

Treading the Path to the Knowledge Society

Patterns of ICT Diffusion in Portugal

Government of the Portuguese Republic

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**Treading the Path to the Knowledge Society
Patterns of ICT Diffusion in Portugal**

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1. The Portuguese Path to the Information Society

1. The Underpinnings of the Portuguese Information Society

The European Union established the goal of turning Europe into the world's most competitive and dynamic knowledge-based economy. This ambition, defined within the Lisbon Strategy, places the new technologies at centre stage, as an instrument that enables innovation and streamlines business processes. The use of the new technologies to enhance productivity and stimulate competitiveness is, however, dependent on the existence of highly qualified labour, with high levels of ICT literacy.

Moreover, above and beyond enabling sustainable economic growth, ICT literacy is foremost a *sine qua non* condition for social cohesion, for the development of an inclusive Information Society.

Portugal's path to the Information Society has been marked by a continuous effort to keep up with its European partners and the demands of the European Union agenda, while dwelling with the remaining problems of its socio-economic structure, which deems difficult any attempt to effectively take advantage of the opportunities offered by the Information Society.

The Portuguese departing situation significantly differs from that of the majority of its fellow European partners. The low levels of ICT access and usage clearly result from the Portuguese socio-demographic structure, which is characterized by low qualification levels. Well over 70% of the Portuguese population have less or no more than compulsory education (9th grade), a startling indicator, especially when compared to the other EU Member States.

The qualifications structure of the Portuguese population has direct implications in the competitiveness of the Portuguese Economy. The business sector features a majority of low-skilled workers, with little or no ICT training, impeding, therefore the adoption of ICT instruments for the implementation of new and more efficient business practices.

The development of the ICT sector, in particular, is additionally hindered by the low number of skilled workers in the ICT field, who merely represent 3.45% of the total number of workers in Portugal. Coupled with reduced R&D expenditure, the low number of

specialized ICT workers noticeably contributes to modest levels of ICT innovation.

Building an Information and Knowledge Society for All in Portugal demands, thus, profound changes in the socio-demographic structure of the country. Ultimately, it implies the development of a truly scientific and technological culture among the Portuguese society.

2. The Portuguese Information Society Strategy

The Portuguese Information Society strategy is inevitably linked to the developments of the EU Information Society policy. Following the transition from the eEurope 2002 to the eEurope 2005, the new Portuguese Information Society strategy was designed to stimulate secure services, applications and contents based on a widely available broadband infrastructure.

This strategy, however, bears in mind the Portuguese specificities. The above mentioned low ICT skills and low ICT penetration in Portuguese households and enterprises are important obstacles and, as such, a major challenge to the development of an inclusive Information Society and of a competitive and sustainable Knowledge-based Economy in Portugal.

The Portuguese Information Society strategy aims at tackling these socio-economic obstacles, by addressing them in policy formulation and implementation. In this sense, achieving the core goal of the eEurope 2002 – the diffusion of Internet access and use – is still a priority issue, and investing in human capital is the sharpest and most consistent way to address it.

In June 2003, the Council of Ministers approved two action plans – the Information Society Action Plan and the eGovernment Action Plan – and three core specific programmes – the National Broadband Initiative, the National Programme for the Participation of Citizens with Special Needs in the Information Society and the National e-Procurement Programme.

These documents embody the Portuguese Information Society strategy, which places four areas at centre stage: infrastructure development, e-government, e-economy and e-inclusion.

These three areas are regarded as key dimensions for the development of the Information Society in Portugal. On the one hand, these policy areas address the EU priorities, whereas, on the other hand, they are aimed at tackling the previously identified socio-economic problems of Portugal.

Stimulating the take up of broadband connectivity, making public services available online, strengthening e-Business and investing in education and training initiatives are all key actions in the pursuit of greater competitiveness and growth and, most of all, essential instruments to better the quality of life in Portugal.

2. R&D and Innovation

The European Innovation Scoreboard (EIS) is a tool for the annual follow-up of the Lisbon Strategy and an instrument for monitoring the innovation policies in the European Union (EU). Four categories of indicators that measure the main trends on the innovation area can be identified: human resources; knowledge creation; transmission and application of knowledge; innovation finance, output and markets.

One of the conclusions of the 2002 Innovation Scoreboard is that the EU innovation leaders are concentrated in the Northern economies (Sweden, Finland, Denmark and Netherlands), while the larger economies have only an average performance. Southern countries (Portugal, Greece, Spain and Italy) are the least innovative countries, according to the EIS indicators.

Portugal is below the EU average in what concerns most of the 2002 Innovation Scoreboard indicators. In fact, Portugal belongs to the group of countries with a structural delay in the Innovation area (jointly with Spain, Greece and Italy) occupying the last position in three indicators: population with tertiary education, employment in high-tech services and high-tech USPTO¹ patents. Noteworthy is Portugal's weak position in several of the education indicators.

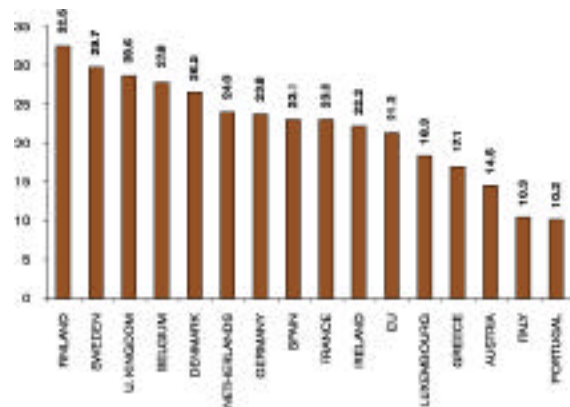
1. Human Resources

Knowledge-based economies require a well-educated workforce with excellent foundation skills and a capacity for continuous learning. In this sense, lifelong learning is a key component of national innovative capabilities. This fact is more important when considering the figures relative to human resources indicators: S&E graduates, population with tertiary education and employment in high-tech services and industry.

In all these indicators Portugal is behind the EU mean, usually occupying the last three or four positions. As can be seen in Chart 2.1, Portugal has only 10% of the working age population with tertiary education, which is half of the EU mean and far behind the Candidate countries numbers².

Chart 2.1
Population with tertiary education

2001, (%) of 25-64 years age class



Source: European Commission, European Innovation Scoreboard, 2002.

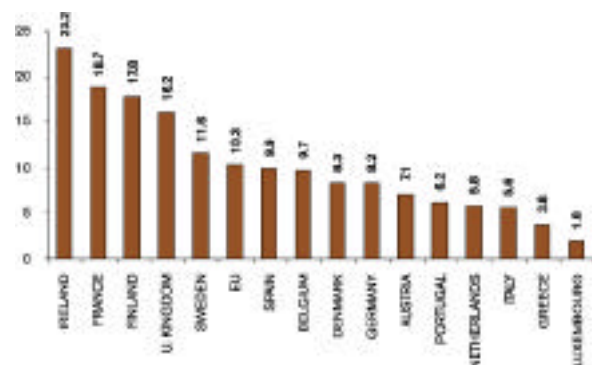
Notes: (1) Reference period, 2001 for all countries, except 2000 for EU, Germany, Luxembourg and Sweden, 1997 for Ireland.

(2) Weighted means based on summing the numerator and denominator across all EU countries.

The situation is as preoccupying in what concerns the number of new S&E graduates. In Chart 2.2, figures show that only 6.2% of the Portuguese new graduates have training in Science & Engineering, while in Ireland, France or Finland that value is three times higher.

Chart 2.2
New S&E graduates

2000, (‰) of 20-29 years age class



Source: European Commission, European Innovation Scoreboard, 2002.

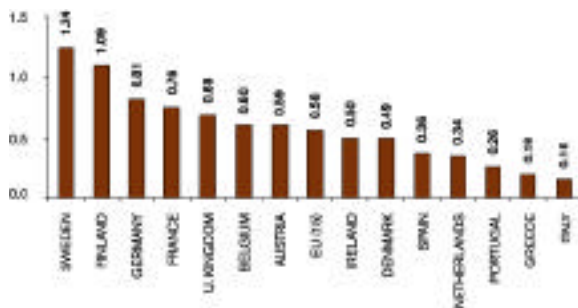
Note: Reference period, 2000 for all countries, except 1999 for Denmark, France, Finland and Italy, 1993 for Greece.

¹ United States Patent and Trademark Office

² See the 2002 European Innovation Scoreboard (EIS) for additional information

Also preoccupying is the situation concerning the new S&T PhDs. In Portugal, the proportion of new S&T PhDs is 0.26, half of the EU average (Chart 2.3). Portugal occupies the third-to-last position, while Sweden (1.24) and Finland (1.09) are the leaders. Besides hindering the chances of having Portuguese workers occupying highly qualified positions³ in the labour market, this fact has, certainly, considerable implications for the Portuguese R&D activities.

Chart 2.3
New S&T PhDs per thousand population
2000, (%o) aged 25-34



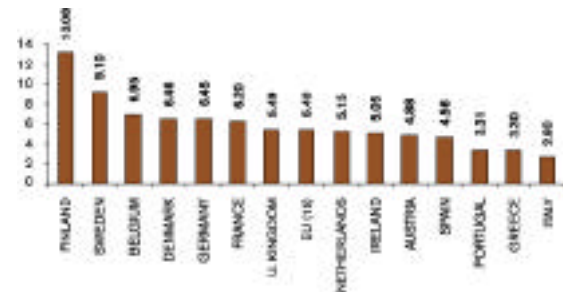
Source: European Commission, Key Figures, 2002.
Notes: (1) Reference period, 2000 for all countries.
(2) 1999 for Italy and Greece.
(3) Eu average does not include Luxembourg.
(4) Spain is provisional.

Also constringing is the number of researchers per thousand of the working force. As can be seen in Chart 2.4, Portugal is at the same level of Greece in this subject, far behind the EU mean or countries like Spain, France, Belgium or Finland (four times higher than in Portugal). This lack of human capital can affect negatively R&D activities (also reflected in the low number of scientific publications⁴) and also the production of “hard” innovations, as well as the production of new skills and inputs for business and services. Therefore, a mismatch can be found between business needs and R&D production in Portugal.

³ Highly qualified positions are those demanding broad scientific, technical and management responsibilities.

⁴ See the “Science Technology and Innovation Key Figures 2002” (European Commission, 2002) for additional information.

Chart 2.4
Researchers per thousand labour force
1999, (%o) labour force

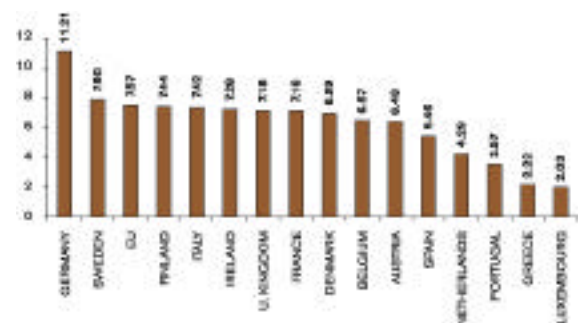


Source: European Commission, Key Figures, 2002.
Notes: (1) Reference period, 1999 for all countries.
(2) 2000 for Finland, Japan, Spain and Portugal, 1998 for Austria and United Kingdom.
(3) UE average does not include Luxembourg.
(4) Researchers are full-time equivalents (FTE); labour force are headcounts (HC).

In spite of the positive trends of the Portuguese Human Resources indicators over the last years, the global situation is still very constrained by the low structure of qualifications. Education indicators are a major weakness of the Portuguese economy, and that is visible in the number of workers in high-tech services and industry.

In what concerns employment in medium-high and high-tech manufacturing, Portugal presents half the value of the EU mean (7.57%). The EU Candidate countries also present two times higher percentages than Portugal.

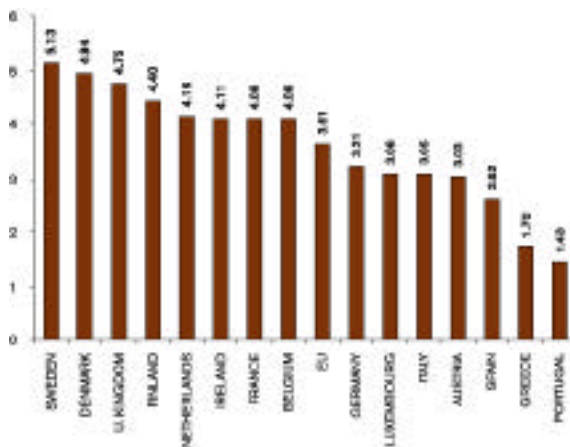
Chart 2.5
Employment in medium-high and high-tech manufacturing
2001, (%) of total workforce



Source: European Commission, European Innovation Scoreboard, 2002.
Notes: (1) Reference period, 2001 for all countries.
(2) Weighted means based on summing the numerator and denominator across all EU countries.

When focusing on at the employment in high-tech services (Chart 2.6) the situation of Portugal is even worse, occupying the last position with only 1.43% of the employment in this sector (the EU mean is 3.61%). Taking into account that high-tech services provide services directly to consumers (such as telecommunications) and inputs to the innovative activities (increasing productivity), these low values may indicate that the structure of the Portuguese economy is still not prepared to respond to the demands of a knowledge-based society.

Chart 2.6
Employment in high-tech services
2001, (%) of total workforce

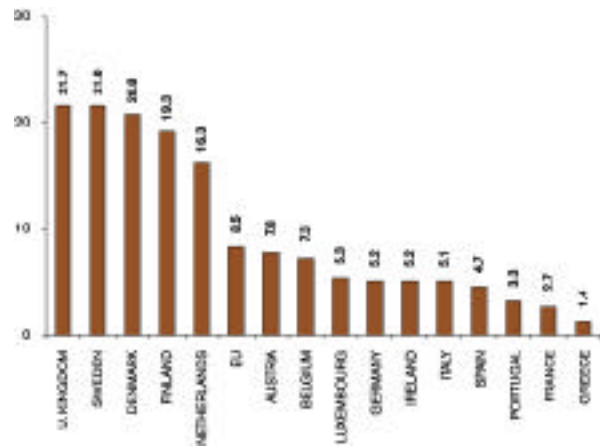


Source: European Commission, European Innovation Scoreboard, 2002.
Notes: (1) Reference period, 2001 for all countries.
(2) Weighted means based on summing the numerator and denominator across all EU countries.

Lifelong learning could be an instrument to accelerate the catching-up process of countries with worse indicators but, as can be seen in Chart 2.7, the Portuguese situation did not improve between 2001 and 2002. The data released for the latter year (reference period of 2001) reveals that only 3.3% of the Portuguese working force is involved in some kind of training, far behind the 8.5% of the EU mean and 5.4% of the Candidate countries mean. Only France and Greece have worse scores than Portugal. Once again, the Nordic countries (Sweden, Denmark and Finland) are the leaders in what concerns lifelong learning.

Chart 2.7
Participation in lifelong learning

2001, (%) 25-64 years age class



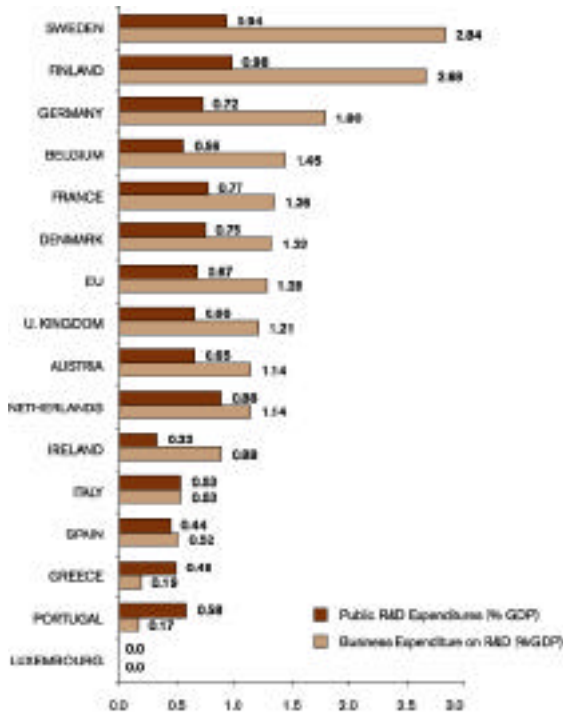
Source: European Commission, European Innovation Scoreboard 2002.
Notes: (1) Reference period, 2001 for all countries, 1997 for Austria and Ireland.
(2) Weighted means based on summing the numerator and denominator across all EU countries.

2. Knowledge Creation

Knowledge creation is a key input for the improvement and stimulation of innovative activities. In OECD countries, the resources allocated to the production of knowledge (expenditures on R&D, software, education and training, etc.) are growing rapidly, increasing their share in overall economies.

Looking at Public and business R&D expenditures in Portugal (Chart 2.8), it becomes clear that we have a public funded system. Thus, the percentage of GDP due to Public R&D expenditures is closer to the EU mean, allowing a better performance of Portugal in this indicator. This situation may reflect the investment in the higher-education system in the last years (most of it public funded).

Chart 2.8
Public and business expenditures on R&D
 1999 (%) of GDP



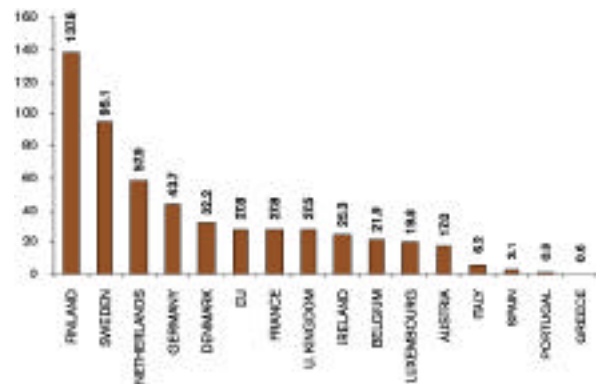
Source: European Commission, European Innovation Scoreboard, 2002.
 Notes: (1) Reference period for Public R&D Expenditures, 1999 for all countries, except 2001 for EU, Germany, Spain, Finland and United Kingdom, 2000 for Denmark and France, 1998 for Austria.
 (2) Reference period for Business Expenditures on R&D, 2001 for all countries, except 2000 for Belgium, Denmark and France 1999 for Greece, Ireland, Netherlands, Portugal and Sweden, 1998 for Austria.
 (3) Weighted means based on summing the numerator and denominator across all EU countries.

Innovation among enterprises involves not only the creation of knowledge through R&D but also all the processes by which new technology is diffused, absorbed and applied. As may be verified business R&D expenditures are extremely low in Portugal, representing only 0.17% of GDP. This situation is dramatic knowing that the formal creation of new knowledge within firms is highly determined by private investment on R&D activities. Nevertheless, Southern European economies (Portugal and Greece) are improving more rapidly than the EU average (both in Public and business expenditures).

One major difference is related to the fact that in almost all other countries business is responsible for the most part of R&D expenditures. For instance, in Finland, Sweden or Germany, Public expenditures are half of the Business expenditures in R&D.

New knowledge is often captured by patent applications (in EPO and USPTO), that is a traditional indicator of the innovation activity. If the creation and appropriation of knowledge is low, patenting activity also tends to be low. As can be verified in Chart 2.9, this is what happens with the number of patent applications in Portugal (per million population), which have no expression (nearly 0).

Chart 2.9
EPO high technology patent applications
 2000, per million population



Source: European Commission, European Innovation Scoreboard, 2002.
 Notes: (1) Reference period 2000 for all countries.
 (2) EPO high technology patent applications per million population.
 (3) Weighted means based on summing the numerator and denominator across all EU countries.

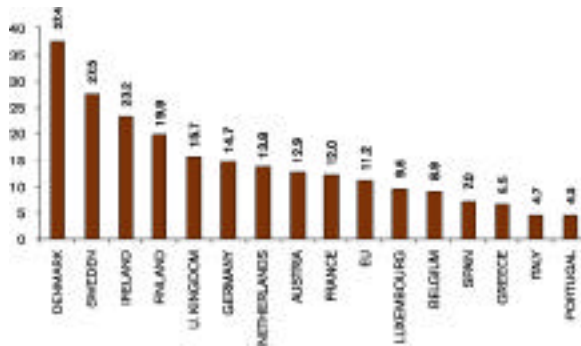
3. Transmission and Application of Knowledge

Innovation is systemic and depends upon complex interactions between many stakeholders. Information and knowledge access and transmission is therefore a critical element of any successful innovation system.

The lack of co-operation and collaboration between firms and stakeholders is a characteristic of the Southern

economies and is reflected in the Portuguese position on this indicator. Looking at Chart 2.10, it surfaces that only 4.5% of the Portuguese companies (manufacturing SME) are involved in innovation co-operation, when the EU average is almost three times higher (11.2%). This situation constrains information flows and knowledge creation, as well as transmission between public research institutions and firms and between firms and other firms. Countries with co-operation and collaborative schemes (like cluster programmes or Centres of Excellence) are the ones with best performance in this field (Denmark, Sweden and Ireland are the best examples).

