offer by ZON with Internet at 8 Mbps.

Minimum price of bundle offerings "Internet+television" – "8192-20Mbps (incl.) basket"
Graph 5.24

Unit: Total cost/month in Euros/PPP
Source: European Commission, Broadband Internet Access Cost.
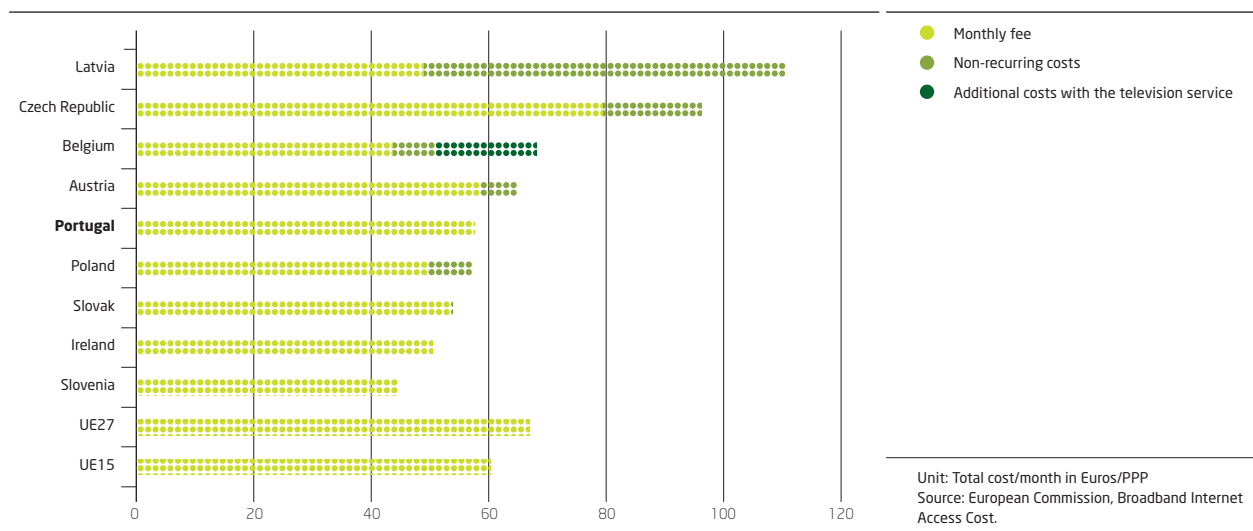
Concerning triple play offers, all offers in Portugal stand below the European average. In Portugal, most customers of this type of bundles prefer 16 Mbps broadband accesses. Comparing triple play offers with these characteristics in the countries considered in the study, it is possible to conclude that Portugal's offer is the 10th cheapest one within 19 countries and 13 per cent below EU27 average.

Comparison of prices of bundle offers (Internet+fixed telephone+television)
Table 5.20

Baskets	Portugal deviation vs. the EU27 average	Ranking
2048-4096 kbps (incl.)	-27%	2
4096-8192 kbps (incl.)	–	–
8192 Kbps-20 Mbps (incl.)	-13%	10
20 Mbps +	-9%	4

Source: European Commission, Broadband Internet Access Cost.

The quality of service actually provided

A study carried out by ICP-ANACOM[95] analysed the quality of the Internet access service of several national fixed (cable and ADSL) and mobile (3G) broadband access providers.

The analysis was made to the fixed broadband residential offers (ADSL and Cable) provided by Telepac/Sapo, Clixgest/Novis, ZON/TV Cabo and Cabovisão, operators which represent over 90 per cent of the fixed offer, as well as the offers of the 3 mobile operators.

Indicators concerning FTP (File Transfer Protocol) file upload and download speeds, the download times of Web pages, and the network's latency, among others, were used to evaluate the broadband Internet access service.

FTP file download and upload speeds

According to the above mentioned study, and in the case of FTP file download, the download speeds of fixed ISPs are higher than the download speeds of mobile operators. The transmission speeds provided by the fixed operators vary between 2502 Kbps and 4387 Kbps, while the speeds of the mobile operators' offers vary between 871 Kbps e 1399 Kbps.

Average download file transfer speed per operator
Graph 5.25

Unit: kbps
Source: ICP-ANACOM.
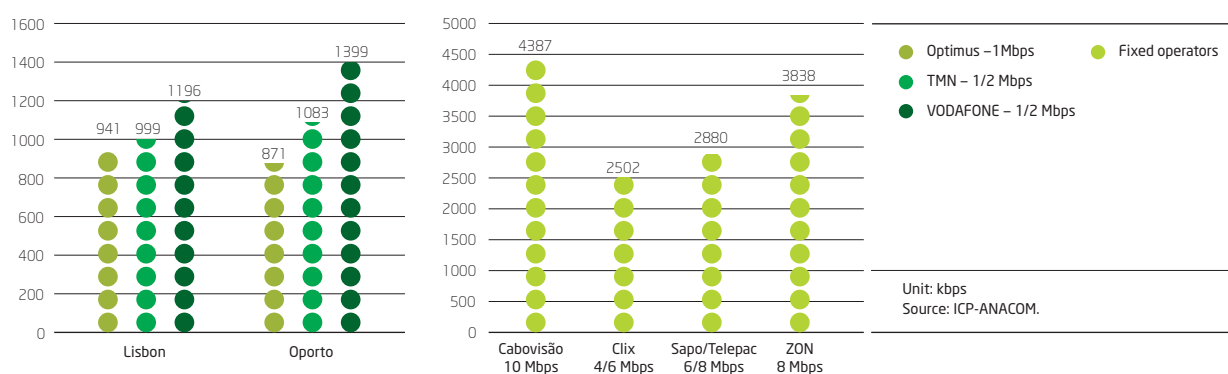
95 http://www.anacom.pt/streaming/QOSacesso_internet_marco09.pdf?contentId=916919&field=ATTACHED_FILE

On the other hand, upload speeds provided by mobile operators are, on average, higher.

Average upload file transfer speed per operator
Graph 5.26

Optimus – 1Mbps
TMN – 1/2 Mbps
VODAFONE – 1/2 Mbps
Fixed operators

Unit: kbps
Source: ICP-ANACOM.
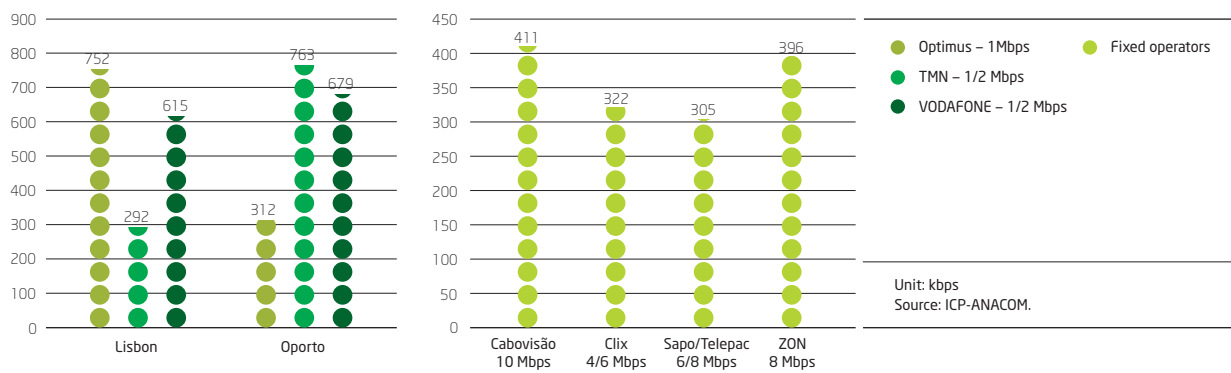
In general, file transfer speeds stand below the theoretical speeds advertised by operators.

