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Information Space
Innovation & Investment in R&D
Inclusion

Europe's Digital Competitiveness Report

Main achievements of the i2010 strategy 2005-2009

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A European Information Society
for growth and employment

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1 Introduction

Europe remains a global force in advanced information and communication technologies (ICT). The World Wide Web, the mobile GSM standard, the MPEG standard for digital content and ADSL technology were all invented in Europe. Maintaining this leadership position and turning it into a competitive advantage is an important policy goal. This is why in 2005 the Commission presented the i2010 strategy to boost Europe's lead in ICT and to unlock the benefits of the information society for European growth and jobs[1]. This strategy outlined concrete policy measures:

- **To boost the single market for businesses and users** by eliminating regulatory obstacles and enhancing regulatory consistency in the telecoms sector and for audiovisual media services (in particular TV and video-on-demand);

- **To stimulate ICT research and innovation** in Europe by pooling public and private research funding and focusing it on areas where Europe is or can become a global leader, such as on LTE (long-term evolution) mobile technology, which will revolutionise wireless broadband, or ESC (electronic stability control), which helps prevent car accidents in case of sudden manoeuvres or on slippery roads;

- **To ensure that all citizens benefit** from Europe's lead in ICT, in particular through first-class online public services accessible to all; safer, smarter, cleaner and energy-efficient transport and by putting the cultural heritage of the EU at our fingertips by creating the European digital library.

Over the past four years, ICT policies have confirmed their role as a major driver of Europe's economic and social modernisation and have made Europe more resilient in times of crisis. Today, they are firmly anchored in European core policies for growth and jobs. All EU Member States have ICT policies and consider them a key contributor to national growth and jobs under the renewed Lisbon agenda. i2010 has also influenced other policy areas, such as the Single Market and the Consumer Agenda. ICT policies today are implemented through various instruments, such as the Structural Funds or the Rural Development Funds.

ICT, and in particular the broadband internet, is a crucial component of the European economic recovery plan[2]. ICT accounts for half of the rise in EU productivity and available high-speed broadband is key to new jobs, new skills, new markets and cutting costs. It is essential to businesses, public services and to making the modern economy work. This has been recognised in the Commission's proposals to speed up economic recovery by smart investments in broadband networks in rural areas, endorsed by the European Council, up to €1.02 billion.

1 i2010 — A European Information Society for growth and employment - COM(2005) 229.

2 See A European Economic Recovery Plan - COM(2008) 800 - and Investing Today for Tomorrow's Europe - COM(2009) 36.

2 Key achievements of i2010

i2010 was designed as the strategic framework for Europe's information society and media policies. It described the overall thrust of policy to promote an open and competitive digital economy across Europe and it underlined for the first time the importance of ICT to improve the quality of life. Its ultimate goal is to complete the single market for ICT products and services to benefit European consumers, businesses and administrations.
The pro-competition and pro-consumer policy drive led by i2010 has produced many tangible results:

- More and more Europeans are online. The number of regular internet users has increased from 43% in 2005 to 56% in 2008; most of them use the internet almost daily and with high-speed internet access. Regular internet use is also becoming more inclusive, with the numbers of users in disadvantaged groups (the inactive, the less educated and those aged 55-64) rising the fastest;

- Europe has become the world leader in broadband internet. With 114 million subscribers, it is the largest world market and penetration rates are rising swiftly. Half of all European households and more than 80% of European businesses have a fixed broadband connection, three quarters of them with average download speeds above 2 Mbps. Broadband internet is available to 93% of the EU25 population, up from 87% in 2005;

- High rates of broadband connectivity have translated into higher usage of advanced services. Europeans are rapidly changing their habits, adopting new ways to communicate. 80 % of regular internet users engage in increasingly interactive activities, e.g. communicating, using online financial services, sharing and creating new content and participating in innovative processes;

- The market for mobile phones has exceeded 100% penetration — increasing from 84% of the EU population in 2004 to 119% in 2009. This makes Europe the world leader in mobile penetration, as the rates in the US and Japan are around 80%. Consumers spend more time talking and texting at prices at least 34.5% less than in 2004, including a 70% drop in roaming charges since 2005;

- Europe has made fast progress in the supply and use of the 20 benchmarked online public services. The supply of fully available services to citizens has increased to 50% in 2007 (27% in 2004) and for businesses to 70% (58% in 2004). One third of European citizens and almost 70% of businesses in the EU use eGovernment services;

- EU–funded ICT research has played a key role in Europe's major industrial development, such as in micro- and nano-electronics, in healthcare and the EU's road safety agenda. Europe is also the home of breakthrough research, such as Giant Magneto-Resistance technology, which revolutionised the hard disk business and won the 2007 Nobel prize in physics, and ADSL technology, the basis for today's broadband internet success;

- ICT policies have been increasingly mainstreamed. Member States have recognised the importance of ICT for productivity and growth and the potential of ICT to achieve a range of socio-economic objectives. Many Member States now have integrated national ICT strategies with objectives similar to those of the i2010 initiative.