Chart 2.10
Manufacturing SME involved in innovation co-operation
1996, (%) of manufacturing SMEs



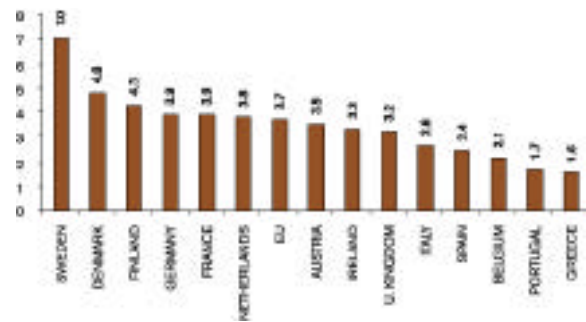
Source: European Commission, European Innovation Scoreboard, 2002.
Notes: (1) Reference period, 1996 for all countries, except 1998 for Spain, Greece and Netherlands.
(2) Weighted means based on summing the numerator and denominator across all EU countries.
(3) Data for the Member States have not been updated as new data from the Community Innovation Survey are not available.
(4) For all countries, data are national estimates taken from the questionnaires distributed to the "Group of Senior Officials in Innovation Policy".

In Chart 2.11, looking at the expenditures on innovation activities (% of all turnover manufacturing), it becomes clear that the Southern economies are the ones with lower expenditures, with Portugal in the last position amongst EU countries (below 2% of EU mean).

Investment in equipment and machinery and acquisition of patents and licences are some of the components of innovation expenditures, measuring the diffusion of new production technology and ideas.

Thus, this level of innovation expenditures leads to a lower performance in terms of productivity and competitiveness in Portugal.

Chart 2.11
Innovation expenditures
1996, (%) of all turnover in manufacturing

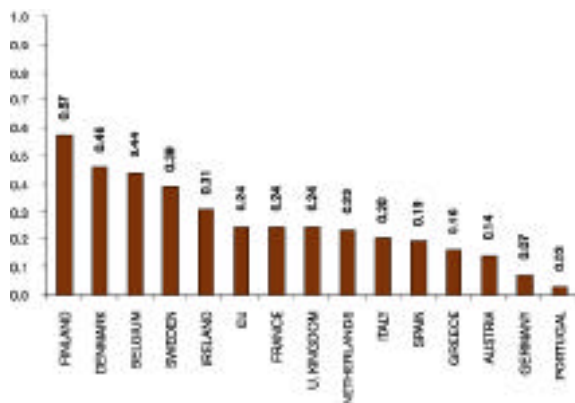


Source: European Commission, European Innovation Scoreboard, 2002.
Notes: (1) Reference period 1996 for all countries, except 1998 for Germany, Spain and Greece.
(2) Weighted means based on summing the numerator and denominator across all EU countries.
(3) Data for the Member States have not been updated as new data from the Community Innovation Survey are not available.
(4) For all countries, data are national estimates taken from the questionnaires distributed to the "Group of Senior Officials in Innovation Policy".

4. Innovation Finance, Output and Markets

In what concerns innovation financing, Portuguese high-tech venture capital investment (as % GDP) is 10 times lower than the EU mean (Chart 2.12). This fact reveals that the seed and venture capital market in Portugal is in the early stages and that could be a barrier to the innovation activities of technology-based firms. Their ability to raise adequate funding is one of the conditions for the success of high-tech entrepreneurship and for the creation and diffusion of innovative activities. These financial barriers also contribute to serious delays and decisions in starting an innovative project, especially in SMEs and small innovators and entrepreneurs.

Chart 2.12
High technology venture capital
 2001 (% of GDP)

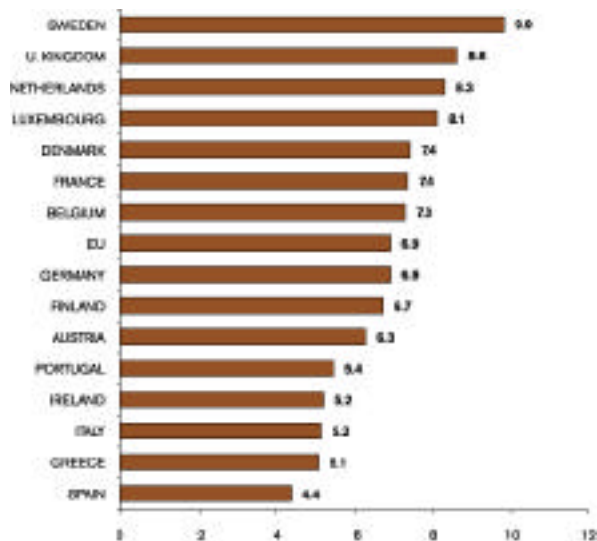


Source: European Commission, European Innovation Scoreboard, 2002.
 Notes: (1) Reference period, 2001 for all countries.
 (2) Weighted means based on summing the numerator and denominator across all EU countries.

ICT expenditure is one of the indicators that reflects the investment in the creation and diffusion of knowledge, stimulating the productivity level and competitiveness.

In Chart 2.13, data show that Portugal is amongst the last positions in what concerns ICT expenditures, lagging far behind the EU mean. Investment in ICT is crucial for innovation in knowledge-based economies, namely in the diffusion of new ICT equipments and services. Nevertheless, Portugal's ICT expenditures are higher than in the other traditional "Cohesion" countries (Spain, Ireland and Greece).

Chart 2.13
ICT expenditures
 2001, (% of GDP)



Source: European Commission, European Innovation Scoreboard, 2002.
 Notes: (1) Reference period, 2001 for all countries.
 (2) Weighted means based on summing the numerator and denominator across all EU countries.

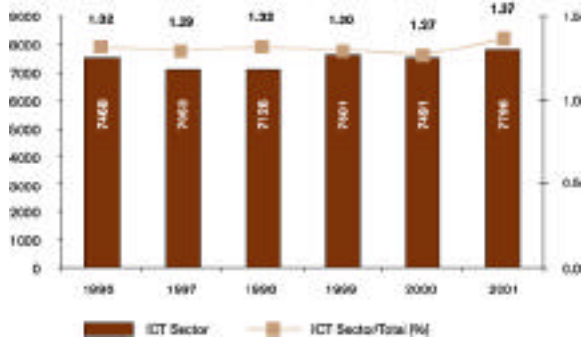
3. The ICT Sector¹ in the Economy

The importance of the ICT sector in the European economy has grown over the last decade. This chapter analyses the size and growth of the ICT sector in the European Union, as well as in Portugal, focusing on the contribution of this sector to employment, added value and investment growth, to international trade and to R&D expenditure.

1. ICT Enterprises in Portugal

Between 1996 and 2001, the ICT sector oscillated slightly (Chart 3.1), but the proportion of ICT enterprises remained steady from 1996 to 2001 (values around 1.3% for all years). The annual average growth rate for the latter period equals 0.1%.

Chart 3.1
ICT sector businesses and share of ICT sector businesses in total businesses in Portugal
1996-2001, Number of businesses with economic activity



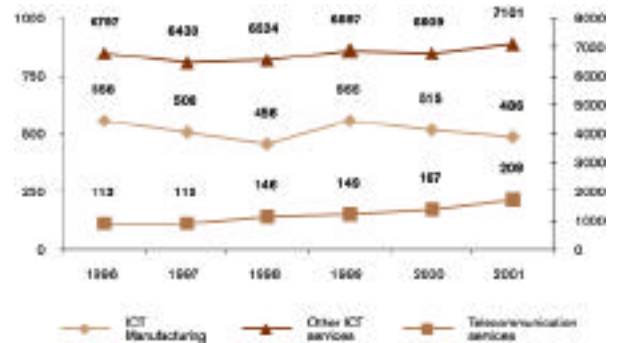
Source: INE, Harmonized Enterprises Survey, 1996-2001.

¹ In 1998, OECD member countries agreed on a definition of the ICT sector as a combination of manufacturing and services industries that capture, transmit and display data and information electronically. The definition based on an international standard classification of activities (ISIC Rev.3) was the first step towards comparisons between countries and has allowed, since then, the first comparable measurements for ICT sector core indicators (see OECD publications for additional information).

In this chapter, for analysis purposes, we'll be considering three subsectors within the ICT sector: manufacturing, telecommunication services and other ICT services.

As can be seen in Chart 3.2, the growth rate registered between 1996 and 2001 is correlated with an increase in the number of enterprises of the "other ICT services" subsector (more 292 enterprises) occurred in 2001.

Chart 3.2
ICT sector businesses by subsector in Portugal
1996-2001, Number of businesses with economic activity.



Source: INE, Harmonized Enterprises Survey, 1996-2001.

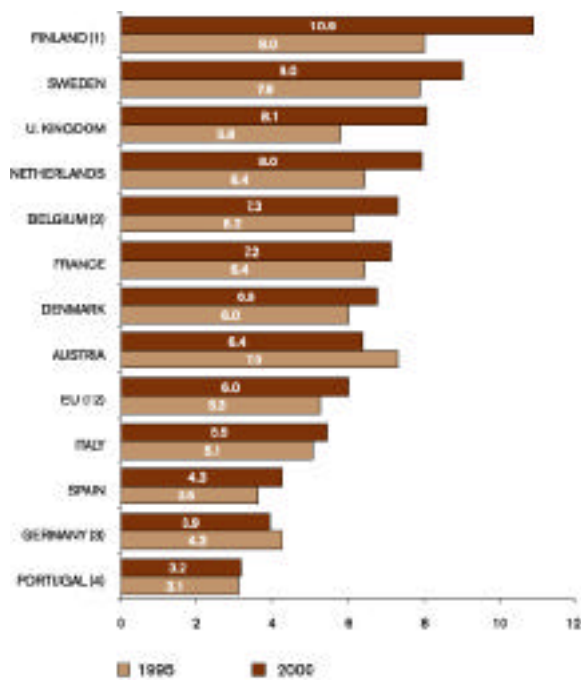
From 1996 to 2001, the number of telecommunication services enterprises rose gradually, with an annual average growth rate of about 13%. The manufacturing subsector, on the other hand, decreased in importance in the same period. This subsector experienced a negative annual average growth rate of -2.7%. In 2001, the manufacturing subsector was composed by 486 enterprises (less 72 enterprises than in 1996).

2. The ICT Sector in Employment Growth

The ICT sector has been important for employment growth in the European Union. Over the 1995-2000 period, ICT employment share rose by around 1% (Chart 3.3).

In 2000, Finland (in resemblance to other Northern European countries) was the country where the number of ICT workers as a percentage of the total number of workers presented the highest values (10.9%).

Chart 3.3
Share of ICT employment in business employment in the European Union
1995-2000, (%) of employment



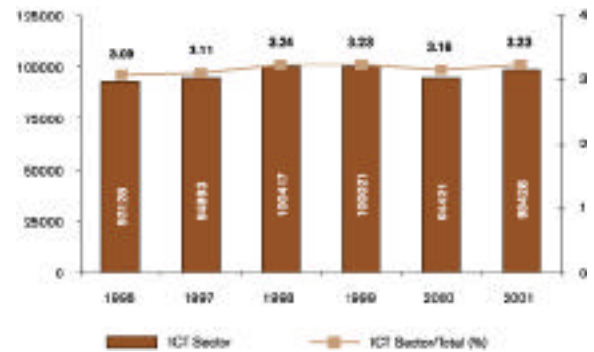
Source: OECD, estimates based on national accounts; STAN and National Accounts databases, September 2002.

- Notes: 1. Based on employees figures only.
2. Rental of ICT goods (7123) is not available.
3. ICT wholesale (5150) is not available. Data for 1999 instead of 2000.
4. Data for 1996 instead of 1995. Source for all data: INE, Harmonized Enterprises Survey, 1995-2000.

Between 1995 and 2000, Portugal experienced an almost null growth in ICT employment (0.1%), being positioned last in the 2000 EU ranking with about 3.2%, half of the EU average (6.0%).

The number of people employed by the ICT sector from 1996 to 2001, in Portugal, oscillated slightly, experiencing an annual average growth rate of 1.1% (Chart 3.4).

Chart 3.4
ICT sector employment and share of ICT sector employment in business employment in Portugal
1996-2001, Number of employees

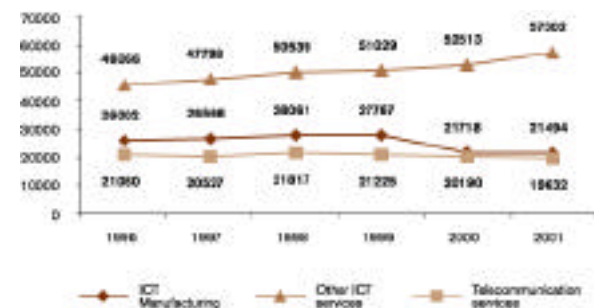


Source: INE, Harmonized Enterprises Survey, 1996-2001.

In 2001, this sector employed 98428 people, which amounted to 3.23% of the total number of employees in Portugal.

The “other ICT services” subsector (representing 60% of the ICT sector workers volume) functioned as the enhancer of ICT employment (Chart 3.5). With an annual average growth rate of 4.5%, this sector compensated the decrease in other ICT subsectors reversing the tendency verified in 2000 and adding around 5000 workers to the ICT sector.

Chart 3.5
ICT sector employment by subsector in Portugal
1996-2001, Number of employees

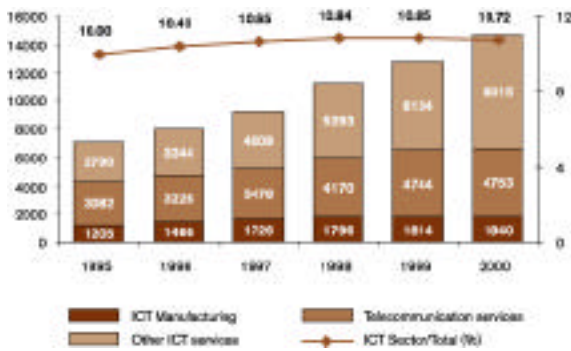


Source: INE, Harmonized Enterprises Survey, 1996-2001.

On the other hand, the ICT manufacturing subsector registered the highest decrease in number of employed workers (negative annual average growth rate of -3.7), which might be the reflex of the declining trend in manufacturing employment in almost all European countries.

In what concerns the qualifications structure of ICT sector workers, the number of graduates doubled in 5 years (7077 in 1995, 14608 in 2000) (Chart 3.6).

Chart 3.6
ICT sector graduates by subsector and share of ICT graduates in business graduates in Portugal
1995-2000, Number of graduates



Source: DETEFP, Ministry of Social Security and Labour, 2003.
Note: Data for 1998 and 1999 do not include the section 30 of ISIC Rev.3 (Office accounting and computer machinery).

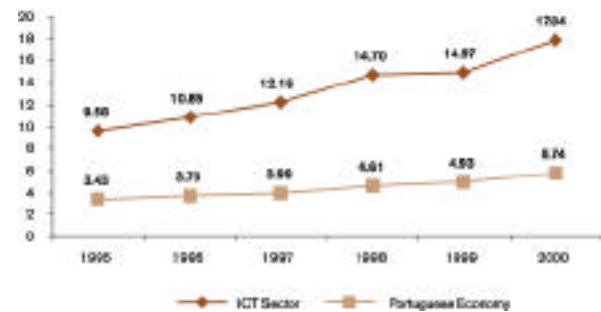
In spite of the above-mentioned increase, the proportion of ICT graduate workers within the total number of graduate workers remained the same, i.e., 1 out of 10 graduate workers employed within the ICT sector. The annual average growth rate for this period was equal to 1.4%.

The growth in the number of graduates was verified in all ICT subsectors, whereby "other ICT services" experienced the most significant growth (23.5%). Enterprises operating within this area were the main graduate recruiters, embracing about 55% of the total number of graduates.

The introduction of new technologies in production processes, as well as the kind of work developed in the ICT sector, explains the great demand of qualified workers within these enterprises. As such, between 1995 and 2000, whereas qualification rates grew 2.31% in the Portuguese economy, they grew 8.26% in the ICT sector.

In 2000, the qualifications rate of the ICT sector was three times higher than that of the overall business sector (Chart 3.7).

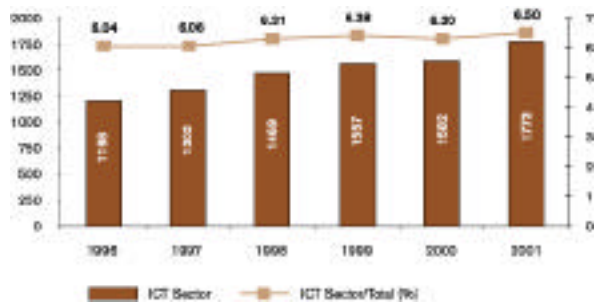
Chart 3.7
Qualification rates in the ICT sector and in total business sector
1995-2000, (%)



Source: DETEFP, Ministry of Social Security and Labour, 2003.
Notes: (1) Data for 1998 and 1999 do not include the section 30 of ISIC Rev.3 (Office accounting and computer machinery).
(2) The qualification rate corresponds to the ratio of graduate workers by total workers.

The recruitment of specialized staff, namely of graduate workers, increased the qualifications rate of the ICT sector. This resulted in more attractive job offers, which contributed to the growth of wages in the ICT sector - over EUR 575 million paid out by ICT enterprises (Chart 3.8).

Chart 3.8
ICT sector wages and share of ICT sector wages in business sector wages in Portugal
1996-2001, Million EUR

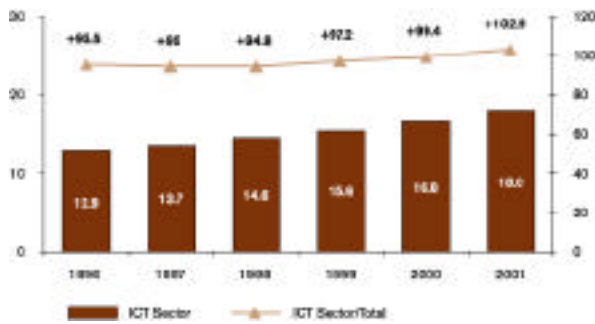


Source: INE, Harmonized Enterprises Survey, 1996-2001.

Besides the divergence in 2000, the share of ICT sector wages in total business wages has been increasing steadily since 1996.

Increased investment in human resources resulted, by and large, in the reinforcement of wages of professionals working within the ICT sector. Consequently, besides an annual average growth rate of 6.9%, income per capita in the ICT sector was double the value observed for the entire business sector in 2001 (Chart 3.9). This may be explained by the shortage of ICT professionals in the Portuguese job market, which may have increased the wage levels in ICT enterprises.

Chart 3.9
ICT sector wages per capita and share of ICT sector wages per capita in business sector wages per capita in Portugal
 1996-2001, Thousands EUR



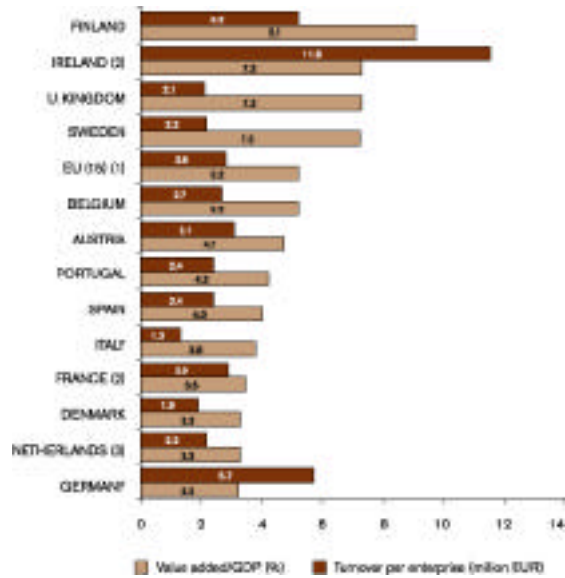
Source: INE, Harmonized Enterprises Survey, 1996-2001.

3. The ICT Sector in Value Added

The importance of the ICT sector in the European economy has been growing since the 90's. This growth has been more intense in Northern European countries. Finland, Ireland, the United Kingdom and Sweden, with added values superior to 7.2%, are the countries whose ICT sector had the greatest relative importance in the countries' GDP.

In 2000, the value added generated by EU countries was of about 5.2% of GDP. Portugal was positioned below the European Union average with 4.2% of GDP (Chart 3.10).

Chart 3.10
Value added at factor cost and turnover in ICT sector in the European Union
 2000, (%)



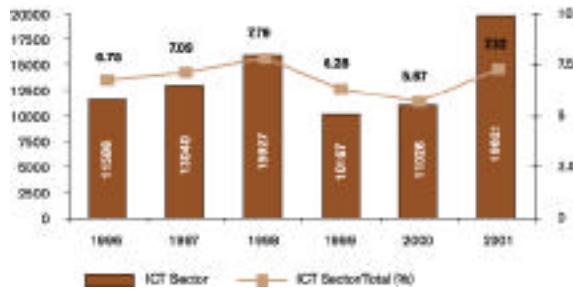
Source: Eurostat, New Cronos, 2003.
 Notes: (1) Estimate, excluding Greece; (2) Excluding group 64.2; (3) Excluding class 51.64
 For value added at factor cost in the ICT sector relative to GDP:
 Germany and Denmark - excluding classes 51.43, 51.64, 51.65
 Netherlands - Excluding division 32, class 51.64 for 2999, group 64.2
 France - Excluding group 64.2
 EU - Estimate, excluding Greece
 Ireland - Excluding group 64.2; 1999

In 2000, the European Union registered a turnover by enterprise of EUR 2.8 million (ICT sector). Ireland clearly stood out with a turnover by enterprise of EUR 11.6 million. Portugal fell behind the European Union average, registering a EUR 2.4 million turnover by enterprise. According to Eurostat, the EU's turnover in the ICT sector in 2000 was estimated to be EUR 1550 billion, of which approximately 27% was generated in the ICT manufacturing sector.

In what concerns Portugal, a total turnover of EUR 19821 million was registered in the ICT sector in 2001. This represents an annual average growth rate higher than 11% relatively to 1996 (Chart 3.11).