In the case of fixed ISPs, the transmission speeds provided by Cabovisão reach about 77 per cent of the maximum theoretical speed advertised, with ZON and CLIX standing close to this figure (72 per cent). Sapo offers' speed present the lowest value in relative terms (55 per cent of the advertised speed).

Regarding the upload file transfer speed, values stand between 45 per cent and 95 per cent, for Sapo and Cabovisão respectively. It should be mentioned that these figures are above the download records for all operators, except for Sapo.

Regarding the previous year, there is an increase of speeds and an approximation to the advertised speeds.

In the case of mobile operators, the download speeds provided vary between 89 per cent and 100 per cent of advertised speeds, while upload speeds vary between 75 per cent and 100 per cent.

Web Browsing
The quality perceived during Web browsing is usually associated to the time needed to locate and download a Web page.

In general, fixed accesses provide lower average download times than mobile technology – in some cases, less than half of the average download times -, although the difference is reduced for more remote destinations.

Latency
Mobile broadband presents higher latency values for all destinations. The values recorded in the worst case did not prevent the provision of VoIP, however, it did not allow for interactive online games that are more sensitive to this parameter (multiple-player online games). The latency values recorded for mobile broadband are, on average, about twice the values recorded for fixed broadband.

The Internet Access Service customer and usage profile

Below are some characteristics of the Internet user and usage, and of the evolution occurred in 2008[95].
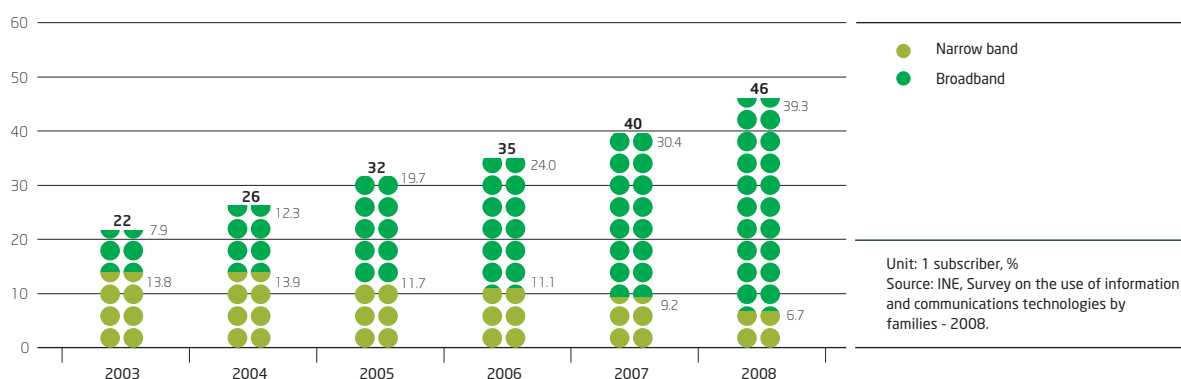
The Internet Access Service customer profile

Residential customers[96] are the great majority of the Internet Access Service's customers, standing for about 87 per cent of the overall amount of customers.

Characteristics of Internet Access Service customers according to their customer segment
Graph 5.27

2008

12.8

87.2

- Residential
- Non-residential

Unit: %
Source: ICP-ANACOM.

According to INE data, during the 1st quarter of 2008, about 46 per cent of Portuguese households had an Internet connection, 6 per cent more than a year before.

Evolution of the Internet Access Service residential penetration rate
Graph 5.28

- Narrow band
- Broadband

Year	Total	Broadband	Narrow band
2003	22	7.9	13.8
2004	26	12.3	13.9
2005	32	19.7	11.7
2006	35	24.0	11.1
2007	40	30.4	9.2
2008	46	39.3	6.7

Unit: 1 subscriber, %
Source: INE, Survey on the use of information and communications technologies by families - 2008.

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[95] The values presented in this section and retrieved from the 2008 electronic communications Survey, may present considerable differences when compared to the figures presented in previous years. This could result from the fact that the information collection method used in the scope of the 2008 report being the personal interview, while the previous surveys used telephone interviews to FTS and MTS providers.

[96] Any customer who doesn't use the service mainly as a means to pursue their economic activity is considered a residential customer.

In the residential segment, the available data shows the existence of regional differences regarding Internet penetration. Lisbon and Tagus Valley continues to be the region with the highest Internet access service penetration.

On the contrary, Internet penetration in the Azores, Alentejo and Algarve regions stands below the national average (46 per 100 inhabitants em 2008).

Ownership of Internet connection by domestic households, per NUTS II
Table 5.21

Regions	Mar-06	Mar-07	Mar-08
North	31.3	32.7	45.5
Centre	36.3	41.1	39.6
Lisbon	40.7	46.4	54.1
Alentejo	27.4	37.1	38.0
Algarve	34.3	42.0	46.3
A. R. of the Azores	37.8	39.9	41.1
A. R. of Madeira	37.1	40.9	44.7

Unit: %
Source: INE, Survey on the use of information and communications technologies by families – 2006, 2007 e 2008.

North (+13 per cent) and Lisbon (+8 per cent) were the regions with the most significant growth. All remaining regions, except for the Centre, saw Internet penetration increase from 2007 to 2008.

Regarding the socio-economic characteristics of the user, and according to the electronic communications consumer Survey – 2008[98], the Internet access service residential customer has an above-the-average income.

Profile of households with Internet
Table 5.22

Social class[99]	Dec. 2008
A\B	68.1
C1	46.8
C2	41.1
D	14.7

Unit: %.
Source: ICP-ANACOM, Electronic Communications Consumer Survey, December 2008.

This result is coherent with previous years' results.

[98] ICP-ANACOM, Electronic Communications Consumer Survey, December 2008.
     The universe is composed of individuals of 15 years or more who reside in private housing units located in Mainland Portugal or in the Autonomous Regions (Azores and Madeira). The sample is representative at the level of NUTS I having been composed of 2040 interviews on the Mainland and 780 interviews in each of the Autonomous Regions. Households were selected by means of proportional stratified random sampling according to the crossing of the NUTS II Region variables and the size of the household. Within each household one individual was selected by means of sampling by quotas guaranteeing the marginal totals of the sex, age class, level of education and employment status variables, according to the General Population Census (2001) of the National Institute of Statistics (INE). The gathering of information was by CAPI – Computer Assisted Personal Interviewing which took place between 5 November and 29 December 2008. The results regarding the Mobile Telephone Service are based on the universe of the individuals and present a maximum margin of error of less than 2 p.p. (with a degree of reliability of 95 per cent). The results regarding the Fixed Telephone Service, Internet Service and paid Television Service are based on the universe of the households and present a maximum margin of error of less than 3 p.p. (with a level of reliability of 95 per cent). The company TNS-Euroteste was responsible for the fieldwork and data handling
[99] The social class variable is determined according to the education level and the professional occupation of the individual with the highest income in the domestic household. Social class A is the highest, and social class D is the lowest.

The fact that Internet penetration is higher in lower age groups also stands out. During the last 3 years, the service's penetration increased in all age groups.

Internet penetration per age group
Table 5.23

Age group	2006	2007	2008
16 – 24	75.2	84.8	87.4
25 – 34	53.9	58.4	69.5
35 – 44	36.3	40.5	47.3
45 – 54	24.0	26.0	30.5
55 – 64	12.1	16.7	18.7
64 – 74	3.0	4.0	5.2

Unit: %.
Source: INE, Survey on the use of information and communications technologies by families – 2006, 2007 e 2008.

Regarding the non-residential service, about 92 per cent of companies have Internet access, and about 81 per cent use broadband. Regarding company size, the larger it is, the greater the probability of having broadband Internet access.

Internet penetration per company size
Table 5.24

	Internet	Broadband
10 to 49 employees	90.6	79.1
50 to 249 employees	98.9	89.9
250 or more employees	100.0	97.6
Total	**91.8**	**80.8**

Unit: %
Source: INE, Survey on the Use of Information and Communications Technologies by Companies 2008.