These are some of the key success stories of the past four years[3]. Although the potential is not yet fully reaped-the

3 The attached staff working paper SEC(2009) 1060 provides a full inventory of all actions taken under i2010 during 2005-2009.

overall achievements of i2010 can best be assessed by comparing them to the objectives set in 2005 for the three strategic pillars of the initiative.

2.1. Boosting the Single Market for European businesses and users

One of the most important areas where ICT policy has made a difference for Europeans is in promoting the single market in telecoms and audiovisual media services for the benefit of citizens.

This was the key goal of the strategic objective for the first pillar of i2010:

> **Objective 1:** A Single European Information Space offering affordable and secure high bandwidth communications, rich and diverse content and digital services.

Fragmentation in Europe's market of 500 million consumers prevents economies of scale, to the detriment of businesses and consumers. This is even more the case in the digital economy; there is no technical reason why borders should hinder the flows of wealth creation. The Commission has actively sought to open up competition in e-communications, remove regulatory barriers, enhance regulatory consistency and create a level playing field for Europe's operators, industry and consumers. It has fostered a more coordinated approach to spectrum and the potential use of the 'digital dividend' across the Member States. The two Roaming Regulations aimed to create a European domestic market for consumers and businesses[4].

The reform of the e-communications framework, due to be adopted shortly, will further improve the single market in a number of ways. Most importantly it will give consumers more choice and improve transparency, protecting them better against security and personal data breaches and spam by encouraging competition in new networks. A new regulatory body at European level should help ensure fair competition and more consistency of national regulation. At the same time, national regulators will gain greater independence. Year after year, annual progress reports on the telecoms framework have shown that Europe's pro-competition rules have promoted competition, investment and innovation, prices have fallen and consumers have more choice, more rights and better quality services.

The launch of the eYou Guide in May 2009 was an important step to empower users by explaining in plain terms European law applicable to the online world. This first multilingual online guide to users' rights in Europe addresses key areas of consumer protection online, including privacy and personal data, internet safety and security, online advertising, copyright and shopping online[5].

Television is undergoing a period of dramatic change and the Commission has kept Europe at the forefront of developments, promoting digital broadcasting and mobile television. Building on the 'country of origin' principle, updated content rules have been agreed to pave the way for new audiovisual services encompassing not only different media (terrestrial, mobile, satellite, over the web) but also different formats (interactive television, video on demand, social networking, etc.). Today, Europe has clear rules for audiovisual media services providers and quality of viewing remains ensured through limits on advertising in documentaries, news and children's programmes. Furthermore, rules on content that is racist or incites hatred have been extended to on-demand services[6].

Commission support for films under the EU MEDIA programme, extended for 2007 to 2013 with a budget of €755 million, has helped bring films and content made in the EU to the international screen. Many films that have won global fame would simply not have left their country of production without European support[7]. EU added value is not just to fund these artistic productions, but to bring European life and culture to a wide international audience by making European films available within and outside Europe.

4 Regulations (EC) No 717/2007 and (EC) No 544/2009 on roaming on public mobile telephone networks within the Community amending Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services

5 http://ec.europa.eu/eyouguide

6 Audiovisual Media Services Directive, 2007/65/EC.

7 e.g. 'La Vie en Rose', 'Das Leben der Anderen', 'Die Fälscher', 'Gomorra', 'Slumdog Millionaire'.

2.2. Stimulating ICT research and innovation in Europe

In the first decade of the 21st century, the EU lags behind other areas of the world regarding ICT R&D, notably the US, Japan and South Korea. It therefore launched ambitious research programmes to counter the deficit and to support forward-looking R&D. During the last five years, the EU has engaged in an intense pursuit of the global leaders, while in the coming years it will strive for world leadership in ICT research.

This approach is reflected in the overall objective for the second pillar of i2010:

> **Objective 2:** World class performance in research and innovation in ICT by closing the gap with Europe's leading competitors.