Chart 3.11
ICT sector turnover and share of ICT sector turnover in business sector turnover in Portugal

1996-2001, Million EUR



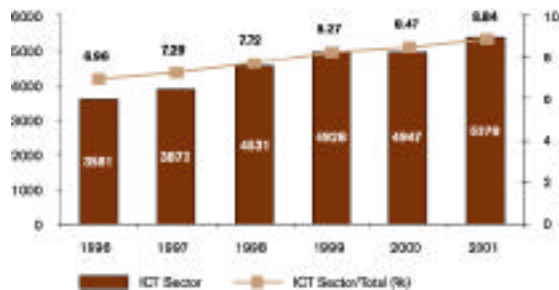
Source: INE, Harmonized Enterprises Survey, 1996-2001.

In spite of the crash observed in 1999, in 2001 the turnover generated by the ICT sector as a percentage of the total turnover (7.32%) reached the levels registered in 1998 (7.79%).

The gross value added generated by ICT sector enterprises reveals the growing importance of this sector in the Portuguese economy. In 2001, the gross value added of this sector reached EUR 5378 million (an annual average growth rate of 8.5% relatively to 1996), amounting to 8.84% of the total value generated by the Portuguese economy (Chart 3.12).

Chart 3.12
ICT sector gross value added pm and share of ICT sector gross value added pm in business sector gross value added pm in Portugal

1996-2001, Million EUR

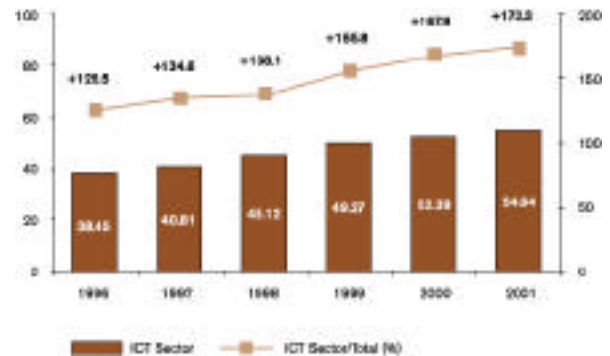


Source: INE, Harmonized Enterprises Survey, 1996-2001.

The gross added value per capita confirms the importance of the ICT sector. In ICT enterprises that value represents over 173% of the added value registered for the whole Portuguese economy (Chart 3.13).

Chart 3.13
ICT sector gross value added per capita and ICT sector gross value added per capita in business gross value added in Portugal

1996-2001, Thousands EUR



Source: INE, Harmonized Enterprises Survey, 1996-2001.

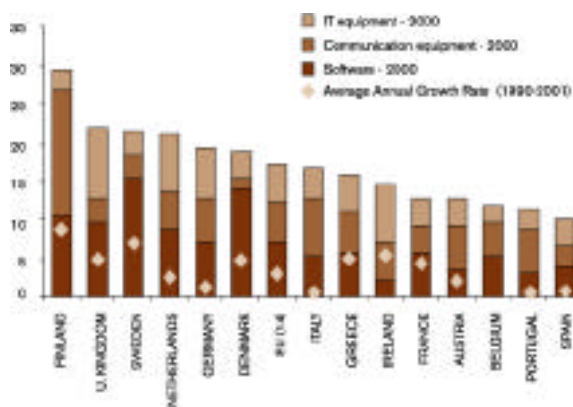
4. The ICT Sector in Investment

ICT investment plays an important role in European economic growth, as the introduction of information and communication technologies enables the adoption of more efficient business practices, which potentially result in significant gains and savings.

In EU countries, ICT investment reached 17% in 2000 - whereby software purchases contributed with 7.2% (Chart 3.14).

Chart 3.14
ICT investment by asset in the European Union

1990-2001, Percentage of non-residential gross fixed capital formation, total economy



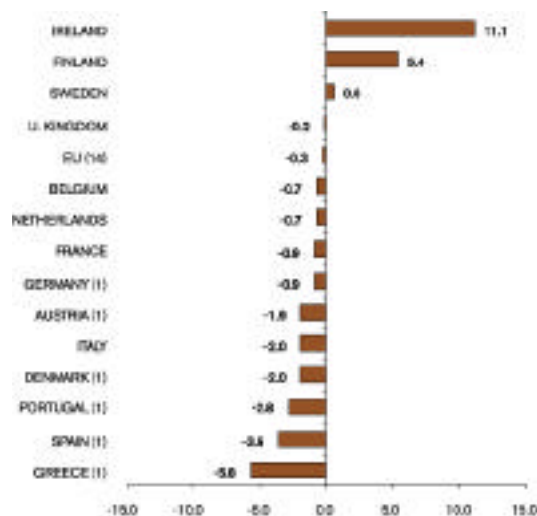
Source: OECD, estimates based on national accounts, data underlying Colechia and Schreyer (2001) and Van Ark, et al. (2002). OECD, SCOREBOARD - OUTLOOK.
 Notes: (1) ICT equipment is defined here as computer and office equipment and communication equipment; software includes both purchased and own account software.
 (2) Annual Average Growth Rate not available for Belgium.

In Portugal the greatest investment efforts were directed to communications equipment (5.2%). Overall, Portugal registered an annual average growth rate of 0.6%, between 1990 and 2001. In this period, this was the lowest registered growth within the European Union, 2.3% below the EU growth average.

5. The ICT Sector in International Trade

In 2001, Ireland, Finland and Sweden were the only countries with a positive ICT sector trade balance, i.e., a higher volume of exports in comparison with imports (Chart 3.15). The comparative advantage of these three countries may be explained by high exports of manufactured products: computers (Ireland) and telecommunications equipment (Finland and Sweden).

Chart 3.15
ICT sector trade balance in the European Union
 2001, (%)

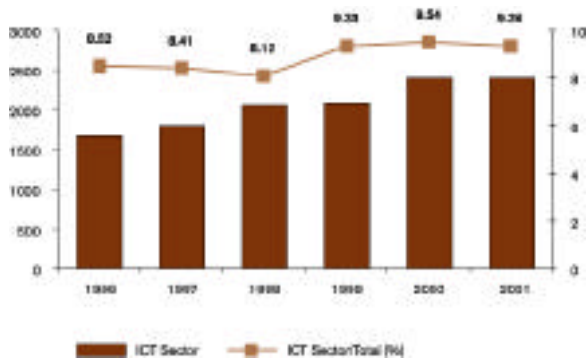


Source: OCDE, International Trade in Commodity Statistics (ITCS) and Structural Analysis (STAN) databases, August 2002.
 Note: 1. 2000 data

In resemblance to its EU partners, Portugal presented a negative trade balance in the ICT sector of 2.8%, diverging 2.5% from the EU average.

In spite of a prevailing negative trade balance, between 1996 and 2000, Portuguese ICT enterprises experienced an annual average growth rate of 7.4% in exports (Chart 3.16). The value added generated by these enterprises represented 9.36% of the total volume of exports in Portugal.

Chart 3.16
ICT sector exports and share of ICT sector exports in business exports in Portugal
1996-2001, Million EUR



Source: INE, Harmonized Enterprises Survey, 1996-2001.

Chart 3.17
ICT sector R&D investment and share of ICT sector R&D investment in business investment in Portugal
1996-2001, Million EUR



Source: INE, Harmonized Enterprises Survey, 1996-2001.
Note: Only enterprises with 20 plus employees.

6. The ICT Sector R&D Expenditure

Technological modernization of infrastructures, products and services is crucial to enhance competitiveness and, as such, R&D investment has risen in importance within enterprises.

In this context, the ICT sector has been instrumental, contributing to the increase of R&D activities in most European countries. From 1996 to 2001, R&D expenditure of Portuguese ICT enterprises presented an annual average growth rate of 29% (Chart 3.17). In 2001, this expenditure amounted to 47.95 million Euros, representing over 1/4 of the total R&D investment by Portuguese enterprises.

4. The Telecommunications

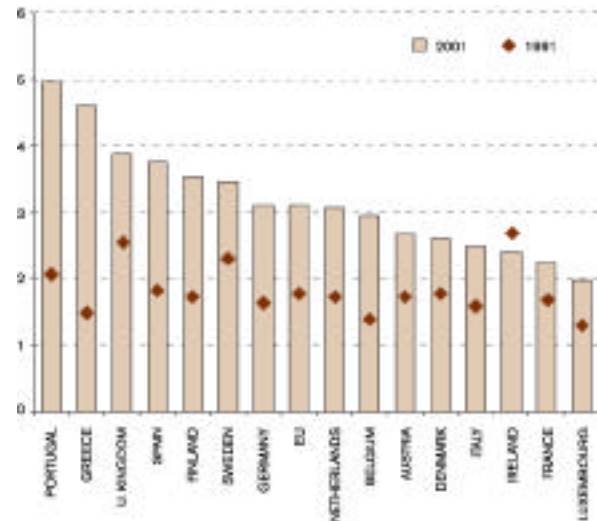
1. The Telecommunications Sector

Over the last decade, the telecommunication sector has played a significant role in economic development, productivity growth and technological diffusion. As underpinnings of Internet and electronic commerce diffusion, the telecommunication industry has induced major changes in economic structures, prompting economic development.

In the European Union telecommunications revenues have grown significantly. In 2001, the total revenues for the telecommunication sector were around USD 243 billion in the European Union, compared to USD 129 billion in 1991. The figures represent around a twofold increase in the European Union over the last decade. In the same period, in Portugal, the telecommunications revenue increased from USD 1.7 billion to USD 5.4 billion, which represented more than a threefold increase and a compound annual growth rate of 12.5%, compared to 6.6% in the European Union. The rapid growth of mobile penetration in Portugal could certainly explain this situation. In fact, as the last OECD Communication Outlook¹ has pointed out “the two majors drivers continued to be wireless communications and the Internet. More recently, revenues for fixed network broadband access and wireless data services have begun to become significant”.

Telecommunications revenues continue to increase as a proportion of GDP. Across the European Union telecommunications revenues increased from 1.80% in 1991 to 3.09% in 2001 (Chart 4.1). In Portugal the proportion of GDP rose from 2.06% in 1991 to 4.96% in 2001, representing more than a twofold increase. As can be observed, Portugal had the highest telecommunication share of GDP amid European Union countries, illustrating thus the dynamism of the national telecommunication industry and the increasing importance of this sector in the Portuguese economy.

Chart 4.1
Telecommunications revenue as a percentage of GDP
in the European Union
1991-2001, (%) of GDP



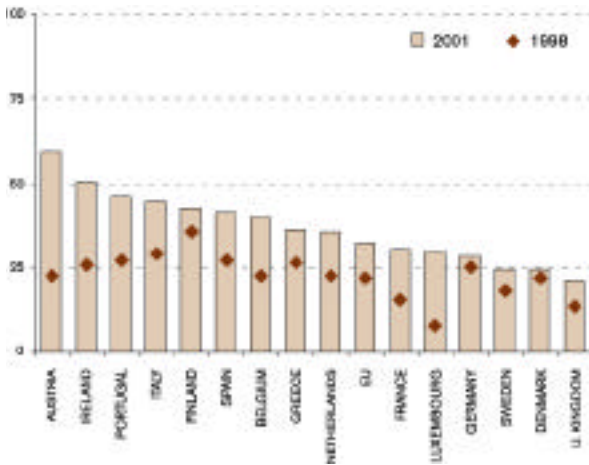
Source: OECD, Communications Outlook, 2003.

2. Mobile Communications

As pointed out above, one of the major drivers of telecommunication revenue is wireless communications. Mobile telecommunications revenues continue to increase in proportion of GDP and in proportion of telecommunication revenue. In 2001 about 1/3 of telecommunication revenue across the European Union came from mobile services (Chart 4.2). In Portugal, mobile telecommunications revenue had a higher weight, amounting to around 50% of telecommunication revenue. This fact corroborates the huge expansion of mobile services in Portugal compared to other types of telecommunications services.

¹ OECD, Communications Outlook, 2003.

Chart 4.2
Mobile telecommunication revenue in the European Union
 1998-2001, (%) of total revenue

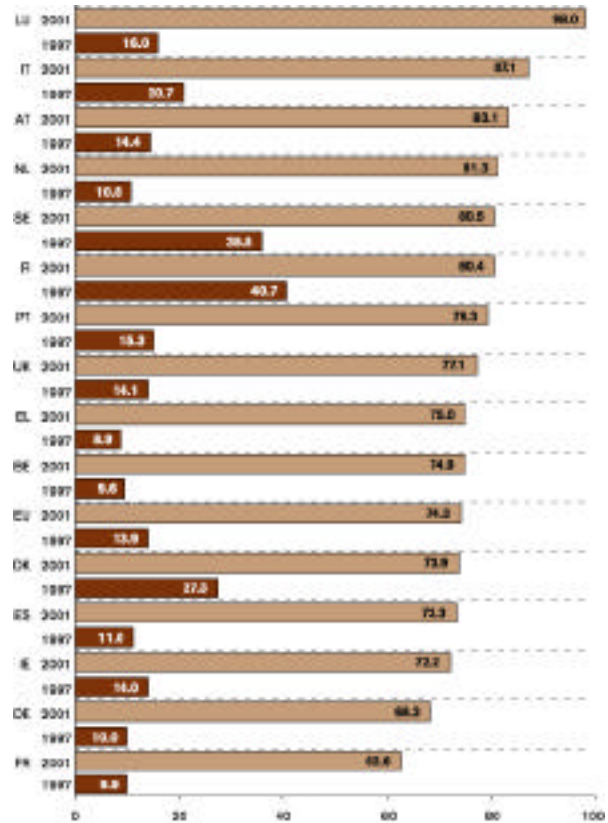


Source: OECD, Communications Outlook, 2003.

In 2001, Portugal had more than 3/4 of cellular mobile subscribers, which means that the country had a penetration rate higher than the European Union one (Chart 4.3). Luxembourg led the ranking with 98% of subscribers, being Germany (68.3%) and France (62.6%) placed at the bottom.

Data clearly indicate that cellular mobile services are widespread across the European Union. In Portugal, this fact could be explained by two main reasons: the liberalisation of mobile communications and its effects on market competition; the early adoption of prepaid cards and the associated perception of costs control by subscribers.

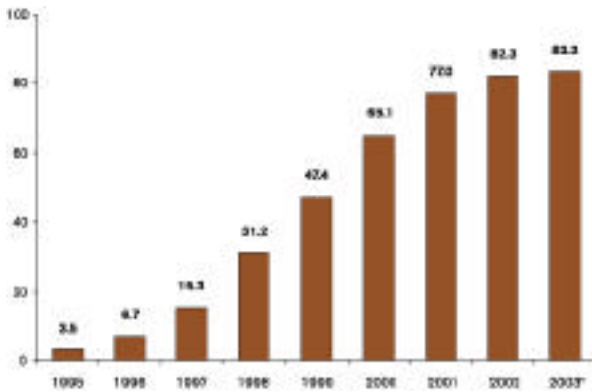
Chart 4.3
Cellular mobile penetration in the European Union
 1997-2001, (%) of subscribers per 100 inhabitants



Source: OECD, Communications Outlook, 2003.

In Portugal a relative slowdown in the growth of mobile penetration can be observed in 2002 (Chart 4.4). The reasons are certainly related to the higher penetration rate verified in 2001, which constrained the potential growth.

Chart 4.4
Mobile telephony subscribers growth in Portugal
1995-2003, (%) of subscribers per 100 inhabitants



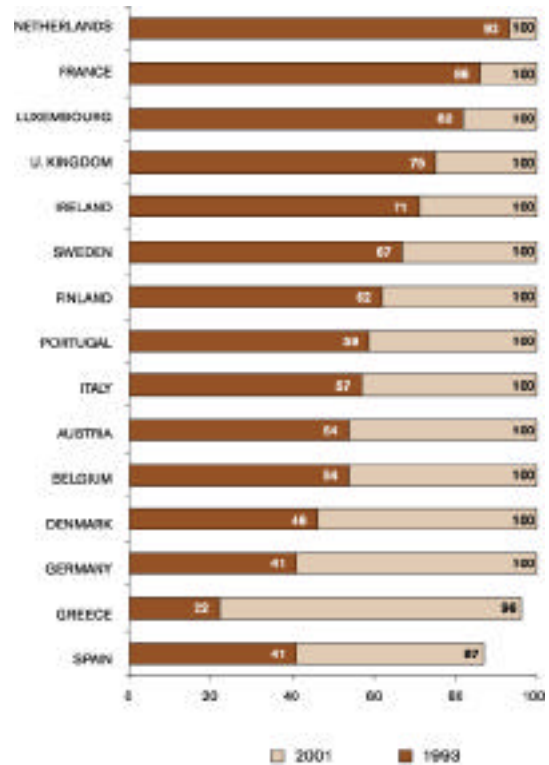
* 2nd Qtr.
Source: Anacom, 2003.
Note: The national communications regulator based on the Census 2001 reviewed the data for the period 2001 to 2003.

3. Digitalisation and Fibre Optic Cable

The installation of fully digital local exchanges in the European area is nearing completion. By the end of 2001, more than 98% of all local loops in the European Union were connected to digital exchanges. In this area all exchanges are digital, with exception of Greece (96%) and Spain (87%), as can be seen in Chart 4.5.

The digitalisation of wireless communications in the European Union is also nearing completion. Since 1998 Portugal, Belgium, Luxembourg and Greece only provided digital services.

Chart 4.5
Digitalisation in the European Union
1993-2001, (%) of digital access lines in the fixed network

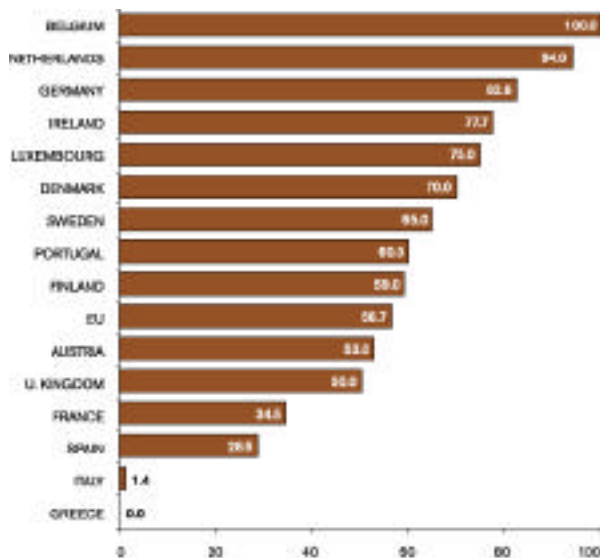


Source: OECD, Communications Outlook, 2003.

Telecommunications carriers continue to rapidly increase the amount of fibre optic cable installed domestically. In 2001, the average of cabled households in the European Union was 3.3% lower than in Portugal (Chart 4.6). In fact, Portugal had the highest penetration rate of cabled households of the southern European countries. Indeed, Southern European countries had the lowest percentage of cabled households. Positioned at the top of the ranking were Belgium, Netherlands and Germany with more than 80% of cabled households.

Chart 4.6
Percentage of cabled households in the European Union

2001, (%) of total households



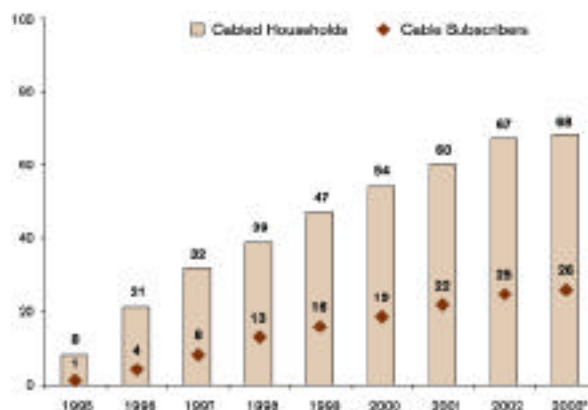
Source: OECD, Communications Outlook, 2003.

The available data for the second quarter of 2003, provided by the Portuguese communications regulator, confirm the growth of the cabled households' rate (Chart 4.7).

Presently, Portugal has 68% of cabled households, which represents more than 2/3 of the total number of households. Cable subscribers represent 26% of the potential subscribers, i.e. all households, and about 40% of the total cabled households. As may be observed, the availability of a cable network covering the whole Portuguese territory is far from completion. The achievement of this goal implies a major challenge: to cable households located in unprofitable areas of the Portuguese territory, mainly peripheral areas.

Chart 4.7
Cable-TV service penetration rates in Portugal

1995-2003, (%) of Households



* 2nd Qtr.
 Source: Anacom, 2003.

4. Internet Infrastructure

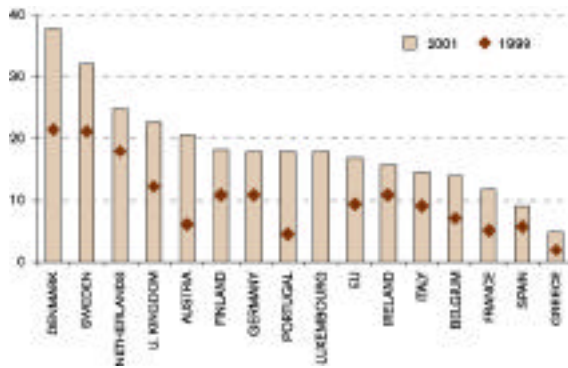
The Internet continues to grow and the percentage of Internet subscribers² is increasing rapidly. At the same time, broadband access is becoming more common, particularly among the more developed countries.