By activity, on the other hand, only the construction industry shows an Internet penetration rate considerably below 90 per cent (83.3 per cent). In the case of broadband, only the construction industry (74.1 per cent) and the transforming industry (78.2 per cent) have penetration rates that are considerably below 80 per cent.

Internet penetration per industry
Table 5.25

	Internet	Broadband
D – Transforming Industries	93.4	78.2
F – Construction	83.3	74.1
G – Wholesale and Retail; Repair of Automobile Vehicles, Motorcycles, and Goods of Personal and Domestic Use	93.1	82.2
H – Lodging and Restaurants [1]	97.8	86.0
I – Transports, Warehousing and Communications	93.4	85.5
J – Financial Activities	99.4	97.4
K – Real-Estate Activities, Leasing, and Services Provided to Companies	98.4	95.2
O – Other Collective, Social and Personal Service Activities [2]	100.0	100.0
Total	**91,8**	**80,8**

Unit: %
Source: INE, Survey on the Use of Information and Communications Technologies by Companies 2008.
[1] Only groups 551 and 552.
[2] Only groups 921 and 922.

The Internet Access Service usage profile

Most Internet Access Service users use broadband. At the end of 2008, the ratio of broadband customers versus the overall amount of customers was 98 per cent. The growing weight of broadband mainly reflects the popularity of applications and contents requiring larger bandwidths and the coming about of always-on offers at a fixed monthly rate that also give users a more economic and cost-controlled use.

Distribution of Internet Access Service customers per bandwidth
Graph 5.29
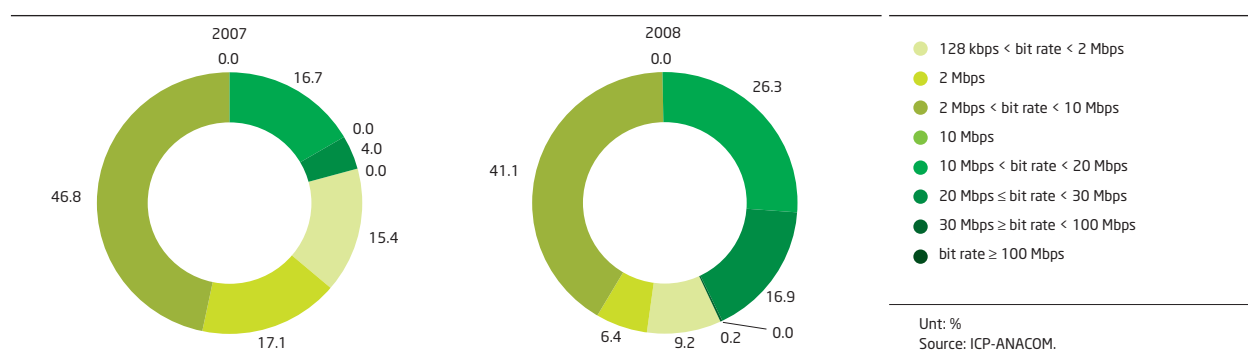

2008

97.6

2.4

● Broadband
● Narrow band

Unit: %
Source: ICP-ANACOM.

On the other hand, and according to the previously-mentioned data from INE, at the end of the 1st quarter of 2008, 91.8 per cent of companies with more than 10 employees had Internet, and 80.8 per cent used broadband[99].

Regarding the access speeds chosen by users, most residential customers (41 per cent) used, in 2008, accesses between 2 and 10 Mbps. About 26 per cent use higher speeds, between 10 Mbps and 20 Mbps.
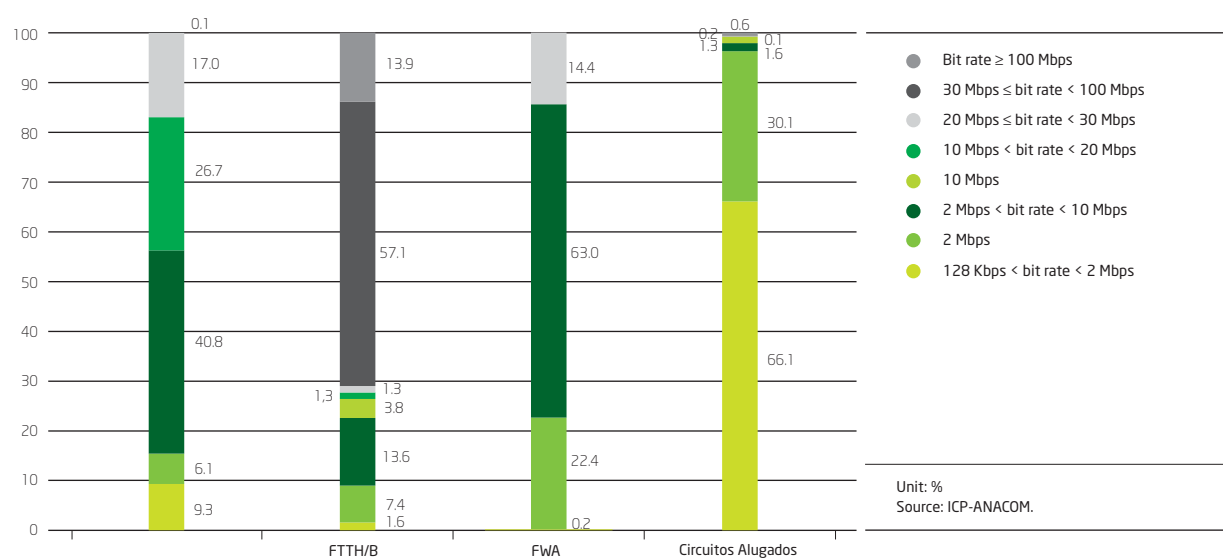
Broadband accesses, per download speed
Graph 5.30

2007

0.0
16.7
0.0
4.0
0.0
15.4
46.8
17.1

2008

0.0
26.3
16.9
0.0
0.2
9.2
6.4
41.1

- 128 kbps < bit rate < 2 Mbps
- 2 Mbps
- 2 Mbps < bit rate < 10 Mbps
- 10 Mbps
- 10 Mbps < bit rate < 20 Mbps
- 20 Mbps ≤ bit rate < 30 Mbps
- 30 Mbps ≥ bit rate < 100 Mbps
- bit rate ≥ 100 Mbps

Unt: %
Source: ICP-ANACOM.

The number of broadband Internet accesses by service class (defined in terms of downstream bit rate) varies according to the technology supporting it. At the end of

2008, optical fibre, ADSL and cable modem had the accesses with the highest bit rates. The largest percentage of leased lines concerns accesses below 2 Mbps.

Broadband accesses, per technology and download speed
Graph 5.31

- Bit rate ≥ 100 Mbps
- 30 Mbps ≤ bit rate < 100 Mbps
- 20 Mbps ≤ bit rate < 30 Mbps
- 10 Mbps < bit rate < 20 Mbps
- 10 Mbps
- 2 Mbps < bit rate < 10 Mbps
- 2 Mbps
- 128 Kbps < bit rate < 2 Mbps