Under this objective, Europe adopted its largest ever budget for ICT research and innovation, more than €10 billion for ICT under FP7 and the CIP[8] from 2007 to 2013 to help generate the next wave of economic growth and drive the transition to a low-carbon society.

Today, e-infrastructure such as GEANT, grids, supercomputers and data repositories are catalysts of a new 'scientific renaissance' to stimulate prosperity and growth. The success of the Future and Emerging Technology scheme has shown the need to boost investment in high-risk transformative research to ensure Europe remains competitive in ICT in the long term[9].

In addition, ground-breaking public-private partnerships have been launched. The *Artemis* and *Eniac* Joint Technology Initiatives in embedded computing systems and in nanoelectronics address crucial technologies to keep manufacturing competitive, from automotive and aero-space to energy equipment and health technologies. The *Ambient Assisted Living* Initiative has taken off and aims to make Europe a hub for developing new digital solutions for Europe's elderly people. These initiatives are helping EU industry achieve world leadership and are ramping up R&D investment by providing incentives to both industry and Member States. Over six years, more than €6 billion has been earmarked for these three initiatives.

The EU is also a potential leader in the future internet. The Commission has started work on a public-private partnership that could underpin the design and architecture of a future internet offering faster transport of more data, more IP addresses, a more secure, privacy and data protection friendly internet that is open, interoperable and promotes innovation, competition and choice. This will expand the usage of RFID and web services. The new initiative builds on existing research priorities; e.g. the FIRE (Future Internet Research and Experimentation) Facility has started offering services to the research community to experiment on new networking and services paradigms. The European Technology Platforms have also broken new ground by acting as open platforms for cooperation between industry, academia and research institutes.

Europe can now build on these major steps to accelerate closing the ICT research gap. Research spending is only a means, however, not an end in itself. Marketing innovative products and services is the key to EU growth, jobs and competitiveness. While some Member States are topping global innovation indexes, innovation readiness remains fragmented. A stronger and more coordinated focus on research and innovation is thus crucial. A renewed strategy for ICT research and innovation in Europe was issued in March 2009[10]. It aims to establish Europe's leadership in ICT, facilitate the emergence of new markets and businesses for ICT and make Europe more attractive to investment in skills, research and innovation.

2.3. Ensuring that all citizens benefit from ICT

i2010 included for the first time a number of initiatives that take account of Europe's demographic challenges,

8 The ICT Policy Support Programme under the Competitiveness and Innovation Programme (CIP) is one of the main financial instruments under i2010, running from 2007 to 2013 with a budget of €728 million. It stimulates innovation and competitiveness through wider uptake of ICT by citizens, governments and businesses, in particular SMEs, http://ec.europa.eu/information_society/activities/ict_psp/index_en.htm.

9 Moving the ICT frontiers — a strategy for research on future and emerging technologies in Europe - COM(2009) 184.

10 A Strategy for ICT R&D and Innovation in Europe: Raising the Game - COM(2009) 116.

putting citizens at the heart of policy and highlighting the economic aspects of various schemes.

Objective 3: An Information Society that is inclusive, provides high quality public services and promotes quality of life.

This is particularly true for eHealth, where European policies are improving the health and well-being of Europeans, while at the same time bringing productivity benefits to complex and costly healthcare systems in the Member States and increasing the competitiveness of the European healthcare industry. Two key policy initiatives were launched in 2008: one to facilitate patient access to telemedicine services and stimulate market development; and the second initiative helps Member States address cross-border interoperability of electronic health record systems to support citizens and the market. eHealth is also one of the focus areas of the Commission's Lead Market Initiative, which aims to accelerate market growth through schemes to improve cross-border cooperation and delivery of health services.

eGovernment is another leading policy area, with over 50% of government services now fully available online. The interoperability of eGovernment services represents still a major challenge. Although the number of citizens using ICT to interact with public administrations is still low, it is steadily rising. The transition from a 'one-stop shop' to citizen-focused services has been the focus of eGovernment policies for the last four years. The 5-year Action Plan adopted in 2006 committed the Commission and the Member States to deliver tangible benefits to all Europeans. The eParticipation preparatory scheme shows how the use of new technologies can lead to greater public participation, providing the public with new tools to make their voices heard. The ongoing CIP large-scale pilots on interoperability of electronic procurement systems and on the pan-European recognition of electronic identities will help unlock the economic potential of eGovernment across the EU.

i2010 also aimed to demonstrate how ICT can improve the quality of life of citizens. This has been the main target of the eInclusion policy since 2005. 2008 saw the launch of the 'eInclusion: Be Part of It!' initiative, which culminated with the eInclusion Vienna ministerial conference. Other examples include initiatives aiming to boost the rights of people with disabilities, elderly and socially disadvantaged persons. Given the close correlation between ICT skills and inclusion in society and the labour market, the Commission carried out a comprehensive review on digital literacy in Europe.