By the end of 2001, the Internet penetration rate was about 16.8% in the European Union, compared to 9.5% in 1999, which represents a compound annual growth rate of 33.4% (Chart 4.8). In Portugal the Internet subscribers' penetration rate was higher than the European Union, reaching 18.1% at the end of 2001, representing a compound annual growth rate of 96.1%, in the period of analysis.

This rapid growth verified in Portugal could be explained by the adoption of "free Internet accounts" in 2000. Since this year the number of Internet subscribers has had a considerable expansion.

² As pointed out by OECD Communication Outlook 2003, "there is a widespread interest in industry and government in the take-up and use of the Internet. The number of people accessing Internet is, therefore, a key indicator. However, as yet there no single measure of adoption, (...) an alternative approach is to compile information on Internet subscribers by country from major telecommunications carriers' reports of the number of subscribers to their Internet services and their estimated market share".

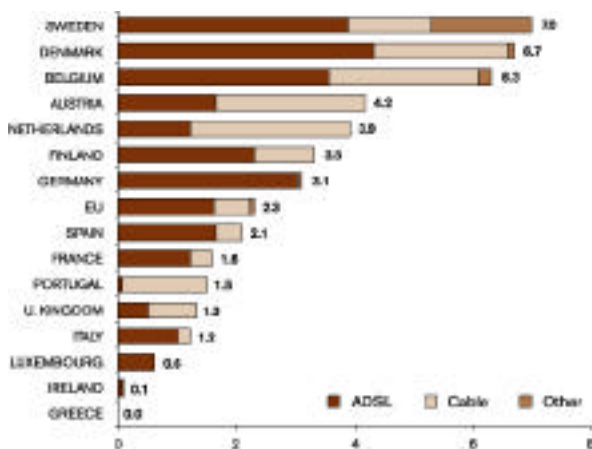
Chart 4.8
Internet subscribers to fixed networks per 100 inhabitants in the European Union
1999-2001



Source: OECD, Communications Outlook, 2003.
Note: No data available for Luxembourg in the year 1999.

It is fundamental to analyse this indicator taking into account that Internet subscribers actually means Internet subscriptions, as one individual can have more than one Internet account. As a result, the observed data should be pondered and Internet subscribers and Internet users should never be mixed-up.

Chart 4.9
Penetration and growth of broadband connections in the European Union
June 2002, Broadband access per 100 inhabitants



	SE	DK	BE	AT	NL	FI	DE	EU	ES	FR	PT	UK	IT	LU	IE	EL
2001	3.87	4.33	3.54	1.66	1.20	2.31	2.99	1.62	1.65	1.21	0.05	0.52	1.02	0.60	0.06	0.001
1999	1.44	2.26	2.53	2.54	2.70	0.99	0.05	0.59	0.45	0.39	1.45	0.78	0.18	0.003	0.04	0
2002	1.69	0.11	0.23	-	-	-	0.06	0.09	-	-	-	-	-	-	-	-

Source: OECD, Communications Outlook, 2003.
Note: "Other" broadband Technologies include satellite broadband Internet, fibre-to-the-home Internet access, Ethernet LANs and fixed wireless subscribers (at downstream speeds greater than 256 Kbit/s).

Broadband Internet access continues to increase in the European Union (Chart 4.9). In 2002, the European Union value reached 2.3% of broadband Internet subscribers. Portugal was situated below the European Union penetration rate, with 1.5% of subscribers. The ranking was led by Sweden (7%) and Denmark (6.7%), on the opposite position of the Chart Greece and Ireland can be found, countries where there was no commercial DSL and Cable modem service available.

In 2002, the percentage of subscribers using DSL (1.62%) surpassed the percentage of subscribers using cable modems (0.59%) in the European Union. In contrast with this reality, in Portugal the number of DSL subscribers was residual. This fact can be explained by the late supply of DSL services, which started in 2001. Between 1999 and 2001, the commercial supply of broadband services (DSL and Cable modem) was only available through cable network.

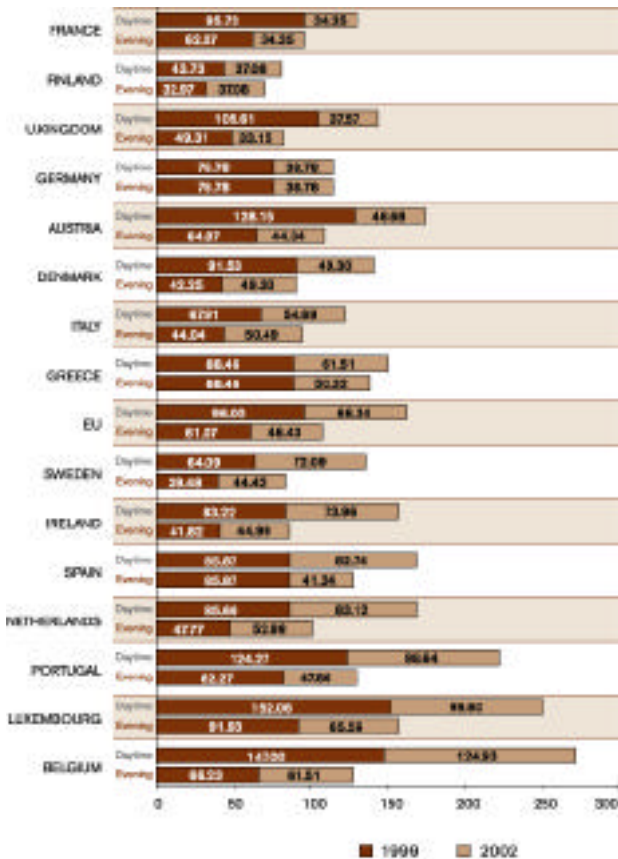
5. Internet Access Pricing

Internet access prices have decreased appreciably in recent years in the European Union (Chart 4.10). Between 1999 and 2002, and according with the OECD methodology³, a decrease of around USD 30 was observed in dial-up access Internet pricing, at daytime rates, and of about USD 15, at evening rates.

In 2002, Portugal continued to have a higher price (USD 98,64), at daytime rates, in comparison to the European Union average price (USD 66,34). The only European countries with higher prices than Portugal were Luxembourg (USD 99,60) and Belgium (USD 124,93).

³ This methodology to measure Internet access pricing is elaborated comparing a basket of Internet access services. This basket includes line rental, PSTN usage charges and the ISP fee.

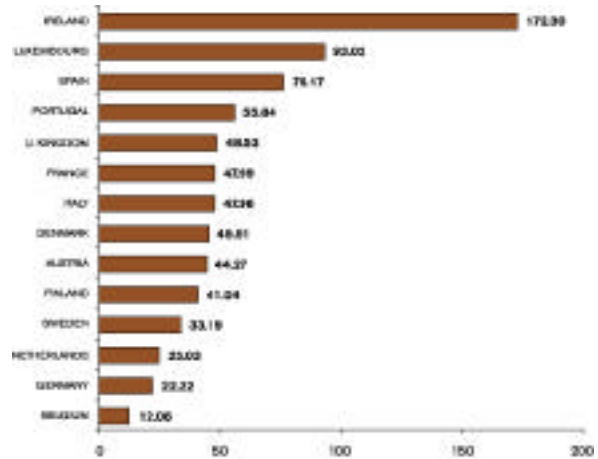
Chart 4.10
Internet access basket for 40 hours using discounted PSTN rates in the European Union
 1999-2002, Prices in USD PPP (including VAT)



Source: OECD, Communications Outlook, 2003.

In what concerns Internet access pricing at evening rates, in 2002 Portugal was better situated among European Union countries. However, the price observed (USD 47,86) was still higher than the European Union average price (USD 46,43). The figures indicate that Portugal needs to reduce prices, a major barrier for Internet access, namely in households (see Chapter 5).

Chart 4.11
Best normalised ADSL rental prices (minimum monthly rental per 1 Mbit's) in the European Union
 2002, Prices in Euros (including VAT)



Source: Teligen, DG Information Society, Internet Access Report, November 2002.
 Note: Greece is not included in this chart.

The costs are, in fact, a huge barrier to ICT diffusion and use. The figures concerning broadband rental prices tend to confirm the correlation between price and access rate.

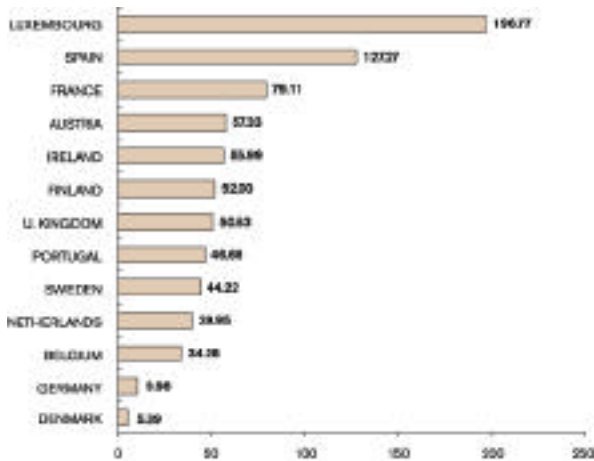
In general, the European Union countries with lower ADSL and Cable Modem rental prices had higher rates of broadband connection penetration (Charts 4.11 and 4.12). The countries with a broadband penetration rate higher than the European Union rate had lower broadband Internet prices, particularly evident in ADSL rental prices.

In what concerns ADSL and cable modem rental prices, it is important to notice the difference between the highest and lowest prices observed in the European Union countries. In 2002, the differences were the following: about EUR 160 in ADSL, around EUR 190 in cable modem. In Portugal, ADSL rental price is more expensive than in other European countries, with exception of Ireland, Luxembourg and Spain.

Chart 4.12

**Best normalised cable modem rental prices
(minimum monthly rental per 1 Mbit's) in the
European Union**

2002, Prices in Euros (including VAT)



Source: Teligen, DG Information Society, Internet Access Report, November 2002.
Note: Greece and Italy are not included in this chart.

Widespread Internet broadband demands a significant reduction of Internet prices in the European Union, and namely in Portugal.

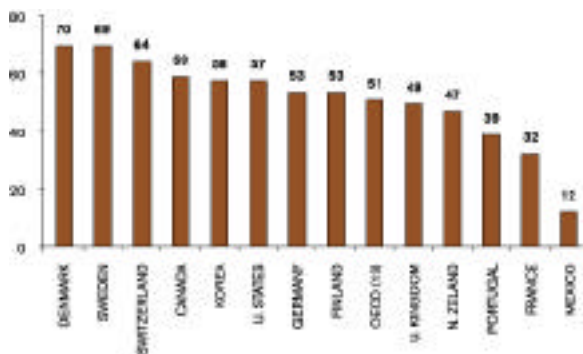
This means that policies aiming to improve competition conditions to facilitate interconnection, to reduce interconnection charges, to enhance access through unbundling and to reduce power of dominant carriers are still, in fact, very important. These policies will be fundamental to achieve the major targets included in the Portuguese Broadband Action Plan, namely, half of households with a broadband Internet connection.

5. e-Citizens

1. Computer Access and Usage

By the end of 2001, the diffusion of computer access in households presented two types of scenarios. According to a sample of OECD countries (Chart 5.1), Portugal was part of the group falling behind the average (51%), with 39% of households with computer access.

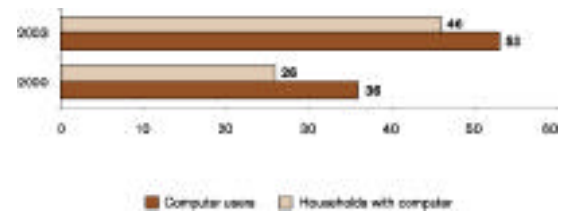
Chart 5.1
Households with computer access in OECD countries
2001, (%) of households



Source: OECD, Science, Technology and Industry Scoreboard, 2003.

In September 2003, there was an improvement, as shown by the results of the Survey on ICT Usage by the Portuguese Population, led by UMIC – Innovation and Knowledge Society Unit. 46% of the Portuguese population declared having one or more computers at home. This represents an increase of 20% comparing to the same period of 2000 (Chart 5.2). Nevertheless, in 2003, Portugal was still falling behind the OECD average of 2001.

Chart 5.2
Computer users and households with computer in Portugal
2000, 2003, (%) of households; (%) of population



Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.

In what concerns usage, by September 2003, 53% of the Portuguese population had used a computer, 17% more than in 2000. In spite of this increase, the patterns of computer usage do not differ: it is higher amongst the youngest age groups (90% of those aged 15-19, against 20% of those aged 50-64) and amongst the highest levels of education (97% of people with a university degree, against 16% of people with primary education).

The household's monthly net income is determinant for having a computer at home. Households in the lowest net income group (inferior to €1,000) present computer penetration rates about 4 times smaller than those households in the highest income level group (superior to €2,500), i.e., 23% in the lowest level against the 88% of the highest level. Data shows that the number of people in the household (dimension) also influences the computer penetration rate. About 30% of households with 1 or 2 persons have a computer. For households with 3 or more persons, the penetration rate surpasses 50%.

Drivers and barriers for having a computer at home

The motivations and set-backs for purchasing a computer are important when it comes to understand its patterns of diffusion. In Table 5.1, and according to the Survey on ICT Usage by the Portuguese Population 2003, the most important drive to have a computer at home is the importance of the device as a tool for children's education (33%). The importance of this driver increased from 2000 to 2003, mainly amongst households with lower income.

Table 5.1
Most important reasons for having a computer at home
2000, 2003 (%) of households with computer access

Drivers	Rank	2003	2000
Important for children's education	▲	33	27
Important professional instrument	▼	27	27
It saves time in performing tasks	◀▶	20	25
To keep up with society's technological development	◀▶	9	9
Leisure	◀▶	6	6

Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

The importance of the computer as a professional tool (27%) is the second most pointed out reason, especially for households with one person. This is truer if they have a university degree. The third most pointed out reason is the economy of time in performing tasks with 20% of answers, and with some lesser degree of importance: to keep up with society's technological development (9%) and leisure (6%).

Table 5.2
Most important reasons for not having a computer at home
2000, 2003 (%) of households without computer access

Barriers	Rank	2003	2000
With no utility to the household	◀▶	42	35
Too expensive	◀▶	31	29
Not a basic need good	◀▶	6	18
Don't know how to use	◀▶	7	6
Access in other places	◀▶	6	4

Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

The perceived lack of utility of the computer to the household is still the most important barrier pointed out by 42% of individuals living in households with no computer. The high costs is the second most important reason with 31% of answers by the population with no computer – which are even more relevant for households

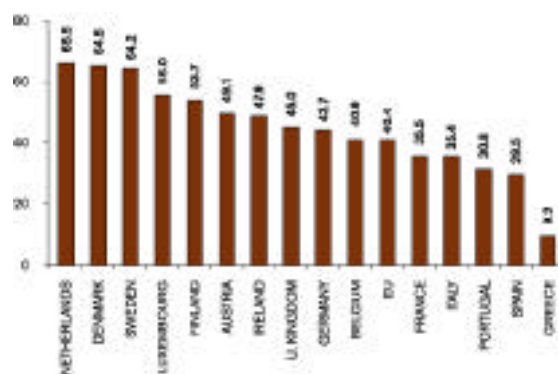
with 4 or more persons. Detached from the two main reasons appear: not a basic need good (8%), don't know how to use (7%) and access to the computer in other places (6%).

2. Household Access to the Internet

According to the information released by the Eurostat (data gathered in the scope of the study "Internet and the Public at Large", at the request of the European Commission¹), in June 2002, 40.4% of the European Union's population had an Internet connection at home – an improvement of 4.3% comparing to June 2001.

In Portugal, Internet penetration in households was about 10% inferior to the European Union (EU) average, with only 30.8% of households connected (Chart 5.3). Nevertheless, this value represents an increase of 7.4% when compared with the same period of the previous year. Growing above the average of the EU was still insufficient to alter the third-to-last position in the benchmarking "ranking".

Chart 5.3
Households connected to the Internet in the European Union
2002, (%) of households

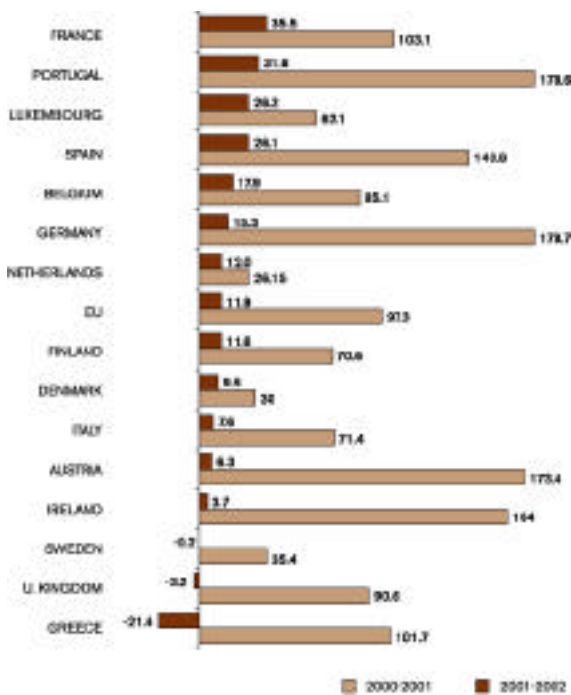


Source: Eurostat, Structural Indicators, 2002.

¹ The European Commission ordered a series of studies (Flash Eurobarometer, "Internet and the Public at Large"), from March 2000 to June 2002, in order to produce statistical indicators for the benchmarking exercise of the eEurope2002 Action Plan. For the eEurope2005 benchmarking exercise, the National Statistical Institutes from each member states will be producing the statistical evidence for the benchmarking indicators.

In spite of its absolute results, Portugal takes part of the leading group in terms of growth rates (Chart 5.4).

Chart 5.4
Households connected to the Internet in the EU:
annual growth rates
2000-2001, 2001-2002, (%)



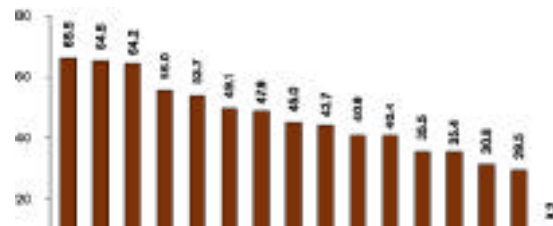
Source: Eurostat, Structural Indicators, 2002.

Between March 2000 and June 2001, Portugal grew 178.6%, when the EU growth average was 97.3%. Between June 2001 and June 2002, Portugal grew 31.6%, when the EU growth average was 11.9%. Besides illustrating a substantial evolution, Chart 5.4 shows (in relation to the Portuguese position in the benchmarking “ranking” of connected households) that it is important to continue growing comfortably above the European average, once its starting point was very low in comparison to most EU member states.

Drivers and barriers for having Internet at home

In line with what was previously developed, namely Portugal’s scores in the EU benchmark, it is important to understand the obstacles and the boosters for having Internet access at home. Table 5.3 and Table 5.4 contextualize the Portuguese situation in September 2003, according to the results of the Survey on ICT Usage by the Portuguese Population.

Table 5.3
Most important reasons for having an Internet connection at home
2000, 2003, (%) of households with Internet access



Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

Professional need is the most identified reason for having Internet at home, a reason of growing importance from 2000 to 2003, as shown by the increase of 8 percentage points to 23%. This value is much higher for households with two persons and almost doubles for households with only one person. The importance of the Internet for children’s education is the second most pointed out reason with 20%. This is even truer amongst households with the lowest incomes (less than € 1,000). Keeping its place as the third most important reason for having Internet at home is the interest in keeping up with society’s technological development (20%). The recognition of Internet as the best tool for finding information (the second biggest increase from 2000 to 2003 with 6 percentage points) is still in the fourth place. The influence of friends and relatives (9%) is the last reason to be identified with a lesser degree of importance in comparison with the others.

Households without an Internet connection mention costs as the biggest set-back. 40% declare not having Internet access at home because it is too expensive, which is even truer for households with the lowest income (Table 5.4).

The possibility to access the Internet in other places is the second most important reason for not having Internet at home with 22% of responses. This value is substantially higher for households with one person (58%). The lack of usefulness to the household is the third most important barrier (14%) for not having an Internet connection. With a lesser degree of importance, in comparison with the above mentioned reasons, one must point out: don't know how to use the Internet (7%) and don't have time to use the Internet (5%).

Table 5.4
Most important reasons for not having an Internet connection at home

2000, 2003, (%) of households without Internet access

Barriers	Rank	2003	2000
Too expensive	▲	40	28
Access in other places	▲	32	13
With no ability to the household	▲	14	10
Don't know how to use the Internet	▲	7	-
Don't have time to use the Internet	▼	5	1

Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.

Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

Broadband Internet connections in the household

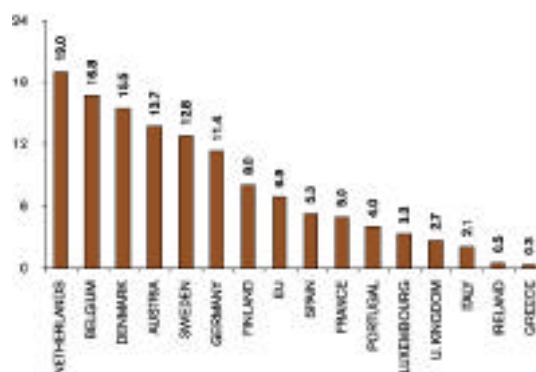
Exploring the possibilities of the Information Society demands the constant expansion of the electronic networks capacity. In line with this perspective, the EU launched the eEurope 2005 Action Plan, which underlines the importance of widespread availability and usage of broadband electronic networks².