Unit: %
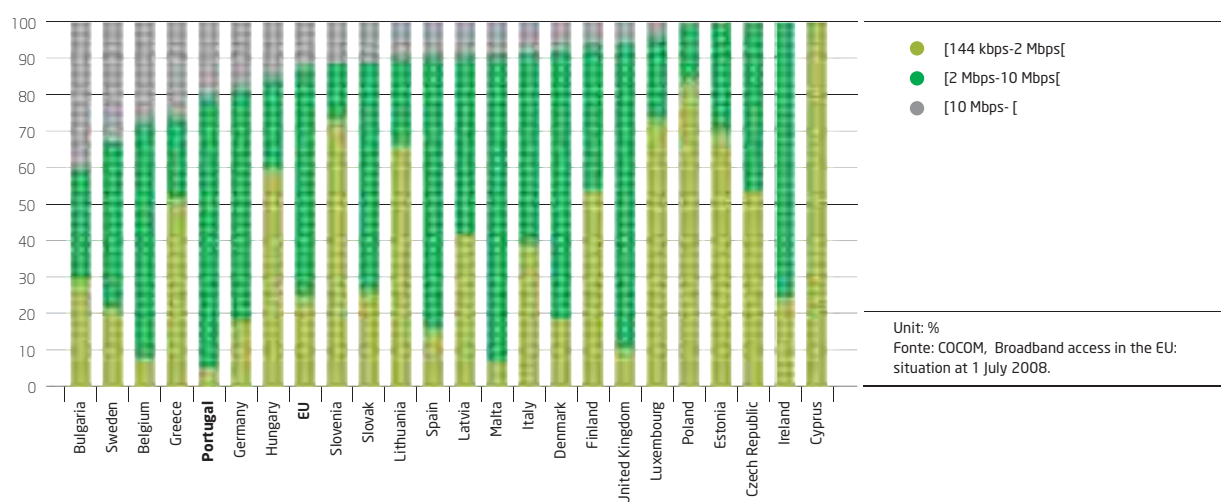Source: ICP-ANACOM.

FTTH/B   FWA   Circuitos Alugados

[99] See INE, Survey on the Use of Information and Communication technologies by Families – 2008.

It should be mentioned that in the EU, the average proportion of accesses with higher bit rates is 12.8 per cent.

In the majority of the considered countries, the most used access speed stands within the 2 Mbps to 10 Mbps interval.

International comparison of broadband accesses per download speed, July 2008
Graph 5.32

- [144 kbps-2 Mbps[
- [2 Mbps-10 Mbps[
- [10 Mbps- [

Unit: %
Fonte: COCOM, Broadband access in the EU: situation at 1 July 2008.

Internet usage goals

Concerning each individual's usage of ICTs, 75.3 per cent of the individuals that used the Internet during the first quarter of 2008 conducted advanced communication activities. Some activities stand out, such as real time written message communications, mentioned by 63.5 per cent of the Internet users; reading *blogs*, mentioned by about half of the users; over one quarter of the users (26.4 per cent) places messages on chats, newsgroups or online discussion forums; and 22.6 per cent uses the webcam to make video calls.

Advanced activities conducted on the Internet, related to communication practices
Table 5.26

	2006	2007	2008
Making telephone calls	15.6	21.6	18.2
Making video calls (via webcam)	x	x	22.6
Placing messages on chats, newsgroups or online discussion forums	x	x	26.4
Communications via real time written messages (e.g.: messenger)	x	56.8	63.5
Reading blogs	x	x	49.9
Creating or maintaining own blog	10.3	13.7	11.4

Unit: %
Source: INE, Survey on the Use of Information and Communication Technologies 2008; The Information Society in Portugal 2007.

Regarding to activities related to obtaining and sharing audiovisual content, the most mentioned activities are: downloading or listening to music, and listening to radio or watching television via Internet, which were designated,

respectively, by 41.6 per cent and 41.2 per cent of Internet users. Other activities should be highlighted such as: downloading or watching movies (for 28 per cent) and using peer-to-peer programmes (22.8 per cent).

Advanced activities conducted on the Internet, related to obtaining and sharing audiovisual content
Table 5.27

	2006	2007	2008
Listening to radio or watching TV	30.0	36.2	41.2
Downloading or listening to music (except online radio)	x	x	41.6
Downloading or watching movies, documentaries or video files (except online television)	x	x	28.0
Using file sharing programmes (peer-to-peer) to exchange movies, music or video files	x	x	22.8
Using the podcast service to automatically receive audio and video files	x	x	5.3
Downloading games (computer or video) or updates to game software	x	x	17.0
Playing online with other people	x	x	17.0
Placing personal content on a website to be shared (text, images, photos, videos, music, etc.)	x	28.3	16.9
Using programmes to manage information archives (news feeds) to read new contents published on websites (e.g.: RSS)	x	x	7.6

Unit: %
Source: INE, Survey on the Use of Information and Communication Technologies 2008; The Information Society in Portugal 2007.

Barriers to joining the service

In 2008, as in the previous years, the main reason that was pointed out for not joining the Internet was lack of interest

or lack of usefulness (33.3 per cent). Computer-related issues come second (31.9 per cent). The price of the service is also a barrier to joining the service (10 per cent).

Main reasons for not having Internet access at home
Table 5.28

|	Dec. 2008
Has no need \ interest	33.3
None of the individuals in the household knows how to use the Internet	21.2
Has no computer or the computer lacks the capacity	17.0
The price of access to the Internet is too high	10.0
The cost of the computer is too high	9.7
Has access at another location (school, work)	5.1
Another reason	2.1
Na	1.8
Total	**100.0**

Unit: %
Source: ICP-ANACOM, Electronic Communications Consumer Survey, December 2008.

It should be noted that the above-mentioned main reasons are identical to those pointed out by EU consumers for not joining the Internet. However, there is a greater importance of barriers "lack of interest" and "PC/modem cost"".

Main reasons for not having Internet access at home in the EU27
Graph 5.33

Unit: %
Source: European Commission,
E-Communications Household Survey, 2008.
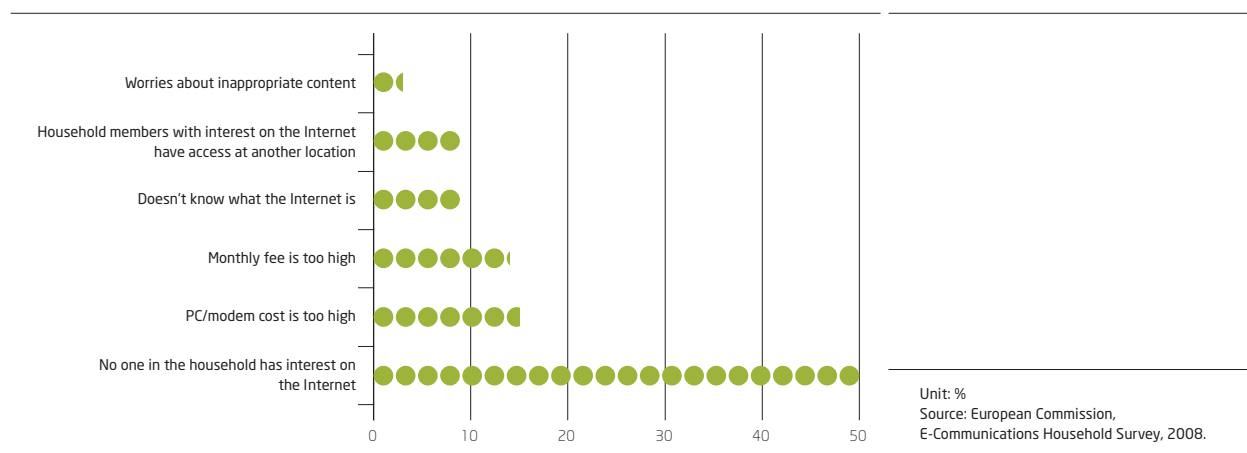
It should be mentioned that, according to the above-mentioned publication, the reason "doesn't know what the Internet is" has its highest value in Portugal (among EU27 countries).

Service usage level: Evolution in the amount of customers, traffic and revenue
Below is the evolution regarding the service's usage level, measured in terms of customers, accesses and revenue.

Internet access customers
At the end of 2008, there were 1.67 million registered Fixed Internet Access Service customers, about 4 per cent more than in 2007.

Mobile broadband users reached 2.37 millions, of which 1.16 millions were active in the last month of 2008. In regards to the previous year, the amount of mobile broadband users increased by 924 thousand.