In 2005, i2010 proposed three 'quality of life' flagship initiatives. The *Ambient Assisted Living* initiative shows how ICT helps address the challenges of an ageing population. The Intelligent Car initiative, launched in 2006, promotes smarter, safer and cleaner vehicles. Cars involved in a serious accident will call 112 for help in the near future. This initiative also brought world-wide media attention to EU research in road safety and informed consumers of the benefits of these novel ICT-based safety systems. 2008 witnessed the birth of Europeana, Europe's multimedia online library, museum and archive with more than three million books, maps, sound recordings, photographs, archival documents, paintings and films from cultural institutions accessible through a web portal available in all EU languages[11]. Also in 2008, i2010 rose to one of the major future challenges by launching a fourth flagship initiative on ICT for sustainable growth, focusing on the contribution of ICT to energy efficiency.

3 Impact of i2010 in the Member States

The i2010 initiative has been implemented in all Member States by national strategies. Some are general ICT strategies and some address more specific policies, such as broadband, eInclusion, eHealth, eLearning and eBusiness.

The national strategies are constantly revised and updated as part of the Lisbon process. Almost all plans closely reflect the goals of the i2010 strategy.

Finland plans to have 1 Mbps as a universal service obligation by 2010 and 100 Mbps for all by 2015. Germany plans full broadband coverage by 2010 and at least 50 Mbps to 75% of its households by 2014. Several Member States also focus on the need for broadband at affordable prices. France aims to have full broadband coverage with a maximum monthly fee of €35 by 2012. Portugal focuses on optical fibre infrastructure, advanced broadband services and high-speed research networks.

A first wave of national ICT strategies was launched after the adoption of i2010 in 2005 and a second wave has recently followed. National ICT strategies show how the open method of coordination works in practice: some clearly refer to inspiration from other Member States. The first generation of national broadband strategies focused on making broadband available to 100% of the population; today the focus is on higher speeds, broadband as part of the universal service obligation or on bringing fibre infrastructure to homes.

Newer strategies address new areas, going beyond the priorities of broadband, public online services and digital literacy shared by all Member States. Many of the smaller Member States now aspire to become top European players.

Some countries are bringing new topics to the ICT agenda, such as green IT, charters for e-rights, legal measures of non-discrimination and accessibility or new ways to develop eGovernment services, skills and digital literacy or models to stimulate the development of digital content.

4 Looking Ahead — Future Policy Challenges

Europe's successes to date have been built on a consistent drive for fair competition in telecoms markets and a borderless market for digital content and media services. Europe's technological leadership stems from its continuous efforts to establish a critical mass of R&D in emerging fields of ICT. It has a great capacity to capitalise on its cultural resources, such as its vibrant and successful film and media sector and the European digital library. This overall policy thrust remains valid for the future.

However, the success of the EU ICT strategy over the last four years needs to be put in a global perspective. Today it is becoming apparent that, even in areas where it has global leadership, **Europe is at risk of losing its competitive edge** when it comes to new, innovative developments. For instance, Europe has positioned itself as a world leader for broadband internet but dramatically lags behind Japan and South Korea in high-speed fibre. Similarly, Europe's mobile communications success has not spilled over into wireless broadband, where Asia is emerging as the world leader. In addition, Europe is sidelined regarding internet services and applications, with the US dominating the new interactive web habitat, especially blogs and social networks.

Therefore Europe needs a **new digital agenda** to meet the emerging challenges, to create a world beating infrastructure and unlock the potential of the internet as a driver of growth and the basis for open innovation, creativity and participation. The European Council in December 2008 called for a European plan for innovation where ICT would be a key technology. Europe needs to raise its game with growth strategies to boost economic recovery and stay world class in high-tech sectors; to spend research budgets more effectively so that bright ideas are marketed and generate new growth; to kick-start ICT-led productivity to offset GDP stagnation as the labour force starts to shrink when the baby boomers retire[12]; to foster new, smarter, cleaner technologies that can help Europe achieve a factor four growth[13] and to use networking tools to rebuild trust in Europe as an open and democratic society.

The Commission is about to launch a public online consultation on nine key areas for Europe's future ICT and media policies[14]:

1. *Unleashing ICT as a driver of economic recovery and as a lead contributor to the Lisbon growth and jobs agenda.* This is crucial in the current economic and financial crisis and to achieve Europe's longer-term economic goals.