In this context, it is important to evaluate the availability of broadband access within the households, once this indicator is, at this time, one of the most important pointers of Information Society development.

² See the Communication from the Commission to the Council, to the European Parliament, The Economic and Social Committee and the Committee of the Regions (Brussels, May 2002), where can be read that the eEurope 2005 Action Plan aims to "stimulate secure services, applications and content based on a widely available broadband infrastructure (...) focussing on the widespread availability and use of broadband networks throughout the union by 2005".

In June 2002, according to data released by the European Commission, the percentage of households with broadband Internet connections³ in the EU was still low (6.9%). In Portugal the broadband penetration rate was even lower with 4% of households connected (Chart 5.5).

Chart 5.5
Households with a broadband Internet connection in the European Union
2002, (%) of households



Source: European Commission, Flash Eurobarometer 125.0, "Internet and the Public at Large", June 2002.

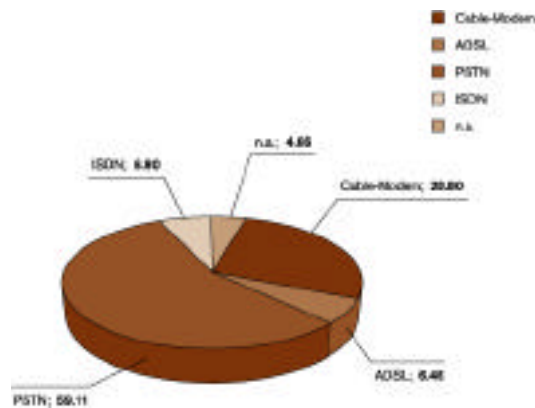
It is important to stress that Southern European countries must make a real effort not to widen the gap between them and Northern European countries, once, as evidence suggests, they are already lagging behind. In fact, the EU average draws a line between the two groups, being that countries as the Netherlands (19.0%), Belgium (16.8%), and Denmark (15.5%) almost triple the EU average for broadband access at home.

In September 2003, the most frequent type of connection in Portugal was still the standard telephone line (Public Switch Telephone Network - PSTN) representing about 59% of all households connected to the Internet (Chart 5.6). The second most popular type of connection was the Cable Modem, enclosing 28.8% of the connected households. The ISDN (Integrated Services Digital network) technology (6.9%) and the ADSL (Asymmetric Digital Subscriber Line) technology (6.5%) were sharing

³ The percentage of households with broadband connections results from the sum of the percentage of households with ADSL connections and Cable Modem connections.

a similar degree of penetration rates. It is important to stress that more than 35% of the connected households had a broadband connection to the Internet (ADSL and Cable Modem), representing 10% of all Portuguese households.

Chart 5.6
Type of Internet connections in Portuguese households, 2003
2003, (%) of households with Internet access



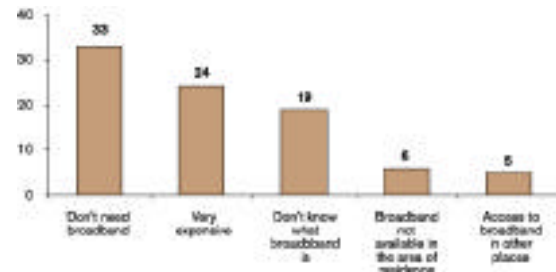
Source: UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Multiple answer question.

As seen above, the penetration of broadband Internet connections in Portugal is progressing towards widespread diffusion. Like this, in order to speed up the process, it is important to understand what type of reasons lay behind the reluctance to adhere to broadband connections at home.

Chart 5.7 shows that the perception of uselessness of having broadband access at home (don't need broadband) is the most important barrier with 33% of responses. The cost involved is the second most important factor for the setback towards broadband connections at home, with 24% of answers. A big percentage of individuals still do not know what broadband is (19%), constituting itself as the third most important barrier.

Chart 5.7
Most important reasons for not having a broadband Internet connection at home

2003, (%) of households with Internet access and without broadband connection



Source: UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

The non availability of broadband in the area of residence (6%) and the access to broadband in other places (5%) complete the set of the most declared barriers to broadband access at home.

3. Internet Usage

Information is becoming more and more important in the collective life of modern societies. With the omnipresence of information and communication technologies (ICT), social and organizational systems are thought out as informational systems. The citizens represent the smaller but most important unit in these systems. It is thus crucial to understand the relationship they establish with ICT.

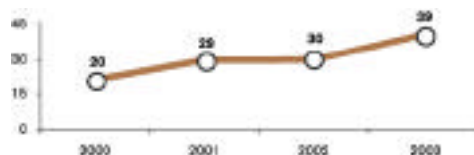
Chart 5.8 shows the difficult migration to Internet usage in Portugal. According to the Survey on ICT Usage by the Portuguese Population, in September 2000 only 20% of the Portuguese used the Internet (of which 62% used the Internet at least once a week). This value increased 9% in the same period of 2001. 2002 was a year of stagnation, but in 2003 there was another "boom" in the percentage of Internet users, increasing up to 39% (of which 73% used the Internet at least once a week).

In overall, the percentage of Internet users grew 19% between 2000 and 2003, representing an annual average growth of 25%.

Chart 5.8

Internet users in Portugal: evolution 2000-03

2000-2003, (%) of population



Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000-2002. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.

The efforts to boost Internet usage must continue to be strengthened once there is still a significant percentage of the population to be reached. In this context, it is important to understand what are the reasons preventing widespread Internet usage.

The lack of interest (34%) is the most important factor that prevents individuals from using the Internet (Table 5.5). Low skills is the second most important barrier, as 26% of the individuals declare not knowing how to use the Internet (being that in 2001 this was the most important reason).

Although somewhat distant from the above mentioned reasons, not having access to the Internet is the third most pointed out barrier with 16% of responses (7% less than in 2001 when, apparently, access to the Internet was more difficult). The perception that usage is still too expensive (14%) completes the depiction of Internet usage barriers.

Table 5.5

Barriers to the use of Internet

2001, 2003 (%) of computer users that do not use Internet

Barriers	Rank	2003	2001
Don't have interest in using the Internet	▲	34	22
Don't know how to use the Internet	▲	26	34
Don't have access to the Internet	▼	16	23
Too expensive	▼	14	19

Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population 2003.

Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

The Portuguese user

Knowing the Portuguese Internet user's profile is very important, when it comes to understanding which segments of the population should be targeted by actions to widespread Internet usage.

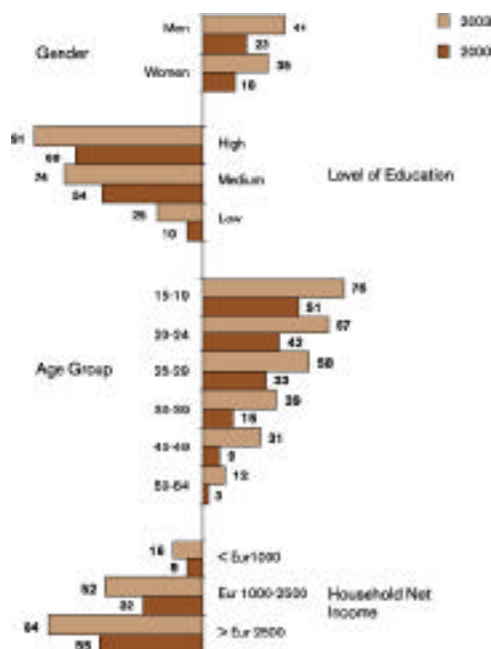
Four variables were taken into consideration for the analysis, namely: gender, level of education⁴ (three levels), age group (six groups) and household net income (three levels).

In September 2003, men used the Internet more than women (44% and 35%, correspondingly). The difference of 9% represents an increase of 4% in the gap that separated men from women in the same period of 2000 (Chart 5.9).

Chart 5.9

The Portuguese user

2000, 2003, (%)



Source: UMIC, Survey on ICT Usage by the Portuguese Population, 2003. OCT, Survey on ICT Usage by the Portuguese Population, 2000.

⁴ The variable "Level of education" is segmented in three categories: high (university degree or more); medium (secondary education) and low (less than secondary education). The variables Gender, Age group and Household monthly net income, have their categories detailed in Chart 5.9.

Internet usage is positively correlated with the level of education, i.e., the higher the level of education, the higher the Internet usage rate (Chart 5.9). Individuals with the highest education level (university degree or more) present a usage rate of 91%, individuals in the medium level of education (secondary studies) present a usage rate of 74% and the individuals with the lowest education level (less than secondary studies) present a usage rate of 25%, which is clearly below the usage rate of the Portuguese population (39%). It is worth mentioning that the gap between the highest and the lowest levels of education has widened between 2000 and 2003. In 2000, the usage rates of the two groups differed 59%, a value that increased to 66% in 2003.

The variable age, as evidence suggests, is inversely correlated with the Internet usage rate, i.e., the lower the age group, the higher the Internet usage rate. Individuals in the lower age group, aged 15-19, present the highest rate of Internet usage (76%), which heavily contrasts with the value presented by the highest age group (12%). The difference between the usage rates of the two groups increased from 48% in 2000 to 64% in 2003.

The same is also true for the fringe groups of the variable household monthly net income. The difference between the usage rates of the lowest and the highest income groups (less than €1,000 and more than €2,500, respectively) has also widened between 2000 and 2003, from 46% to 68%. The variable in analysis, household monthly net income, is also positively correlated with the Internet usage rate, once the usage rates from the lowest to the highest income groups are 16%, 52% and 84%, respectively.

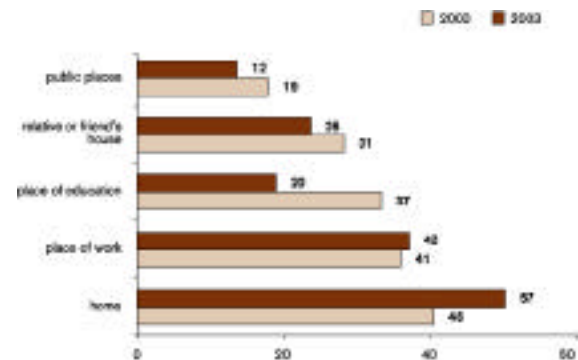
In overall, after crossing the four variables, Portuguese users can more easily be found within the categories: male, under 30 years old, with a high level of education and a high income.

Places of use of the Internet

In September 2003, as in 2000, the Portuguese Internet users still preferred to access the web from home (Chart 5.10). According to the Survey on ICT Usage by the Portuguese Population, 57% of Internet users accessed from home (an increase of 11% in comparison to 2000). The workplace appears in second place with 42% of responses. Not to be overlooked is the decrease of Internet users accessing from the place of education (school, university). Between 2000 and 2003 this value decreased 17% (from 37% to 20%). The same behaviour is observable for the access from public places (19% in

2000 to 12% in 2003) and from a relative or friend's house (31% in 2000 to 26% in 2003).

Chart 5.10
Internet access places
2000, 2003, (%) of Internet users



Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Multiple answer question.

Internet uses

After tackling the issues of infrastructure, access diffusion and usage rates, it is relevant to engage in an analysis over the different types of activities undertaken by Internet users on the web.

A first look at Table 5.6 shows that the type of Internet uses pattern has changed from 2000 to 2003; on the one hand, this is due to a more complex and diverse use of the Internet, on the other hand, because of a greater variety of available services.

The most widespread use of the Internet is sending and receiving e-mails (76%), which alludes to the role Internet gained in the social contacts dimension (either in a personal or in an institutional perspective).

The other Internet uses are more self-oriented, being possible to identify different trends such as leisure (downloading music, games and videos, 54%; reading and downloading online newspapers and magazines,

43%; using chat sites, 33%), comfort (obtaining information from public authorities' websites, 47%; searching information about goods and services, 42%; Internet banking, 28%) and convenience (work-related activities, 51%; study and learning activities, 49%; downloading software, 38%).

Table 5.6
Most performed activities on the Internet
2000, 2003, (%) of Internet users

Activities	Rank	2000	2003
Sending/receiving emails	▲	79	88
Downloading music, games and videos	▲	54	44
Work-related activities	▼	51	55
Study/learning activities	▼	48	79
Obtaining information from public authorities' websites	◀▶	47	—
Reading/Downloading online newspapers and magazines	◀▶	43	—
Searching information about goods and services	▼	42	58
Downloading software	▲	38	37
Using chat sites	▼	33	40
Internet banking	◀▶	28	—

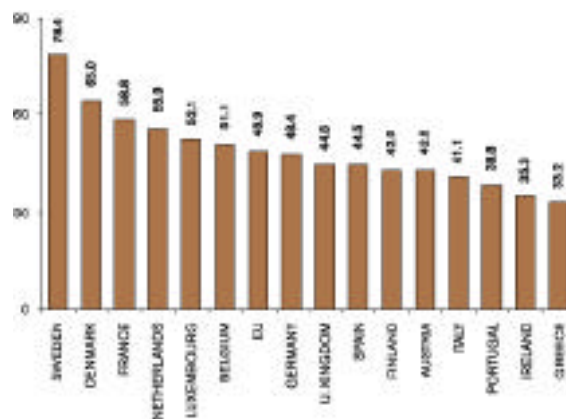
Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Multiple answer question.

Also noteworthy is the increase in the percentage of Internet users recurring to Internet banking and visiting public authorities' websites for obtaining information. This is particularly important as simplifying the interaction between citizens and institutions, in particular public bodies⁵, is one of the main goals to be achieved with the diffusion of Internet usage. Nevertheless, in spite of Portugal's growth, only in 2003 Portugal reached the EU average for June 2002 (according to data released by the European Commission).

⁵ The eEurope2002 Action Plan established the following goals: to improve access, dissemination and exploitation of public sector information; ensure that citizens have easy access to essential public data; promote online interaction between citizens and government. See eEurope 2002 Action Plan for additional information.

The European Union's average was 48.9% and, by that time, Portugal diverged 20%, presenting a value of 38.8% of Internet users visiting e-government sites (Chart 5.11). This was even more preoccupying if one takes into consideration that the number of Internet users was one of the lowest in the European Union⁶.

Chart 5.11
Internet users visiting e-government websites in the European Union
2002, (%) of Internet users



Source: European Commission, Flash Eurobarometer 125.0, "Internet and the population at large", June 2002.

Chart 5.12 portrays the type of interaction of Portuguese Internet users with public authorities' websites.

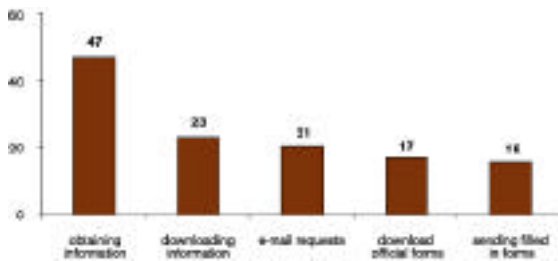
Obtaining information is the main purpose to visit a public authority's website. By September 2003, 47% of Internet users had visited e-government websites to search for information. Downloading information (23%) and making requests by email (21%) followed side by side in second place. Downloading official forms (17%) and sending filled in forms (16%) were coupled in third place.

A possible reading for the above mentioned data is that the interaction between citizens and online government is

⁶ See European Commission and OECD for additional information. OECD has been working on a stable definition of e-commerce within the Working Group on Indicators for the Information Society. See OECD for additional information.

mainly unilateral. A two-way interaction (sending filled in forms) is the least frequent. Notwithstanding, it is abusive to understand this behaviour as reluctance or lack of trust from citizens towards e-government. A complete analysis must take into consideration the number and quality of public services available online.

Chart 5.12
Type of interaction with e-government websites
2003, (%) of Internet users



Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Multiple answer question.

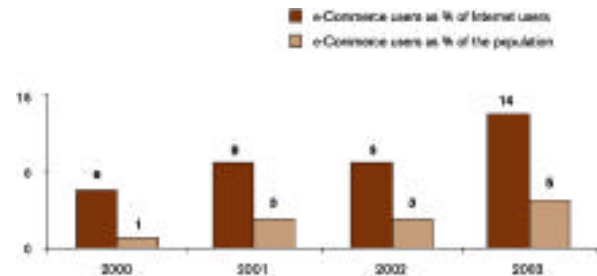
4. Online Purchasing

Discussing e-commerce is not a simple task, especially in what concerns the production of statistical indicators for international comparison. There still is no stable definition for this concept and, in different countries, different approaches are used. For this analysis e-commerce users will be defined as individuals who place orders or buy over the Internet.

Chart 5.13 shows that by September 2003, according to data from the Survey on ICT Usage by the Portuguese Population, the practice of e-commerce was still rather low. Only 5% of the Portuguese population had ordered or bought goods/services over the Internet, which represented an increase of 4% in comparison to the same period of 2000. This represented an annual average growth rate of 72%.

As percentage of Internet users, the e-commerce users increased 8% (from 6% in 2000 to 14% in 2003).

Chart 5.13
e-Commerce users in Portugal: evolution 2000-03
2000-2003, (%) of Internet users; (%) of population



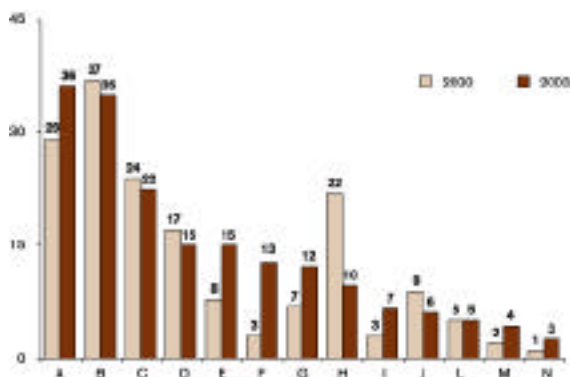
Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000-2002. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.

In spite of the small percentage of e-commerce users in Portugal, certain patterns of consumption are starting to be revealed.

According to more than 35% of e-commerce users, by September 2003, books, magazines and newspapers, as well as music (CD's, etc.) and movies (DVD's, etc.), were the most purchased products over the Internet, followed by computer software (22%) and electronic equipment (15%), continuing the pattern observed in 2000 (Chart 5.14).

Noteworthy is the decrease of computer hardware purchases (from 22% in 2000 to 10% in 2003) and the increase in travel and accommodation services, as well as in the entertainment events services, respectively with 15% and 13% of e-commerce users' responses. Food, groceries and toys are the types of products with less success in online shopping.

Chart 5.14
Type of products purchased online
2000,2003, (%) of e-commerce users



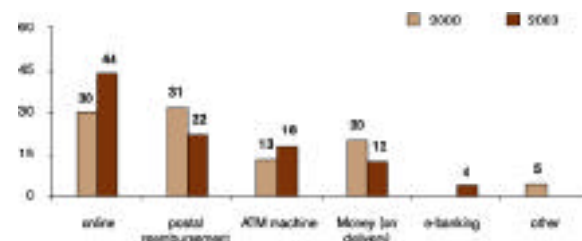
- A - Books, magazines, newspapers
- B - Music and movies (includes CD's, DVD's, etc.)
- C - Computer software (excludes video games)
- D - Electronic equipment (includes cameras)
- E - Travel and holiday accommodation
- F - Entertainment events (shows, sports, etc.)
- G - Clothing, jewellery and accessories
- H - Computer Hardware
- I - Car accessories
- J - Share purchases, financial services and insurance
- L - House and garden products
- M - Food and groceries
- N - Toys

Source: OCT, ICT Usage by the Portuguese Population, 2000. UMIC, ICT Usage by the Portuguese Population, 2003.
Note: Multiple answer question.

Chart 5.15 shows that e-commerce users are less reluctant to give their credit card details for online payment. In September 2003, 44% of the individuals paid for their purchases online (14% more than in 2000). Nonetheless, as all other forms of payment correspond to 66% of the responses, it seems that the large majority of the Portuguese buying online feels more comfortable paying without having to disclose their credit card details.

Also significant are, on the one hand, the fact that the types of payment not including electronic means are losing weight and, on the other hand, the take off of e-banking.

Chart 5.15
Types of payment means for online purchases
2000, 2003, (%) of online purchases



Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.

Drivers and barriers to the use of e-commerce

As previously seen in this chapter, the percentage of e-commerce users is still small amongst the Portuguese population. As such, it is important to understand the reasons behind the adherence and the refusal towards purchasing online.

By September 2003, the main drivers for the use of e-commerce were the access to rare or unavailable goods (23%), the variety of goods (21%) and comfort (19%). These drivers do not significantly change with the introduction, in the analysis, of the following socio-demographic variables: gender, level of education and age group (Table 5.7).

Table 5.7
Most important reason for using e-commerce
2000,2003, (%) of e-commerce users

Drivers	Rank	2000	2003
Access to rare/unavailable goods	▲	23	21
Variety of goods	▲	21	19
Comfort	▲	19	11
Order to order	▲	8	3
Goods and services available 24/7	▼	6	25
Easier to compare goods	▲	5	1
Cheaper prices	▼	5	4

Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

The pattern of drivers for online purchasing amongst e-commerce users has not changed from 2000 to 2003, with the exception of the availability of products 24/7, which decreased about 20%.

The same behaviour can be observed for the pattern of reasons that constitute barriers to online purchasing, i.e., the most important reasons observed in 2000 are still the most relevant in 2003. In Table 5.8, it is clear that (although in reverse order) the lack of trust in e-commerce (23%) and the preference to shop in person (44%) are the most important reasons when it comes to the decision of not buying online.