Number of customers
Table 5.29

	2007	2008	2008/2007 var. (%)	2004/2008 average annual variation	2004/2008 var. (%)
Total fixed Internet customers	1,611,720	1,675,272	3.9%	8.2%	36.9%
Dial-up access	99,326	40,975	-58.7%	-43.2%	-89.6%
Fixed broadband access	1,512,394	1,634,297	8.1%	18.5%	97.2%
Mobile broadband users	1,454,574	2,378,800	63.5%		

Unit: 1 customer, %
Source: ICP-ANACOM.

The migration trend from narrow band to broadband remains. The amount of fixed broadband customers grew 8.1 per cent in 2008, while dial-up access customers decreased by 59 per cent. The ratio of broadband customers versus the overall amount of customers reached 97.6 per cent, 3.7 per cent more than in 2007.

In 2008, there were 122 thousand new fixed broadband customers, 33 more than a year before. However, the growth rate was two times below the average growth rate during the 2004/2008 period.

**Evolution in the number of fixed broadband access customers
Graph 5.34**

Unit: 1 customer
Source: ICP-ANACOM.
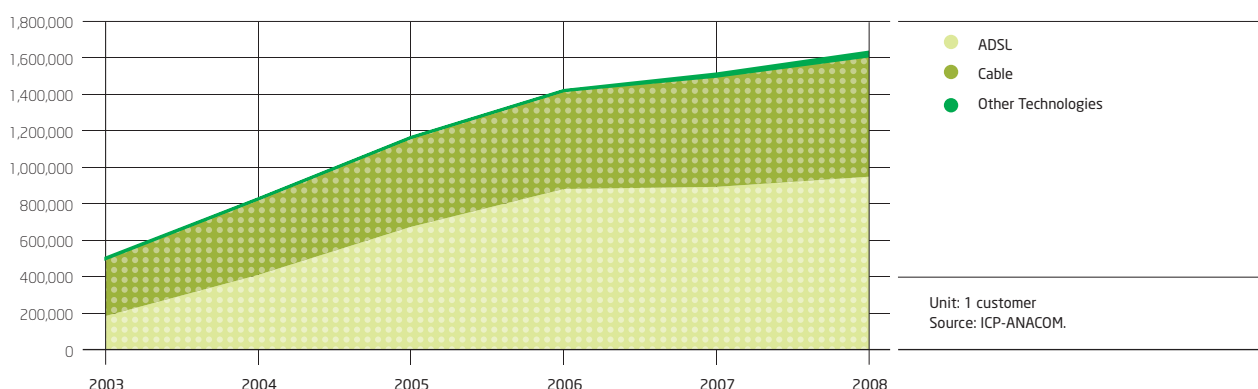
Although ADSL continues to be the main access technology since the end of 2004, its relative weight had a slight decrease in 2008. ADSL's prominence is explained by the broader geographic availability of this type of access, and by the development of offers based on local loop unbundling.
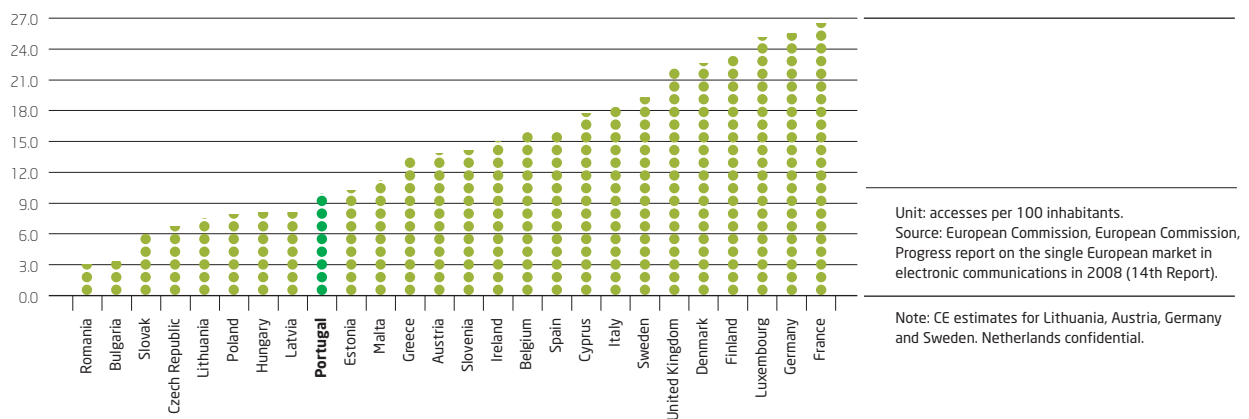
**Number of customers per fixed broadband access mode
Table 5.30**

	2007	2008	2008/2007 var. (%)	2004/2008 average annual variation	2004/2008 var. (%)
ADSL access	891,939	947,141	6.2%	23.2%	130.5%
% of total fixed broadband	59%	58%			
Cable modem access	605,799	661,685	9.2%	12.4%	59.5%
% of total fixed broadband	40%	40%			
Other Access Technologies	14,656	25,471	73.8%	73.2%	800.0%
% of total fixed broadband	1%	2%			
Total fixed Broadband Customers	**1,512,394**	**1,634,297**	**8.1%**	**18.5%**	**97.2%**

Unit: 1 customer; %
Source: ICP-ANACOM.

In spite of the predominance and growth recorded, DSL penetration in Portugal is one of the lowest within the EU27.
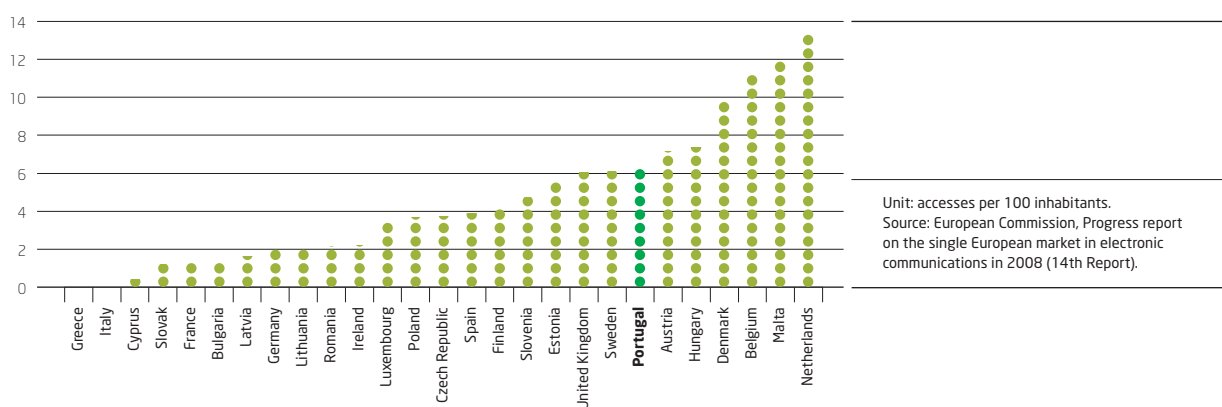
DSL broadband accesses per 100 inhabitants in the EU27 – 4Q08
Graph 5.35

Unit: accesses per 100 inhabitants.
Source: European Commission, European Commission, Progress report on the single European market in electronic communications in 2008 (14th Report).

Note: CE estimates for Lithuania, Austria, Germany and Sweden. Netherlands confidential.

Internet Access by cable modem grew 9.2 per cent em 2008, a growth rate above DSL's. Cable modem access penetration is relatively high in Portugal, about 2.8 per cent above the EU27 average. Portugal ranks 7th in this ranking.

Cable modem accesses per 100 inhabitants in EU27 – 4Q08
Graph 5.36

Unit: accesses per 100 inhabitants.
Source: European Commission, Progress report on the single European market in electronic communications in 2008 (14th Report).

In spite of its small weight within the overall amount of fixed broadband customers, other access technologies grew about 74 per cent regarding the previous year. This growth is mainly explained by the evolution of the offer of Internet access using the FWA technology and optical fibre.