The increase of responses evoking the preference to shop in person (14% from 2000 to 2003) can be derived from a certain resistance towards innovation and the adoption of new technological processes.

Trust concerns, though, were not as strong by September 2003 as they were in 2000. This might be related to the perception, amongst Internet users, that the electronic networks are becoming safer, as 79% declared never having experienced any security problem when using the Internet (6% more than in 2000).

Table 5.8
Most important reasons for not using e-commerce
2000,2003, (%) of e-commerce non-users

Barriers	Rank	2003	2000
Prefer to shop in person	▲	44	30
Lack of trust	▼	23	34
Complaint/address concerns	◀▶	7	8
Privacy concern	◀▶	6	6
More expensive	◀▶	5	3
Don't know how to use	◀▶	0	1

Source: OCT, Survey on ICT Usage by the Portuguese Population, 2000. UMIC, Survey on ICT Usage by the Portuguese Population, 2003.
Note: Levelled by the year of 2003 – categories with response levels inferior to 5% were considered residual, therefore excluded from the analysis.

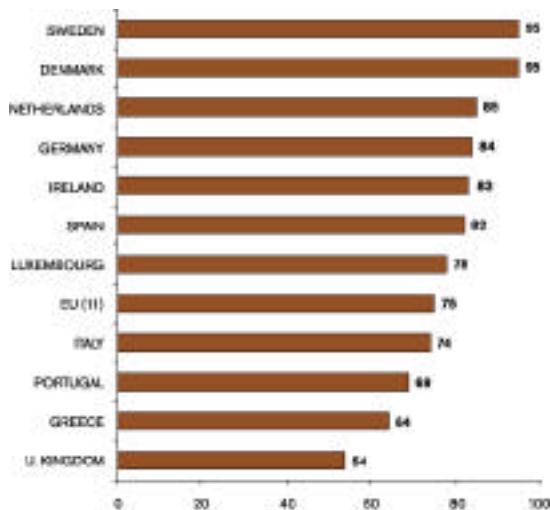
6. ICT in Enterprises¹

1. Internet Access and Usage

According to the Community Survey on ICT Usage in Enterprises led by Eurostat, 75% of enterprises in the European Union (EU) had an Internet connection in December 2001 (Chart 6.1).

Chart 6.1
Enterprises with Internet access in the European Union

December 2001, (%) of enterprises with economic activity



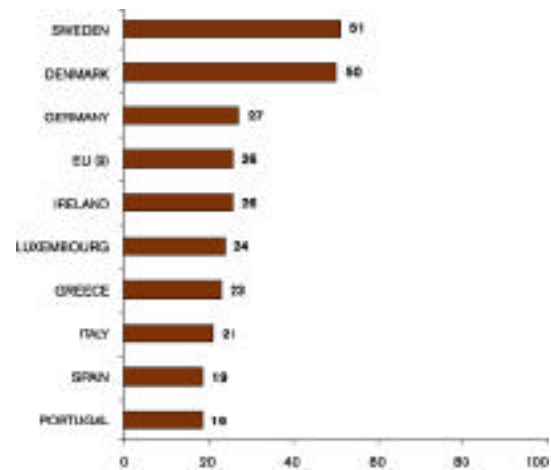
Source: Eurostat, Community Survey on ICT Usage in Enterprises - 2002.

With 69% of enterprises connected to the Internet, Portugal was third-to-last in this ranking, 6% below the EU value and even further apart from the Northern European countries, namely Denmark and Sweden, where Internet access in enterprises was effectively widespread (95%). The last ranked country was the United Kingdom, diverging more than 20% from the EU value, a somewhat surprising indicator given the high levels of ICT investment in this country.

¹ Data presented in this chapter only refer to enterprises with 10 or more employees and within the following NACE Sectors: D, G, H, I, J (only 67) and K.

In December 2001, about 27% of enterprises within the EU had a broadband Internet connection (Chart 6.2). Denmark was at the top of the EU ranking with over 50% of connected enterprises, closely followed by Spain and Finland, both with about 45%.

Chart 6.2
Enterprises with broadband Internet access in the European Union
December 2001, (%) of the enterprises with economic activity



Source: Eurostat, Community Survey on ICT Usage in Enterprises - 2002.

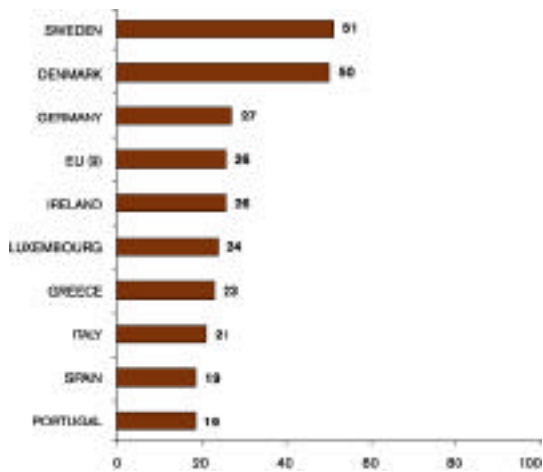
Note: In this chart, Broadband is defined as xDSL technologies and fixed connections with more than 2Mbps.

In spite of being better positioned in what concerns broadband connections in enterprises, Portugal was still 8.3% below from the EU average.

Internet usage by workers is, in general terms, intimately related to the diffusion of Internet connections in enterprises, whereby Spain is the only country that differs from this pattern (Chart 6.3). Nordic countries were ranked at the top, with 1 out of every 2 workers recurring to the Internet. In Portugal, as well as in other Southern European countries, only about 1 out of 5 workers used the Internet, whereas the European ratio presented a more positive value, 1 out of 4 workers.

Chart 6.3
Internet use by workers in the European Union

December 2001, (%) of the enterprises with economic activity; (%) of total employees in enterprises with economic activity



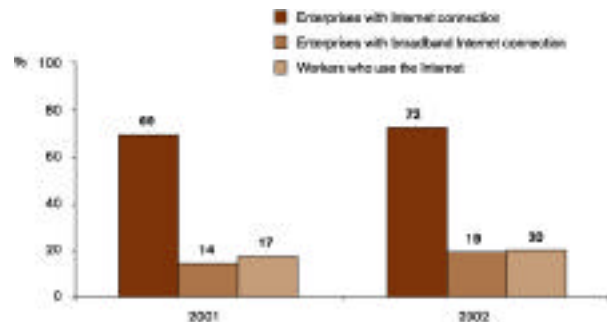
Source: Eurostat, Community Survey on ICT Usage in Enterprises - 2002.
Note: Workers using the Internet in their daily work routines at least once a week

In fact, all Southern European countries are characterized by low percentages of Internet usage by workers, independently from their Internet penetration rates. This can be explained by the following: a) workers' qualifications structure (low school levels and low levels of ICT expertise); b) reduced training investment (the benefits of workers' ICT training and usage are often not taken into account by enterprises' directors and managers, partly due to their own low qualifications); c) ICT diffusion policy within enterprises (in spite of the growing number of enterprises connected to the Internet, this technology tends to be available only to some levels of the organizational structure, namely to managers and middle managers).

According to more recent data (July 2002), 72% of the Portuguese enterprises had an Internet connection (a 3% increase since 2001), and 19% declared having a broadband Internet connection (5% more than in 2001) (Chart 6.4). Notwithstanding increases in the above mentioned indicators, Portugal is still lagging behind the 2001 EU value, and especially distant from the Northern European countries' values.

Chart 6.4
Internet access and usage in Portugal

2001-July 2002, (%) of enterprises with economic activity; (%) of total employees in enterprises with economic activity



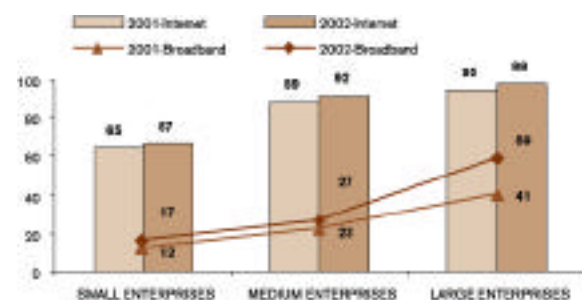
Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2002.

Still in 2002, 20% of the Portuguese workers used the Internet, a 3% increase relatively to the value registered in the previous year.

When analysing data broken down by enterprise size and sector of activity, a positive evolution in Internet connections is observable (Chart 6.5 and Chart 6.6).

Chart 6.5
Enterprises with Internet access by size in Portugal

2001-July 2002, (%) of enterprises with economic activity

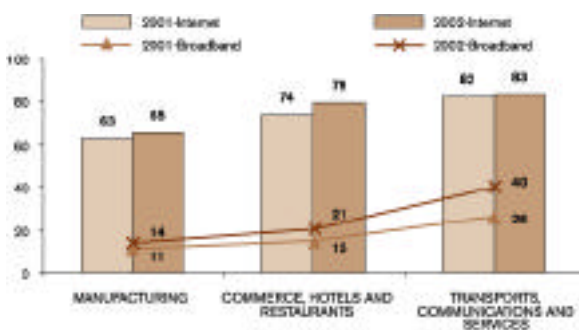


Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2002.

Between 2001 and 2002, a positive growth was recorded both in Internet penetration and in broadband diffusion (Chart 6.5). Nonetheless, there is still a significant gap between large and small enterprises: the larger the enterprise, the higher the Internet and broadband penetration rates. In 2002, almost all large enterprises were connected to the Internet (98%) and 4 out of 10 had a broadband connection. In small enterprises, on the other hand, penetration rates were lower. Internet and broadband Internet were used, respectively, in 67% and in 17% of these enterprises.

Internet and broadband, in particular, were further widespread among enterprises of the transports, communications and services sector (83% and 40%) (Chart 6.6).

Chart 6.6
Enterprises with Internet access by sector of activity in Portugal
2001-July 2002, (%) of enterprises with economic activity

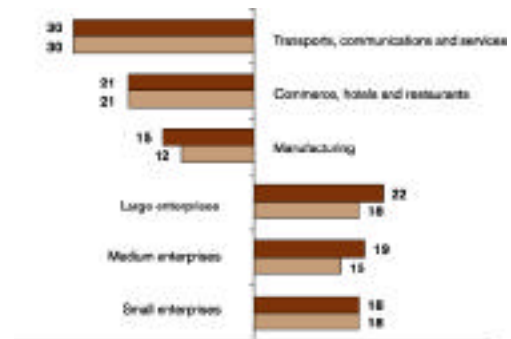


Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises – 2002. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises – 2002.

Enterprises that integrated the manufacturing industry presented the lowest percentage of Internet connections (65%). The same stands for broadband connections, whereby only 14% of enterprises had such a connection type.

Internet usage by workers of Portuguese enterprises increased slightly from 2001 to 2002. However, this evolution was not followed by all types of enterprises.

Chart 6.7
Workers using the Internet by sector of activity and size in Portugal
2001-July 2002, (%) of total employees in enterprises with economic activity



Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises – 2001. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002. Note: Workers using the Internet in their daily work routines at least once a week.

Large enterprises and those integrating the transports, communications and services sector presented the highest percentage of workers using the Internet (Chart 6.7). Small enterprises and the manufacturing sector, on the other hand, presented the lowest percentages (18% and 15%, respectively).

In 2002, enterprises resorted to the Internet mostly for information search (9 out of 10), however, there has been a slight decrease in this indicator's percentage in comparison to 2001 (Table 6.1).

Table 6.1
Online activities resorted to by enterprises in Portugal
2001-July 2002, (%) enterprises with Internet connection

▼ Information search	95
▲ Interaction with public bodies	75
▲ Banking and financial services	68
▲ Market monitoring (prices)	41
▲ To develop R&D activities	18
▲ Information on job opportunities (recruiting and job search)	18
▲ Training and education	13

Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.

A tendency has been identified within Portuguese enterprises, concerning the increase of Internet usage for diverse purposes. The Internet is namely increasingly used for the interaction with public bodies and for banking and financial services. These activities are 2nd and 3rd in the ranking of Internet uses by enterprises, with respectively 75% and 68%. The take up of these two activities may result from the modernization of the Internet services made available by public bodies and financial institutions.

The lack of e-learning platforms in Portugal may be the reason for the relative reduction of Internet based training and education, which appears at the bottom of the performed Internet activities in enterprises. Indeed, only 13% of the enterprises connected to the Internet mentioned this item.

For enterprises that used the Internet, security and cost related issues were identified as the main obstacles in Internet usage (Table 6.2). Although security concerns (viruses and hackers) remained the main barrier (28%), costs associated with updates and maintenance and with access and implementation (15%, 14% e 11% respectively) were acknowledged as the three next biggest worries.

Table 6.2
Main barriers for Internet access in Portugal

2001-July 2002, (%) of enterprises that use the Internet; (%) of enterprises that not use the Internet

Enterprises who use the Internet		Enterprises who do not use the Internet	
▼ Lack of security (viruses, hackers)	28	▼ Lack of perceived benefits for the Enterprise	21
▲ Expense on home pages' development and maintenance	15	▲ Absence or low qualification of personnel/lack of specific know-how	20
▲ Internet access charges too high	14	▼ Lack of security (viruses, hackers)	18
▲ Costs to make it available too high	11	▲ Costs to make it available too high	11
▼ Data communication too slow or unstable	10	▼ Data communication too slow or unstable	9

Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.

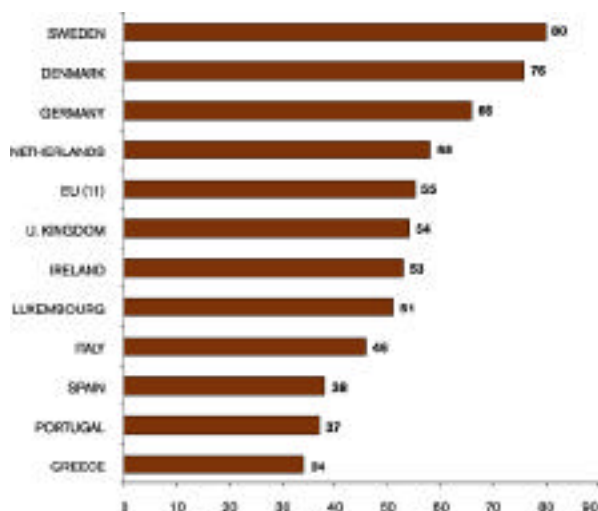
In what concerns enterprises that did not use the Internet, the main identified reason for not recurring to this technology was the "Lack of perceived benefits for the Enterprise" (21%). The lack of qualification of personnel/lack of specific know-how and high costs associated with implementing the Internet were also recurrently identified, being furthermore the only two reasons to register a percentage increase in comparison to the previous year.

2. Web Presence

World Wide Web provides enterprises with the possibility to quickly widespread their brands through very affordable means. Bearing this in mind, the construction of Webpage may be of great benefit to enterprises.

According to the Community Survey on ICT Usage in Enterprises led by Eurostat, in 2002, 55% of Enterprises within the EU were present on the web (Chart 6.8).

Chart 6.8
Enterprises with web presence in the European Union
2002, (%) of enterprises with economic activity



Source: Eurostat Community Survey on ICT Usage in Enterprises - 2002.

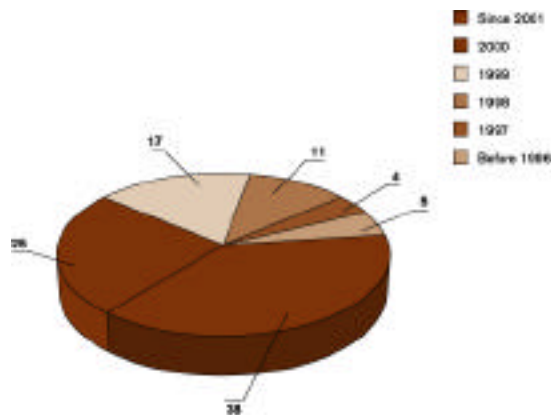
The adoption of an Internet marketing strategy (online products and/or services' information) was apparently more frequent in countries, where the Internet was further widespread. As such, the Netherlands, Germany and, above all, Sweden and Denmark had the highest percentages of enterprise web presence, significantly above the EU value.

Portugal was second-to-last with 37% of its enterprises present on the web (a 9% increase since 2001). In what concerns this indicator, Portugal will have to undertake an additional effort to catch up with its European Union partners, and come closer to the EU value, from which it presently diverges by 18%.

Portuguese enterprises have started to use websites as a promotional instrument, especially since 1998, when 11% of enterprises resorted to the Internet for this purpose (Chart 6.9). It is also noteworthy that about 4 out of 10 enterprises with web presence created their websites in the last two years.

Chart 6.9
First year on the web in Portugal

2001-July 2002, (%) of enterprises with web presence



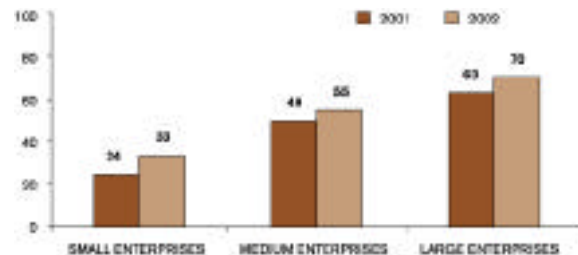
Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises – 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.

A breakdown of enterprises by size and by sector reveals that large enterprises and those operating within the transports, communications and services sector commonly resorted to

the Internet to advertise their activities (70% and 46%, respectively) (Chart 6.10 and Chart 6.11).

Chart 6.10
Enterprises with web presence by size in Portugal

2001-July 2002, (%) of enterprises with economic activity

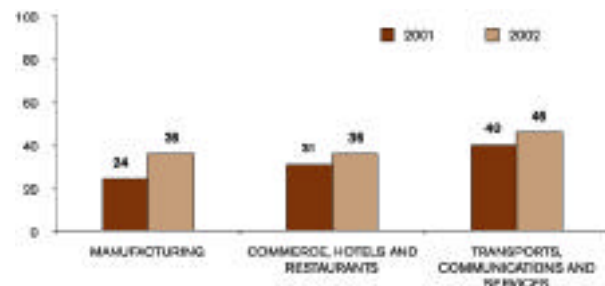


Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises – 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.

Small enterprises and those within the manufacturing sector presented the lowest web presence values. Nonetheless, these enterprises experienced the most significant annual growth rate in what concerns the Internet presence indicator (38% and 50%, respectively).

Chart 6.11
Enterprises with web presence by sector of activity in Portugal

2001-July 2002, (%) of enterprises with economic activity



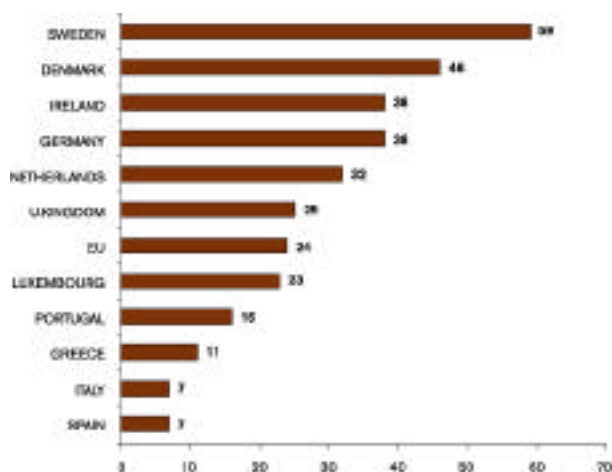
Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.

3. Use of Communication Networks in Business Processes

The use of Internet and of other networks, such as EDI, in business processes is instrumental in simplifying business practices and reducing costs. Above all, recurring to these technologies is extremely helpful to aid expansion to new markets.

In this context, according to the Community Survey on ICT Usage in Enterprises led by Eurostat, Denmark and Sweden - the EU Member States with higher levels of Internet penetration - registered the highest rates of Internet use for the purchase of goods and/or services (59% and 46%, respectively) (Chart 6.12).

Chart 6.12
Enterprises purchasing goods and/or services online in the European Union
 December 2001, (%) of enterprises with economic activity



Source: Eurostat, Community Survey on ICT Usage in Enterprises – 2002.
 Note: Data concerning purchases do not include enterprises that initiated online purchasing of good and/or services in 2002. Data only refer to Internet transactions.

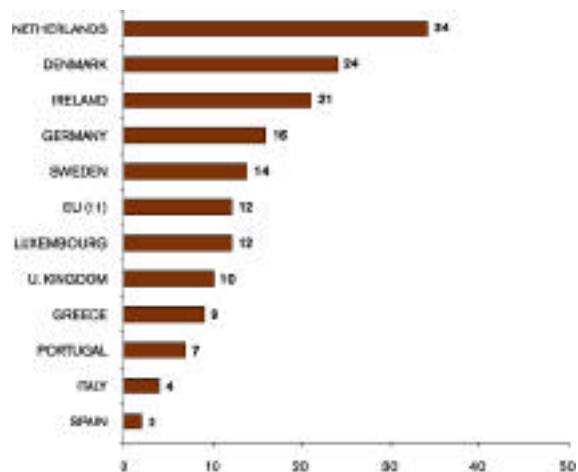
The EU value clearly set a division between Southern countries, on the one hand, and the remaining Member States, on the other (Luxembourg stands out as the only

exception). Portugal led the bottom group with 16% of enterprises recurring to the Internet for purchases, 8% below the EU value.

When compared to online purchases, selling goods or/and services online had not quite taken up as steadily. Developing an effective e-commerce system, i.e. online sales, proved to be more problematic, as it requires greater financial investment and specialized human resources.