Mobile broadband users
The number of mobile broadband users grew exponentially during 2008. The number of active mobile broadband users is already above the number of fixed Internet access users.

Evolution in the number of mobile broadband users
Table 5.31

		2007	2008	Var. (%) 2007/2008
No. of users with mobile broadband Internet access		1,454,574	2,378,800	63.54%
Active during this period		659,812	1,160,767	75.92%
	% of total	45%	49%	

Unit: 1 user; %
Source: ICP-ANACOM.

Between the end of 2007 and the end of 2008, the number of users increased 64 per cent and the number of active users increased 76 per cent.

Evolution in the number of mobile broadband users
Graph 5.37

No. of users with mobile Internet access
Which were active during that period

Unit: thousand
Source: ICP-ANACOM.
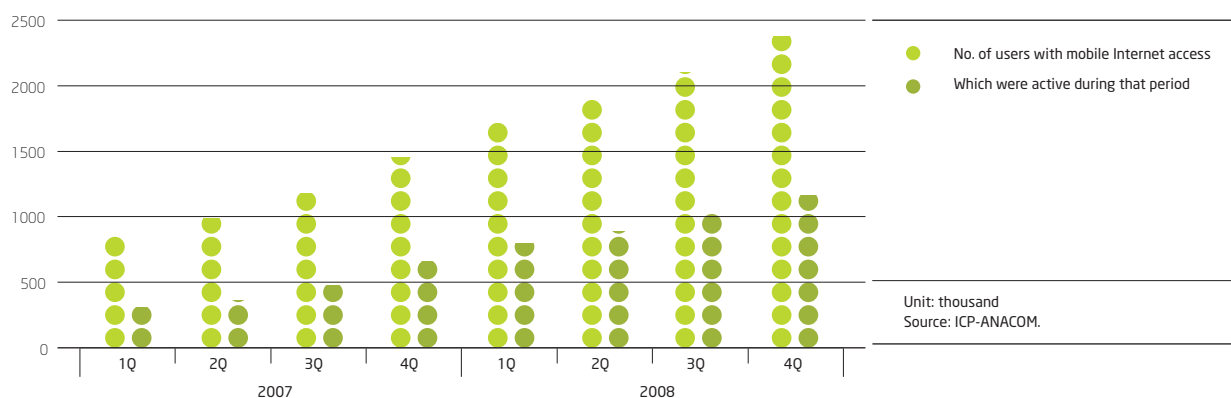
The evolution in the number of this service's users was not only influenced by the operators' commercial policies, which provided flat-rate offers since the beginning and actively promoted this service, but also by Government policies fostering information society that, together with the operators, provided low-priced computers and mobile broadband Internet access to students, teachers and trainees.

The service's usage also increased gradually along the year. At the end of 2008 almost half of the potential users actually used the service.

Traffic

Traffic originated by fixed broadband customers at the end of 2008 totalled 66.8 million GB, which results in a 40 GB average traffic per consumer per year.

Regarding mobile broadband, traffic per Internet session and monthly traffic per active user increased, respectively, 41.5 per cent and 46.9 per cent in 2008, the second indicator reaching figures close to the traffic limits established by some of the offers.

Evolution of traffic per sessions and per user
Table 5.32

	2007	2008	2007/2008 var. (%)
MB per session	20	28	41.5%
MB per active user (monthly)	640	940	46.9%

Unit: MB, %
Source: ICP-ANACOM.

Comparing the average monthly traffic per user with that of fixed broadband, the mobile service user's consumption is considerably lower: 1 GB against 3.3 GB. This difference should be justified by the traffic limits of mobile broadband offers, much lower than fixed broadband's, by the prices charged on each technology, and by the different user and usage profiles of these types of broadband Internet access (See box 3).

Service revenue

The 2008, the individual revenue of the (fixed) Internet access service totalled 421.5 million Euros. Mobile Internet revenue increased about 99 per cent from 2007.

Internet access service revenue broken down
Table 5.33

	2007	2008	2007/2008 var. (%)
Revenue from the (fixed) Internet access service, isolated	483,622	421,449	-12.9%
Revenue from mobile internet access	130,134	259,377	99.3%

Unit: thousand Euros
Source: ICP-ANACOM.

It should be mentioned that the proliferation of bundle offers integrating the Internet service made it impossible, in some cases, to break down these offers' revenues by each individual service. For this reason, the following table presents the revenue of the bundle offers that include the Internet service (and other services) and which the operators did not break down by service.

Revenue of service bundles with Internet included
Table 5.34

	2008
Revenue of bundle offers that include the Internet access service	125,755

Unit: thousand Euros
Source: ICP-ANACOM.

Evaluation by consumers

According to the results of the electronic communications consumer survey[100], and as what occurred in previous years, consumers' perception of the quality of the broadband services is generally positive. Nevertheless, 16 per cent of those interviewed evaluated it negatively.

Satisfaction with the provided Internet service[67]
Table 5.35

	Dec. 2008
Very good	10.2%
Good	73.8%
Bad	14.9%
Very bad	1.1%

Unit: %
Source: ICP-ANACOM, Electronic communications consumer survey 2008.

Analysing consumer satisfaction regarding the access speed in particular, about 19 per cent of those inquired evaluated this service's feature negatively.

In line with generalized satisfaction with the service, only 9 per cent of those questioned stated that they had filed a complaint with their operator during the last year.
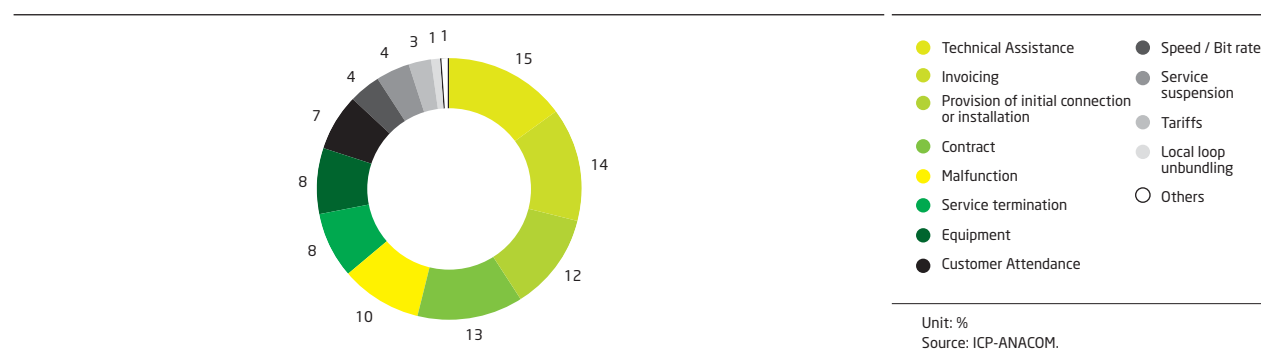
It should be mentioned, however, that in relative terms, the Internet access service is the service with the largest amount of complaints at ICP-ANACOM. Around 9,720 complaints were received during 2008 regarding the Internet Access Service and its providers, against 5,017 complaints received in 2007.

Most of the requests regarded technical assistance (15 per cent), invoicing (14 per cent), contract (13 per cent), the installation process (12 per cent), and malfunctions (10 per cent).

Distribution of complaints received by ICP-ANACOM – 2008
Graph 5.38

Technical Assistance
Invoicing
Provision of initial connection or installation
Contract
Malfunction
Service termination
Equipment
Customer Attendance

Speed / Bit rate
Service suspension
Tariffs
Local loop unbundling
Others

Unit: %
Source: ICP-ANACOM.

[100] This question used a scale where 1 means "Very unsatisfied" and 10 means "Very satisfied". Replies were grouped into 4 intervals: "Very good" – 9 and 10, "Good" – 6 to 8, "Bad" – 3 to 5 and "Very bad" – 1 and 2.