With the exception of the Netherlands, all countries registered lower levels of online sales than of online purchases (Chart 6.13). The European online sales value is about half that of the online purchases' value.

Chart 6.13
Enterprises selling goods and/or services online in the European Union
 2002, (%) of enterprises with economic activity

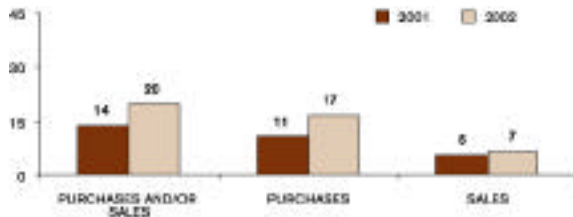


Source: Eurostat, Community Survey on ICT Usage in Enterprises – 2002.
 Note: Data concerning purchases do not include enterprises that initiated online purchasing of good and/or services in 2002. Data only refer to Internet transactions.

In Portugal, only 7% of enterprises sold goods and/or services through electronic commerce, 5% below the EU value. This activity registered the slowest growth rate from 2001 to 2002 (only 1%) (Chart 6.14).

Chart 6.14
Enterprises using electronic commerce in business processes in Portugal

2001-July 2002, (%) of enterprises with economic activity

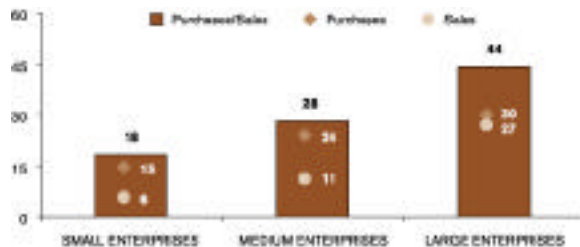


Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises – 2001. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.
The percentage of enterprises that both purchased and sold goods and/or services online rose from 14% in 2001 to 20% in 2002, representing an annual growth rate of about 43%.

The aforementioned electronic commerce activities are more frequently carried out by large enterprises, in which either purchases or sales were common practices of 3 out of every 10 enterprises (Chart 6.15). About half of all large enterprises used the Internet both for purchasing and selling goods and/or services (44%).

Chart 6.15
Enterprises using electronic commerce in business processes by size in Portugal

July 2002, (%) of enterprises with economic activity

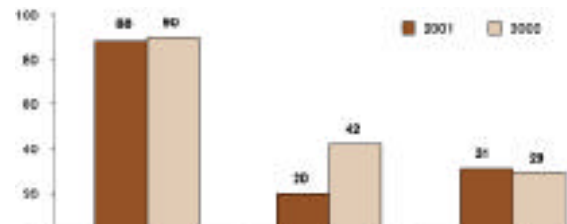


Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises – 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

The breakdown by sector of activity reveals that the manufacturing sector was placed slightly behind all others in terms of electronic commerce practices (Chart 6.16). This may be explained by the nature of required and provided services within this sector.

Chart 6.16
Enterprises using electronic commerce in business processes by sector of activity in Portugal

July 2002, (%) of enterprises with economic activity

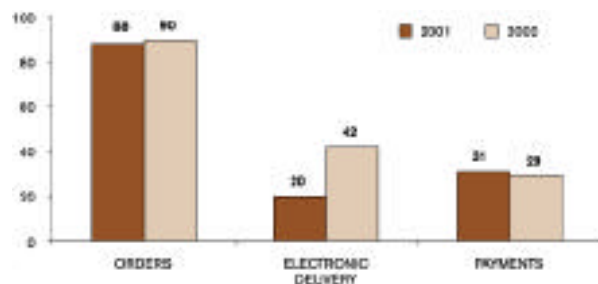


Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

In Portugal, 9 out of 10 enterprises that used e-commerce for purchasing goods and/or services also placed their orders through this mean (Chart 6.17). Moreover, 4 out of 10 received the purchased goods and/or services through electronic delivery, which experienced a growth rate of over 100% in reference to 2001.

Chart 6.17
Commercial processes related with purchases of goods and/or services online in Portugal

2001-July 2002, (%) of enterprises that purchase goods and/or services online



Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

In spite of technological progress in e-commerce processes and in related security measures, only 29% of enterprises paid for the acquired goods and/or services online. Similarly to what happened in Internet usage, security issues were identified as a major barrier for the take up of electronic commerce in enterprises.

In 2002, “information search” related to e-commerce purchases was by far the main activity (93%), being the second most identified practice, “receiving free digital products”, which amounted to 43% (Table 6.3).

Table 6.3
Activities related with purchases of goods and/or services online in Portugal

2001-July 2002, (%) of enterprises that purchase goods and services online

▲	Information search	93
▲	Receiving free digital products	43
▲	Sending orders	42
▲	On-line payments	38
▲	Receiving purchased digital products	37
▼	Obtaining after sales assistance	31

Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

Besides being last on the list of e-commerce activities, “obtaining after sales services” was the only item that experienced a negative relative evolution. This may indicate reduced investment by enterprises that carry out online sales in this area (the creation of online efficient helpdesks, for instance). A further explanation may be that enterprises still privilege traditional means of assistance, i.e. by telephone or in person.

The search for simplified procedures constituted the main reason for companies to adopt e-commerce purchasing (90%) (Table 6.4). Although there was a slight decrease in value from 2001 to 2002, “Speed of processing” registered the second highest percentage (74%) in the ranking of benefits of online purchasing of goods and/or services¹.

Table 6.4
Main benefits of purchasing goods and/or services online in Portugal

2001-July 2002, (%) of enterprises that purchase goods and services online

▲	Simplified business processes	90
▼	Speed of processing	74
▼	Cost reductions	60
▲	Reaching new/more suppliers	39

Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

It is noteworthy that, in spite of the possibilities offered by this technology to reach new supplier markets, the least mentioned benefit of online purchasing was “reaching new/more suppliers” (39%).

Table 6.5
Main barriers for purchasing goods and/or services online in Portugal

2001-July 2002, (%) of enterprises that purchase goods and services online; (%) of enterprises that do not purchase goods and services online

Enterprises purchasing on-line		Enterprises that do not purchase on-line		
▼	Uncertainty relatively to the security of the process	32	▼ Products/services of Enterprise not suitable for online purchasing	39
▲	Products/services of Enterprise not suitable for online purchasing	21	▲ Uncertainty relatively to the security of the process	38
▲	Uncertainty in payments	18	▼ Uncertainty concerning contracts, terms of delivery and guarantees	8
▲	Uncertainty concerning contracts, terms of delivery and guarantees	13	▼ Uncertainty in payments	7
▲	Stock of (potential) customers too small	7	▲ Stock of (potential) customers too small	6

Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001. Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

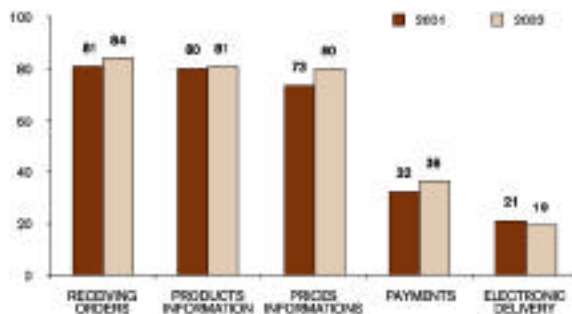
Security and the nature of wanted products/services were pointed out both by enterprises which purchase online and by enterprises which do not purchase online as the main obstacles for adopting/not adopting e-commerce (Table 6.5). Obstacles related to payments, contracts, terms of delivery and guarantees were the next most important obstacles.

Receiving orders, providing product and price information were the most recurrent reasons for Internet business use in enterprises, which used e-commerce for selling goods and/or services (80% or over) (Chart 6.18).

Chart 6.18

Commercial processes related with sales of goods and/or services online in Portugal

2001-July 2002, (%) of enterprises that sell goods and services online



Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

It is also important to mention that electronic delivery was the least used process, experiencing a decrease from 21% in 2001 to 19% in 2002. This may be explained by the nature of the transacted goods and/or services, which often do not allow the use of electronic delivery.

The main activity related to selling goods online was product advertising and marketing (70%) (Table 6.6).

Table 6.6

Activities related with sales of goods and/or services online in Portugal

2001-July 2002, (%) of enterprises that sell goods and services online

▲	Advertising and marketing of products	70
▲▶	Contacts' Availability for clarifications	67
▲	Receiving orders	60
▲	After sales support	35
▲	To personalize the page for the regular customers	34

Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001.
Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
Note: Electronic commerce refers to Internet, EDI and other networks transactions.

When analysing the second and fourth most used activity, a parallelism can be established with what happens in "after sales support" in online purchasing: most enterprises that use e-commerce for selling their products still prefer offering phone contact (or even e-mail) as opposed to interactive platforms for problem solving. Enterprises identified "contacts" availability for clarifications' as the second most important activity (67%), whereas "after sales support services", on the other hand, was pushed to a substantially lower position (35% of enterprises).

The low qualifications structure of Portuguese workers is a problematic transversal to all economic sectors in Portugal, bearing consequences in the use of electronic commerce. Besides low preparation of workers within supplier enterprises, there are not enough qualified human resources within buyer enterprises. In fact, this is identified as a barrier for the adoption of e-commerce: 38% of enterprises indicate that "customers are not prepared to use electronic commerce" (Table 6.7).

Table 6.7
Main barriers for selling goods and/or services online in Portugal

2001-July 2002, (%) of enterprises that sell goods and services through electronic service; (%) of enterprises that do not sell goods and services through electronic service

Enterprises selling on-line		Enterprises that do not sell on-line	
▲ The customers are not prepared to use electronic commerce	36	▼ Goods and services available not suitable for online selling	36
▲ Lack of human resources to create, maintain and use this technology	14	▼ The customers are not prepared to use electronic commerce	18
▼ Cost of developing and maintaining an e-commerce system	13	▲ Lack of human resources to create, maintain and use this technology	14
▼ Goods and services available not suitable for online selling	11	▲ Cost of developing and maintaining an e-commerce system	10
▲ Uncertainty concerning contracts, terms of delivery and guarantees	9	▲ Uncertainty in payments	9

Source: Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises - 2001.
 Eurostat/INE/UMIC, Community Survey on ICT Usage in Enterprises, 2002.
 Note: Electronic commerce refers to Internet, EDI and other networks transactions.

Enterprises that do not use e-commerce for providing products/services pointed out the nature of sold products/services as the main reason (36%). Lack of both buyers (18%) and workers (14%) skills are also among the most important barriers to e-commerce practices pointed out by enterprises that do not recur to e-commerce sales.

7. ICT in Government, Education and Health

The development of the Information Society has led to major changes in citizens expectations and organizational structures, cultures and working processes. The OECD defines “e-government” as “the use of information and communication technologies, and particularly the Internet, as a tool to achieve better government”. The usage of information and communication technologies enables better policy outcomes, higher quality services, greater engagement with citizens and improves other key outputs identified.

1. The Electronic Government in Portugal

1.1. Online availability of public services

With the main objectives of enabling participating countries to analyse progress in the field of e-government, to compare performance within and between countries and identify best practices in order to stimulate progress in the field of e-government, the Web-based Survey on Electronic Public Services Report presented the results of the benchmarking exercise on the progress of e-government in Europe.

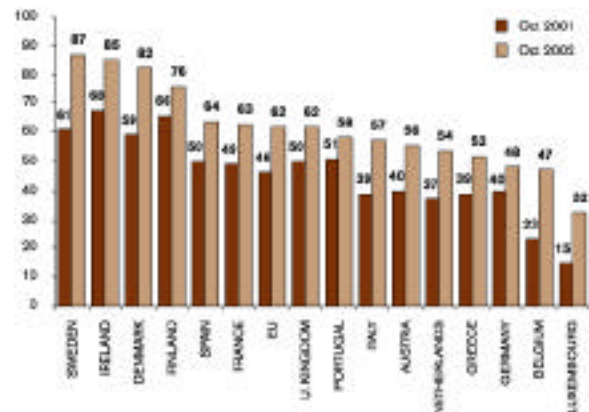
The CGE&Y¹ study measured the availability of public services on the Internet and the level of online sophistication² of the delivery process in the EU (alongside with Iceland, Norway and Switzerland).

Focusing on the supply side of the e-government approach, that is, on online public service provision, a list of twenty basic public services was defined targeting citizens (12 indicators³) and enterprises (8 indicators⁴). As can be seen in Chart 7.1, in October 2002, Sweden, Ireland and Denmark (87%, 85% and 82%, respectively) were the countries presenting the best performances in what concerns public services online. Luxembourg was

the one with the lower percentage (32%). Portugal presented a medium performance (58%) being placed below the EU average (62%). It is noteworthy that in October 2001 Portugal was above the EU average. In fact, Portugal presents the lowest growth rate among all EU countries (Belgium and Luxembourg experienced the most significant growth rates - more than 100% for both countries).

Chart 7.1
e-Government online availability of public services in the European Union

2001-2002, (%) of basic services



Source: European Commission, Web-based Survey on Electronic Public Services Report (Cap Gemini Ernst & Young), 2001-2002.

In October 2002, some public services in Portugal were wholly provided online, namely, income taxes, birth and marriage certificates, social contributions for employees, corporate taxes, VAT and registration of a new company. On the other hand, Portugal still had some services that were altogether not available online: submission of data to statistical offices and custom declarations. Health-related services are those less available online in all countries. Notwithstanding, Portugal closely follows Spain and Finland, coming third in this ranking.

¹ Cap Gemini Ernest & Young

² The levels of sophistication are:
Level 1 – Online information about public services.
Level 2 – Interaction: downloading of forms
Level 3 – Two-way interaction: processing of forms including authentication
Level 4 – Transaction: case handling, decision & delivery (payment eventually)

³ The complete list for citizens services is: Income taxes, Job Search, Social Security Benefits, Personal Documents, Car Registration, Application for Building Permission, Declaration to the Police, Public Libraries, Birth and Marriage Certificates, Enrolment in Higher Education, Announcement of Moving and Health-related Services.

⁴ The complete list for businesses services is: Social Contribution for Employees, Corporate Tax, VAT, Registration of a New Company, Submission of Data to the Statistical Office, Custom Declaration, Environment-related Permits and Public Procurement.

1.2. Access and use of ICT in Central Government Administration

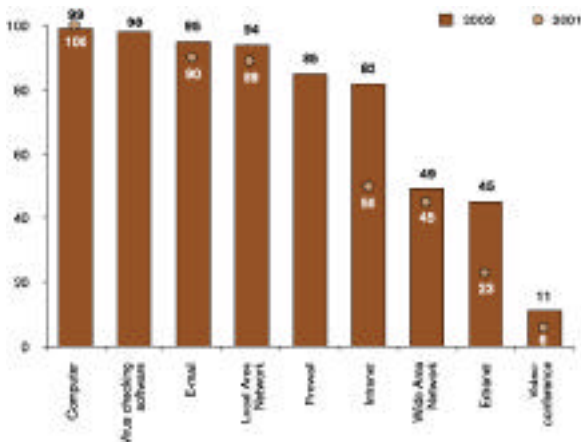
The diffusion of ICT, namely the possession and usage of ICT equipment, is creating the appropriate conditions for a new phase of modernization in Public Administration bodies. This analysis is concentrated on Central Administration, in which modernizing efforts were particularly intense over the last few years.

In 2003, according to the 3rd edition of the Survey on ICT usage in Central Government Administration, led by the Innovation and Knowledge Society Unit (UMIC), the access to computers, Local Area Networks and e-mail is practically generalized. Public bodies in Central Administration present, for most ICT equipment, high penetration rates (Chart 7.2).

Noteworthy is the increase in the percentage of public bodies with Intranet (50% in 2001 to 82% in 2003) as well as the high concerns with safety. In 2003, 98% of public bodies have virus-checking software and 85% have firewall.

Chart 7.2
ICT access in Central Administration public bodies

2001, 2003, (%) of all central administration public bodies



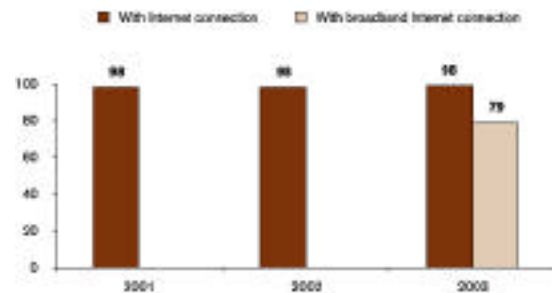
Source: OCT/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2001. UMIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

Notes: For the indicators "institutions with virus checking software" and "institutions with firewall", there is no available data for 2001.

As can be seen in Chart 7.3, the access to Internet in Central Administration public bodies is generalized (nearly 100%) since 2001. Broadband access is also quite considerable, as 79% of public bodies declared using this type of Internet connection.

Chart 7.3
Internet access in Central Administration public bodies

2001-2003, (%) of all central administration public bodies

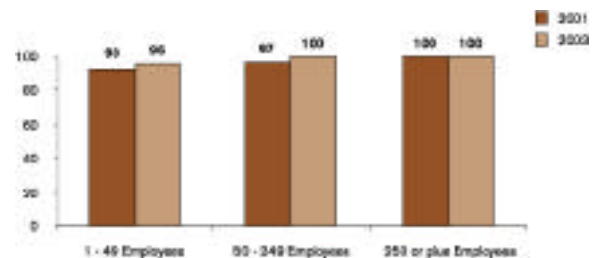


Source: OCT/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2001. OCT, Survey on ICT Usage in Central Government Administration, 2002. UMIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

In Chart 7.4, when considering Internet access penetration rates by size of the public body, it can be seen that only smaller institutions do not have full Internet access.

Chart 7.4
Internet access in Internet Central Administration public bodies by size

2001, 2003, (%) of all central administration public bodies

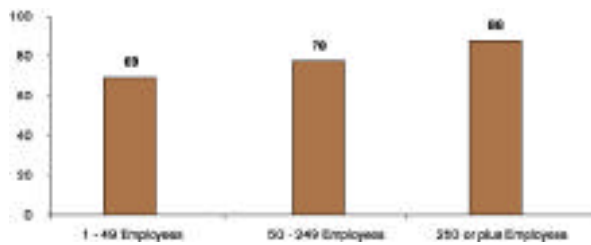


Source: OCT/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2001. UMIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

Applying the same analysis to broadband Internet access, as can be seen in Chart 7.5, it is clear that size is positively correlated with the pattern of diffusion, i.e., larger Central Administration public bodies have higher penetration rates. Only 69% of public bodies with less than 50 employees have broadband access while 88% of public bodies with 250 or plus employees have this type of Internet access.

Chart 7.5
Central Administration public bodies with broadband Internet access by size

2003, (%) of all central administration public bodies

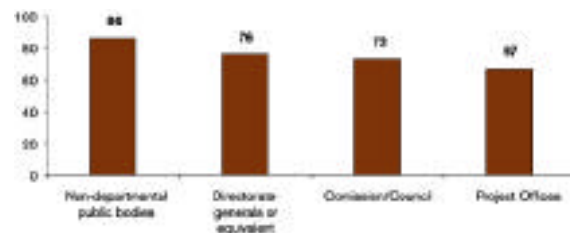


Source: U MIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

As evidence shows (Chart 7.6), the type of public bodies also influences broadband access penetration rates. Non-departmental public bodies present the highest value (86%), in contrast with Project Offices, which present the lowest penetration rate (67%).

Chart 7.6
Central Administration public bodies with broadband Internet access by type

2003, (%) of all central administration public bodies

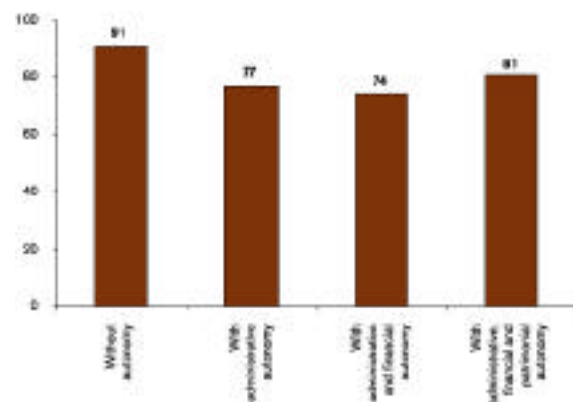


Source: U MIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

The degree of autonomy is another variable to take into consideration in the analysis of broadband penetration rates (Chart 7.7). Public bodies with no present the highest value (91%) followed by public bodies with total autonomy (administrative, financial and patrimonial) with 81%. Notwithstanding, it is important to stress that the good performance of public bodies without autonomy is related to their access to the Government Network (which is not a necessary condition for the others).

Chart 7.7
Central Administration public bodies with broadband Internet access by degree of autonomy

2003, (%) of all central administration public bodies



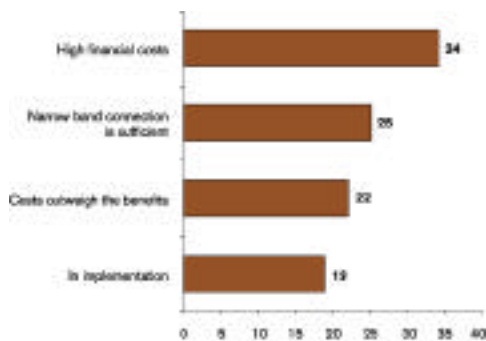
Source: U MIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

As previously pointed out (Chart 7.3), around 20% of public bodies do not have broadband Internet access. Taking into account that broadband access is essential to the quality and modernization of e-government processes (online front-end public service and back-office procedures), understanding the barriers to its diffusion is determinant.

Amongst Central Administration public bodies without broadband Internet access, high financial costs (34%) and narrow band connections being sufficient for the activities pursued (25%) constitute the main barriers to adopt broadband. The constraint of the implementation process is the least mentioned reason with 19% of answers.

Chart 7.8
The most important reason for not having broadband Internet access

2003, (%) of central administration public bodies without broadband Internet access



Source: UMIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

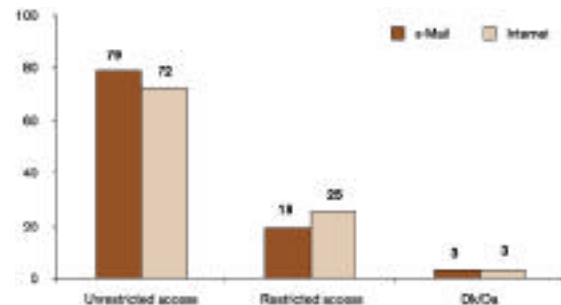
Note: Only valid cases were analyzed.

Considering that ICT, particularly the Internet, are essential tools to facilitate and speed up work processes, it is of great importance that all the employees (if applicable) have generalized access to ICT equipment.

In Central Administration public bodies (Chart 7.9) access policy is mainly unrestricted for e-mail and Internet (79% and 72%, respectively). However, it is necessary to keep in mind that this does not mean access by all workers. In fact, in 25% of public bodies only directors have access to the Internet. Other indicators as available infrastructure, skills, amongst others, must be taken into account.

Chart 7.9
Internet and e-mail access policies in Central Administration public bodies

2003, (%) of all central administration public bodies Source



UMIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

1.3. Web presence

Over the last few years, the evolution and growing generalization of Information and Communication Technologies, presented great opportunities for Central Government public bodies to reshape, redefine and improve traditional models of information dissemination and public service rendering.

The creation of websites allows information to be disseminated in a faster and cheaper way, thus, bringing advantages not only for citizens and businesses, but also, for the public bodies and the overall society.

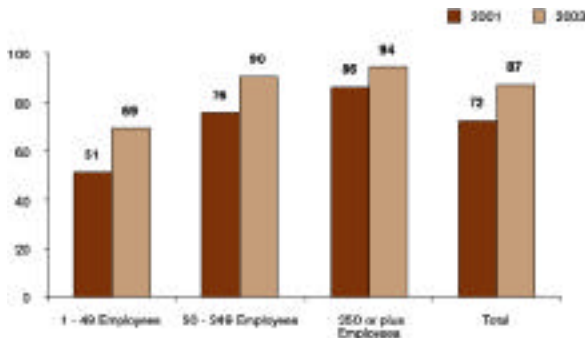
Internet presence of Central Administration public bodies has increased 15% (from 72% in 2001 to 87% in 2003).

In Chart 7.10, it can be observed that size influences the web presence rates. The larger the public body, the higher the penetration rate.

Chart 7.10

Central Administration public bodies with Internet presence by size

2001,2003, (%) of all central administration public bodies



Source: OCT/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2001. UMIC/Instituto de Informática, Survey on ICT Usage in Central Government Administration, 2003.

Analysing the breakdown by size, it can be seen that the larger public bodies are those which take more advantage of the Internet as a vehicle for their activities and information dissemination. Almost all Central Administration public bodies with 250 or more employees (94%) have Internet presence. The category 50 to 249 employees presents a value of 90%. Public bodies with less than 50 employees are the least present on the Internet with 69%.

1.4. Central Administration in Portugal: website evaluation

In a context in which new technologies have become synonym of globalization, the public administration shows great concern and makes visible efforts to be present on the Internet with user friendly websites quality services and contents.

The evolution has been notorious, especially in areas of strong institutional tradition, with great impact on citizens, as, for example, Central Administration services. It is important that websites have all the necessary requirements (quality and useful information, updated contents, available on-line services, etc.).

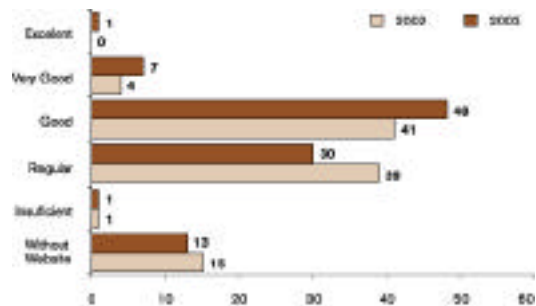
In order to evaluate the quality and maturity of central public administration Internet presence in Portugal, the study “Central Administration Website Evaluation”, led by Accenture at the request of OCT (2002) and UMIC (2003) has been conducted.

This study was accomplished with the objective of producing recommendations aiming at improving the quality of the evaluated websites, as well as at disseminating good practices. In order to do that, 6 evaluation criteria were defined: Contents, Content Updating, Usability, Accessibility, Convenience for Citizens with Special Needs and Online Services. The results are presented in Chart 7.11.

Chart 7.11

Website evaluation (global classification)

2002-2003, (%) of all central administration public bodies



Source: OCT (Accenture, Central Public Administration Website Evaluation, 2002); UMIC (Accenture, Central Public Administration Website Evaluation, 2003).

Generically, the evaluations’ results have improved slightly, which denotes public bodies diligence and efforts to improve their websites. In fact, some websites have gone from a general classification of “regular” to a “good” or a “very good” one, also occurring a reduction of the number of public bodies without a website.

Nevertheless, websites still require some improvements, so as to enable a more effective interaction between the user and Central Administration, through the Internet.

2. ICT in Education

The European Union's Action Plans eEurope 2002 and eLearning - Designing Tomorrow's Education, underlined the need to adapt the education systems to the Knowledge Economy. Following the established targets, Portugal made significant efforts to integrate the new technologies in the education system.

The Portuguese education policies have subsequently concentrated on ensuring widespread infrastructure coverage in schools, on the one hand, and on providing the necessary qualifications to enable the use of the computer and the Internet by teachers and pupils, on the other.

2.1 Computer and Internet access in schools

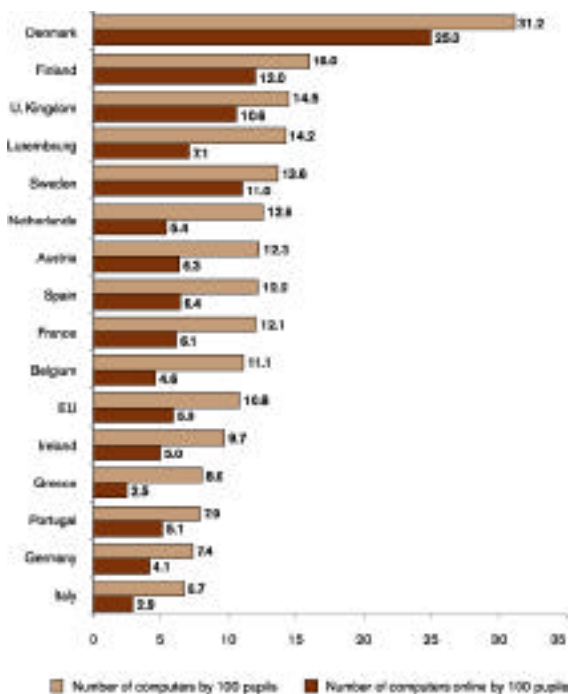
Since 1997, public initiatives have tackled the underdevelopment of ICT infrastructure within the public schools' network, aspiring to provide at least one computer connected to the Internet per school. According to data released by the Observatory for Science and Technology in 2002, full school coverage was achieved in December 2001.

Nevertheless, full coverage did not necessarily entail good coverage; it rather referred to the existence of at least one computer per school, regardless of the number of pupils per school.

In fact, when analysing the Portuguese ratios concerning the number of computers and the number of online computers per 100 pupils, it becomes evident that, in 2002, the available infrastructures were insufficient to support the consistent use of ICT for education purposes.

These indicators placed Portugal at the bottom of the European Union's rank, sided by Greece, Germany and Italy. With an average of eight computers and five online computers per 100 pupils, Portugal was significantly below the European average and even more distant from the top country, Denmark, which presented ratios of 31 computers and 25 online computers per 100 pupils.

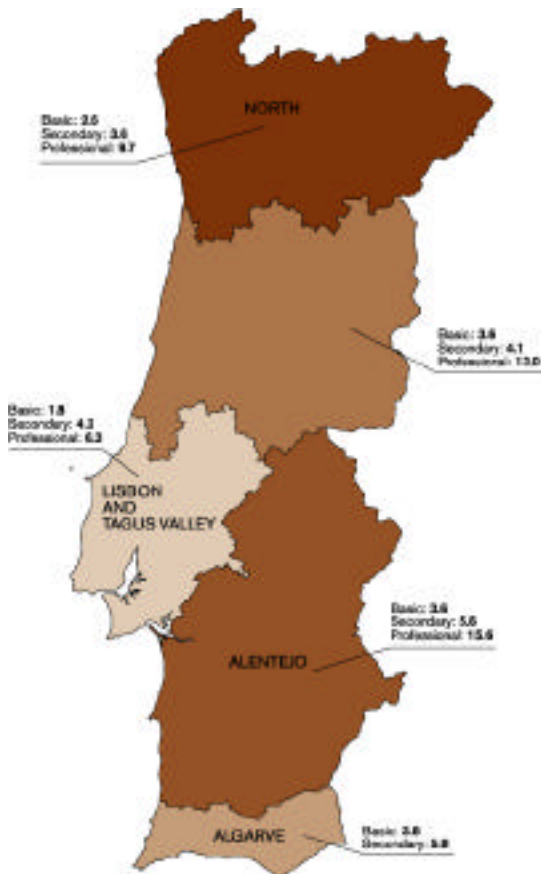
Chart 7.12
 Number of computers (offline/online) for teaching purposes by 100 pupils
 2002, (ratio)



Source: European Commission, Benchmarking exercises (Flash Eurobarometer 118.0, "Headteachers"), June 2002.

Moreover, a breakdown of the Portuguese ratio by regions and education levels, clearly demonstrates the existing asymmetries among regions and education levels. Curiously, Alentejo, the poorest region of Continental Portugal, presented the best ratios, head to head with the Algarve. Explaining this performance would require a close look at population density in these regions. Schools comprehending professional education were better infrastructured, with a total average of eleven computers per 100 pupils, against five computers in the secondary level and three in the basic level.

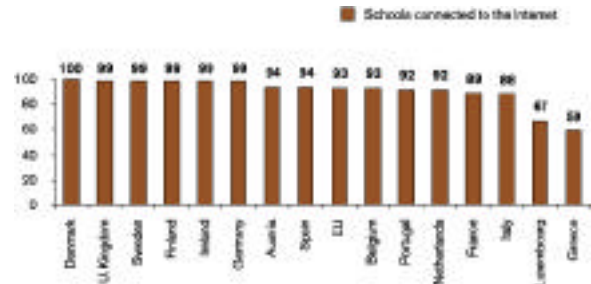
Figure 7.1
Number of computers per 100 pupils within the Basic, Secondary and Professional levels by Regions
2002, (ratio) Public Network



Source: Department of Evaluation, Prospective and Planning, Ministry of Education, 2002.

In what concerns Internet access, 92% of the Portuguese schools were connected in 2002, just one percent below the European average. The most frequent Internet connection type was ISDN, which represented about 74% of the total number of connections.

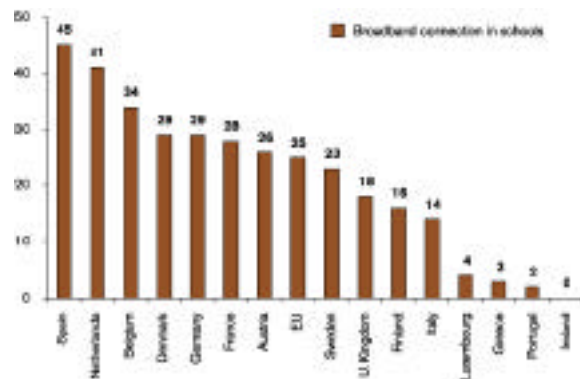
Chart 7.13
Schools connected to the Internet
2002, (%) of all schools



Source: European Commission, Benchmarking exercises (Flash Eurobarometer 118.0, "Headteachers"), June 2002.

In comparison to the levels of broadband penetration in other European Union countries' schools, Portugal was clearly lagging behind. Broadband connections, i.e., ADSL and Cable Modem, only represented 2% of the total number of Internet connections. Spain was placed on the opposite side of the ranking with a broadband penetration rate of 45%, closely followed by Netherlands with 41%.

Chart 7.14
Broadband connections in schools
2002, (%) of schools connected to Internet



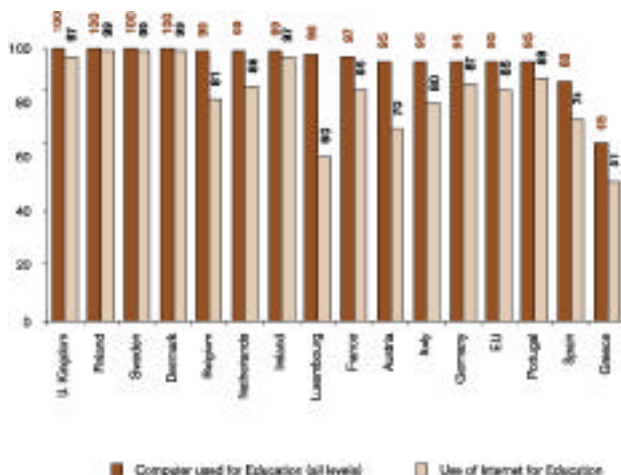
Source: European Commission, Benchmarking exercises (Flash Eurobarometer 118.0, "Headteachers"), 2002.

2.2 Computer and Internet usage for Education

In recent years, there were numerous ICT training initiatives supported by public funds and specifically designed for teachers. These initiatives were aimed at improving teaching/learning processes through the use of new technologies, the computer and the Internet in particular, and multimedia contents.

According to data released by the European Commission (Flash Eurobarometer 118.0) in June 2002, 95% of the Portuguese schools used the computer for education purposes and 89% of them resorted to the Internet as well.

Chart 7.15
Computer and Internet use for education in schools
 2002, (%) all levels of education



Source: European Commission, Benchmarking exercises (Flash Eurobarometer 118.0, "Headteachers"), 2002.

This indicator on the use of the Computer and the Internet in schools reveals a quite positive positioning of Portugal relatively to the European Union's average and even in comparison to its fellow EU member states. However, as previously shown, the number of available computers in schools, in 2002, stoutly contrasted with this positive scenario.

Overview of ICT in the Portuguese Education System

The new technologies are gradually taking their place as a valuable education instrument within the Portuguese public schools' network. Teachers increasingly recur to the computer and the Internet for teaching purposes, whereas pupils eagerly embrace them for learning as well as for recreational purposes.

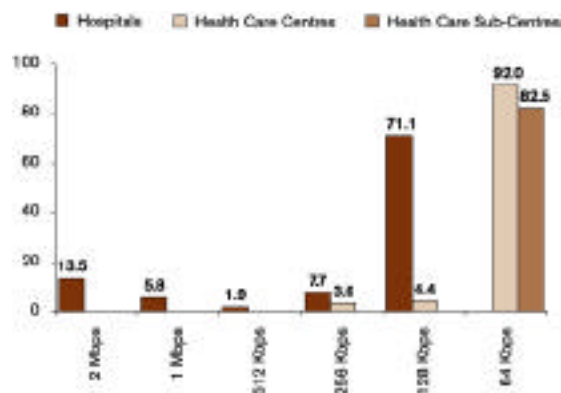
Nonetheless, and in spite of an evolution in available infrastructures and in teachers' qualification, the number of available offline and online computers undermines the schools' ability to effectively resort to these new technologies and, thus, to consistently integrate them in teaching/learning processes.

3. e-Health

3.1. Internet access in health care units

Portugal adopted a centralized approach to e-Health, as ICT have been adopted in the National Health System's units through a sole e-Health Network. In November 2003, every hospital and primary health care centre had an Internet connection, the same happening in 4 out of 5 sub-centres.

Chart 7.16
Internet connections in hospitals and health care centres
 2002, (%) of health care units



Source: IGIF, Ministry of Health, 2002.

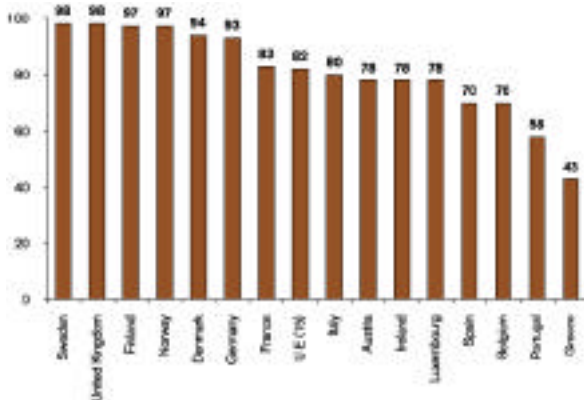
The fairly good Internet coverage stoutly contrasts with the average Internet connection speed. The Internet connection speed varies significantly depending on the type of health care units. Hence, progress made in some few hospitals, where telemedicine has been deployed for several years, finds no correspondence in other health care units (chart 7.16).

3.2. ICT usage by general practitioners

Along with Internet access speed, ICT usage by practitioners appears to be a great challenge in Portugal. A survey conducted by the European Commission in 2002 revealed that only 58% of the Portuguese general practitioners made use of computers for their activity, only ahead of Greece and diverging about 25% from the EU average.

Chart 7.17
General practitioners using computer for their activity in the EU

2002, (%) of general practitioners

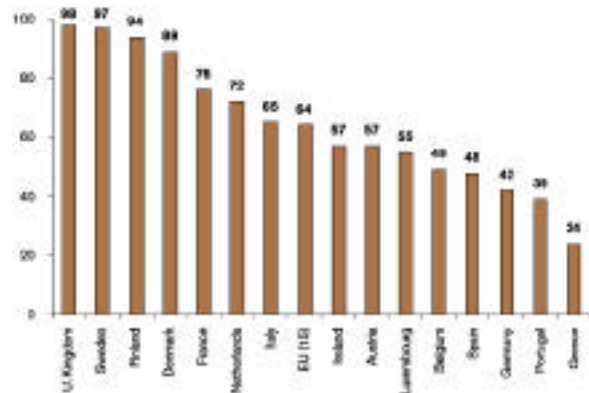


Source: European Commission, Benchmarking Results (Flash Eurobarometer 126.0, "General Practitioners"), 2002.

Besides, about 40% of general practitioners accessed the Internet for medical purposes, again only ahead of Greece and 25% below the European average (64%).

Chart 7.18
General practitioners using the Internet or a general practitioners network for their activity in the EU

2002, (%) of general practitioners using computer

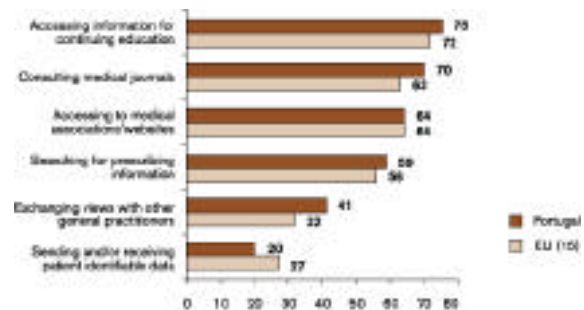


Source: European Commission, Benchmarking Results (Flash Eurobarometer 126.0, "General Practitioners"), 2002.

Analysing the type of Internet usage performed by general practitioners accessing the Internet clearly shows similar patterns between EU and Portuguese general practitioners. Internet usage for information search and training, whichever the source (medical journals, medical associations' websites, etc.), is far more usual than Internet usage for communication among general practitioners, be it for exchanging views or to send and/or receive patient identifiable data.

Chart 7.19
Activities performed online by general practitioners

2002, (%) of general practitioners using the Internet

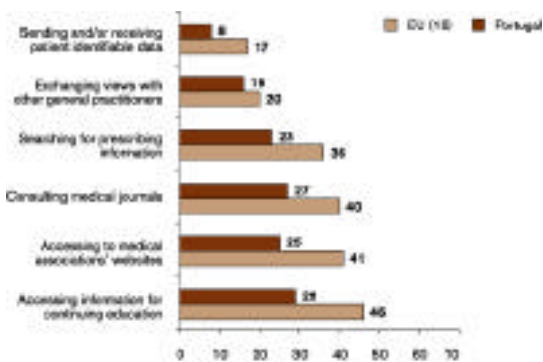


Source: UMIC, from European Commission, Benchmarking Results (Flash Eurobarometer 126.0, "General Practitioners"), 2002.

Notwithstanding, these close patterns do not hide the fact that they only refer to general practitioners that use the Internet for professional purposes.

If the universe of general practitioners was taken into account, the low rates of ICT usage by Portuguese general practitioners would automatically be reflected in this indicator.

Chart 7.20
Activities performed online by general practitioners
2002, (%) of general practitioners



Source: European Commission, Benchmarking Results (Flash Eurobarometer 126.0, "General Practitioners"), 2002.

To sum up, figures related to ICT usage by general practitioners reveal a north-south gap with very few exceptions, closely following the pattern of Information Society developments within the European Union.

Portugal is ranked near the bottom in these indicators of ICT usage by general practitioners, which somehow contrasts with the fact that Internet connections are quite widespread in Portuguese health care units (chart 7.16). It may thus be asserted that computer and Internet access is not widely available for medical staff inside Portuguese health care units.