Broadband penetration

At the end of 2008, the (fixed) broadband Internet access penetration rate stood at 15.4 per 100 inhabitants for fixed accesses, and 22.4 per 100 inhabitants for mobile accesses.

Evolution of broadband penetration rates
Table 5.36

	2007	2008	2007/2008 var. (%)	2004/2008 average annual var. (%)	2004/2008 var. (%)
(fixed) Broadband customers	14.2	15.4	1.1	1.9	7.4
ADSL customers	8.4	8.9	0.5	1.2	4.9
Cable modem customers	5.7	6.2	0.5	0.6	2.3
Other type of access customers	0.1	0.2	0.1	0.1	0.2
(mobile) Broadband customers[101]	13.7	22.4	8.7		

Unit: customers per 100 inhabitants
Source: ICP-ANACOM.

As for fixed accesses specifically, broadband penetration is about 1.1 per cent above the figure recorded at the end of the previous year. Broadband penetration growth recorded in Portugal was, however, below that registered in the OECD countries. The difference between the growth of broadband penetration recorded in the OECD and the broadband growth in Portugal increased, reaching 0.7 per cent.

Variation in the fixed broadband access penetration rate
Graph 5.40

Unit: p.p
Source: ICP-ANACOM, OCDE.

Note: 2008 figures correspond to the variation of the penetration rate from 2Q08 versus 2Q07.
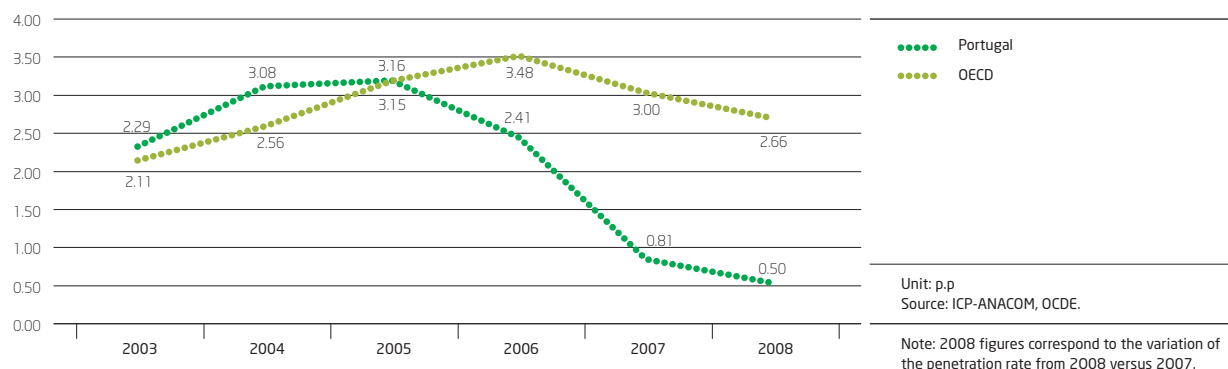
Portugal was the country within the EU19 where the fixed broadband penetration rate less grew during 2008. Broadband penetration in Portugal increased about 4 per cent regarding 2007, while in the OECD the average growth rate was 14 per cent.
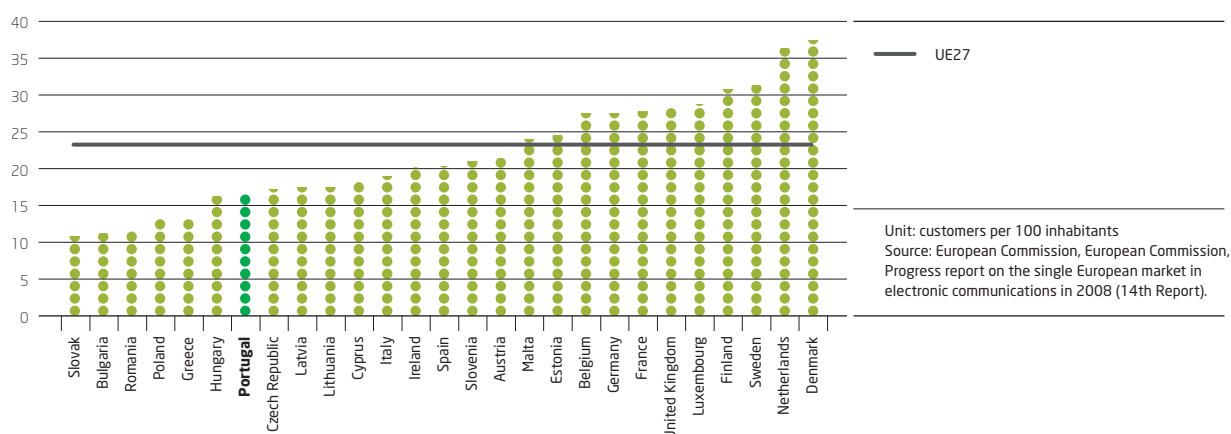
[101] Mobile operators' customers may access mobile broadband Internet, which they did at least one time since the service was launched, per 100 inhabitants.

Growth rate of fixed broadband penetration from 2Q08 versus 2Q07
Graph 5.41

OCDE

Unit: %
Source: OCDE.
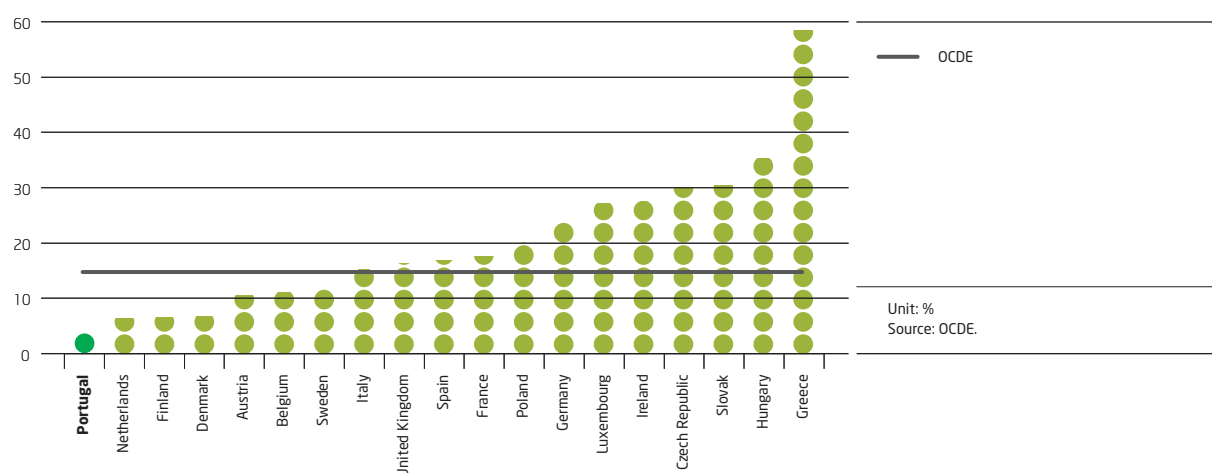
As a result of the performance registered in 2008, Portugal ranks 21st, for this indicator.

Fixed broadband penetration in EU27 – 4Q08
Graph 5.42

UE27

Unit: customers per 100 inhabitants
Source: European Commission, European Commission, Progress report on the single European market in electronic communications in 2008 (14th Report).

This evolution may have been influenced by the following factors:

• The launch of mobile broadband offers. It is possible that fixed broadband consumption has been partially re-routed to mobile broadband. Mobile broadband has been marketed as a fixed broadband replacement for some market segments. Additionally, younger population groups, individuals living alone and those with higher social status are more likely to have mobile broadband[102].

[102] In order to characterize the choice of access provider, a model was estimated with a dependent variable equal to 1 when the chosen operator is a mobile Internet access operator, and equal to 0 when the interviewee is the customer of a fixed Internet access provider. It used the replies given during the electronic communications consumer survey. The theoretical model used for the estimate was the simple logit.

• The relatively low PC penetration in households. As previously mentioned, the lack of a PC is a barrier to joining the Internet. The European Commission, among others [103], even mentions that:

… The correlation between PC rate … and Internet rate (Y-axis) is almost linear (Pearson equals 0.97). It can thus be said that the lack of PCs is an obstacle to Internet access.[71]

The rate of domestic households in Portugal with a PC was 39 per cent in March 2008, while in the EU27 it was 57 per cent[104].

It is thus possible for the lack of PC to partially justify the lower take up of broadband that occurred in Portugal during 2008[105].

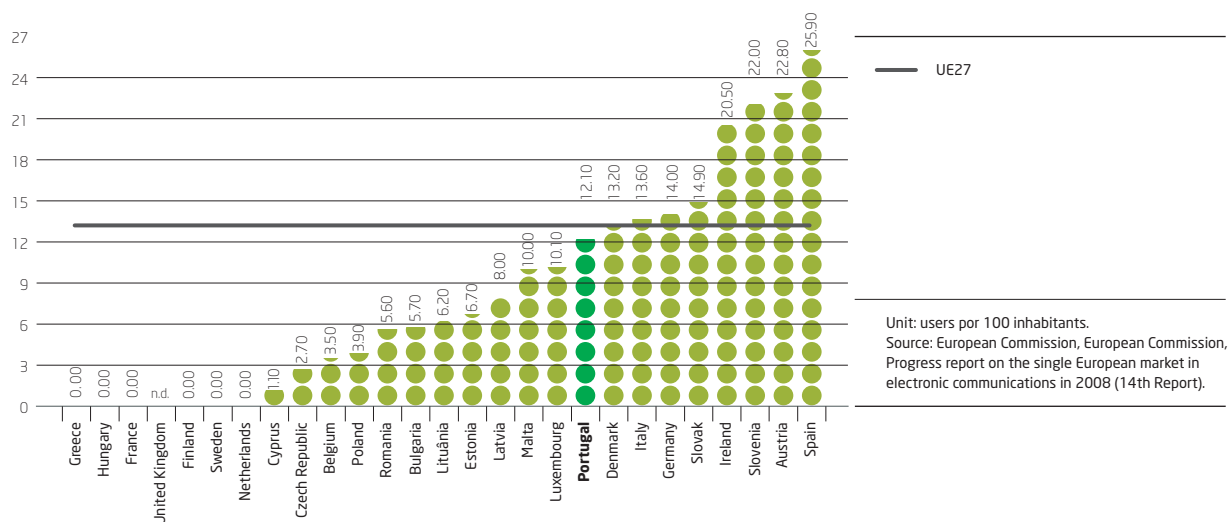• Human capital level below average. The lack of interest shown by consumers may be connected to the relatively low human capital level. Statistics on the education level and the digital literacy level, in this scope, are quite explanatory. It is even possible to conclude that the highest the education level, the more likely it is to have Internet access[106]. Additionally, as previously mentioned, Internet penetration is already high among population groups with higher education levels and among younger population groups;

• Service's price levels. Some consumers indicate the price level as a barrier to joining the service.

This is a well known set of factors in the socio-economic context which can have considerable importance in explaining fixed broadband penetration, as George Ford from the Phoenix center[103] seems to demonstrate.

In the case of mobile broadband and according to the European Commission, Portugal ranks 9th in the EU ranking, slightly below the European average.

Mobile broadband penetration in EU27 – December 2008
Graph 5.43

Unit: users por 100 inhabitants.
Source: European Commission, European Commission, Progress report on the single European market in electronic communications in 2008 (14th Report).

It should be mentioned that there were several technical difficulties related to the collection of information on mobile broadband, starting from the service's definition, including the applications to be considered, the type of terminal equipment or the difference between a qualified user and an active user. For this reason, the information collected by

[103] See The Broadband Performance Index: A Policy-Relevant Method of Comparing Broadband Adoption Among Countries, Phoenix Center for Advanced Legal and Economic Public Policy Studies, July 2007.
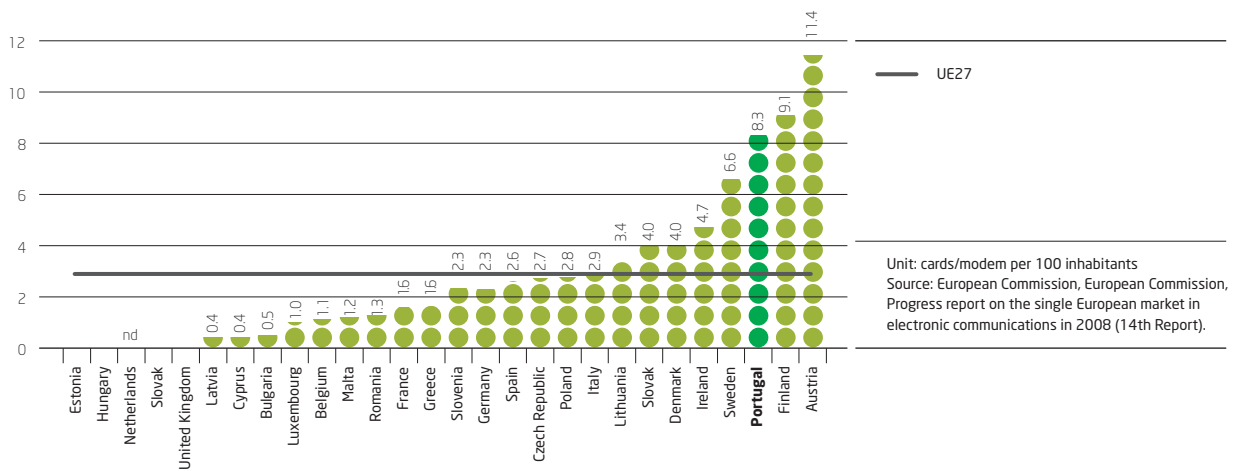[104] European Commission, E-Communications Household Survey, April 2007.
[105] European Commission, E-Communications Household Survey, June 2008.
[106] In order to characterize the Internet, three models were estimated with base on the data collected during the 2007 electronic communications consumer survey. The theoretical model used for the estimate was the simple logit. Several independent variables were introduced in the models concerning the interviewee's sex, age, education level, social status, the presence of individuals aged between 7 and 24 years old in the household, and the NUTS II region where the interviewee lives. This data is included in the current model via binary variables, with value 1 in the positive cases, and values 0 for the opposite.

the various international entities may not be comparable. Within this scope, ICP-ANACOM was one of the first regulators to release information on mobile broadband accesses (since January 2007), and has made all the effort in order to promote international comparisons that include it. By February 2009, ICP-ANACOM organized in Lisbon, together with the OECD, a workshop intended to define a set of standardized indicators on this issue, which will show its results during the next months.

In Portugal, by the end of 2008, 78 per cent of these accesses corresponded to PCMCIA cards or USB modems used to access the Internet through Desktop and Laptop computers. The number of users with this type of equipment grew around 92 per cent during the last year. At the end of 2008, the European Commission collected information concerning this particular indicator, making it possible to compare the penetration of the mobile access mode that comes closer to fixed broadband within the EU27 countries. Portugal ranks 3rd in this ranking.

Mobile broadband penetration by PCMCIA card or USB modem in EU27 – December 2008
Graph 5.44

Unit: cards/modem per 100 inhabitants
Source: European Commission, European Commission, Progress report on the single European market in electronic communications in 2008 (14th Report).

Overall, broadband penetration (fixed + mobile) in Portugal should be 25 per 100 inhabitants, a result which makes Portugal rank 13th within the EU ranking.

Broadband penetration in EU27 – December 2008
Graph 5.45

Unit: customers/users per 100 inhabitants
Source: European Commission, European Commission Progress report on the single European market in electronic communications in 2008 (14th Report).