2. *Increasing the role of ICT in the transition to a more sustainable low-carbon economy.* Focusing on ICT to promote responsible energy consumption in households, transport, energy generation and manufacturing and reveal the potential to make

12 Employment in the EU is projected to shrink by about 19 million people by the year 2060, due to the fall of the working age population. This means that productivity will have to be the source of future economic growth. A recent estimate is that EU labour productivity growth would converge to a long-term historical average of 1¾%, from COM(2009) 180 - Dealing with the impact of an ageing population in the EU: 2009 Ageing Report.

13 'Doubling Wealth, Halving Resource Use' E von Weizsäcker, A. Lovins and H. Lovins (1995).

14 The consultation on themes (5) and (6) below will be run jointly by the Information Society and Media and the Internal Market Directorates-General.

substantial energy savings. Smart meters, efficient lighting, cloud computing and distributed software will transform usage patterns of energy sources. ICT-based solutions will be essential to Europe's efforts to manage the transition to a sustainable economy.

3. *Upping Europe's performance in ICT research and innovation.* Despite the achievements of the past years, European R&D is constantly challenged. A strong ICT R&D base in Europe is crucial as ICT breakthroughs are key to solving a number of challenges, such as health care, the demands of an ageing society, security and privacy and managing the transition to a low-carbon economy.

4. *Creating a 100% connected economy through a high-speed and open internet for all.* The potential of high-speed infrastructure for economic recovery, long-term growth and innovation in Europe must be unlocked. It will be crucial to keep high-speed, future-proof networks open to foster innovation in new services and content, for and by all users in the online sphere.

5. *Consolidating the online single market.* We have yet to achieve an online single market, despite solid progress during the past years. Europe still faces legal fragmentation, with payment systems, security, privacy and other obstacles that discourage businesses and consumers to go digital. . This applies also to the market for digital content where fragmentation makes it difficult for European citizens to access the full span of rich and culturally diverse online offer available across the EU.

6. *Promoting users' creativity.* The new digital habitat (WEB 2.0 and beyond) offers an unprecedented chance to unleash the creativity of Europe's citizens. The internet today is an interactive political forum, a vibrant social network and a vast source of knowledge. With new participative platforms and services, users have become active players, producers or 'prosumers' and it is essential to put in place new policies to encourage users' creativity and participation.

7. *Reinforcing the EU's position as a key player in the international ICT arena.* The continued success of modern ICT depends on international openness and cooperation, an internet free of restrictions on traffic, sites, platforms and the type of equipment to be attached, and free of censorship. It also depends on our ability to handle global challenges, such as international governance, security, inappropriate content and malpractice, privacy, protection of persona data and new vast address spaces (IPv6), multilingual identifiers and so on. Many of these issues can only be solved at international level. But Europe's voice often struggles to be heard.

8. *Making modern and efficient public services available and accessible to all.* eGovernment is increasingly a reality in Member States. However, efforts must be further pursued to increase interoperability among public administrations. On its side, to achieve this goal the Commission has proposed to pursue the successful IDABC programme by tabling a proposal for a new programme aimed to promote Interoperability Solutions for public Administrations (ISA)[15] and is pursuing its works to revise the European Interoperability Framework, aimed to define the general rules and principles for collaboration among the Member States' administrations and the EU Institutions[16]. The use of ICT in schools has increased significantly; the Lisbon targets to equip and connect all schools in Europe have already been met. eLearning and eHealth applications can greatly improve the quality of education and health care across the EU. However, the benefits of all these applications have not yet been realised fully. We need to avoid opening up new digital divides. The participative web offers new opportunities but also challenges public administrations, enabling citizens to review their relationship with the authorities.

9. *Using ICT to improve the quality of life of EU citizens* by unlocking the storehouses of Europe's cultural heritage and bringing it online. The 2008 eInclusion initiative showed the socio-political and economic importance of this and the 'eInclusion business case' is now stronger than ever to overcome the main aspects of disadvantage, such as age, education, gender and location. In the current economic downturn, disenfranchised people in particular risk being further excluded from society and the labour market.

15 See COM(2008)583.

16 See http://ec.europa.eu/idabc/en/document/7728.

5 Conclusions

The achievements of i2010 and the ways it has been implemented in the Member States provide a snapshot of the dynamism and range of schemes that innovative policies can produce. i2010 has laid the building blocks for a modern ICT-enabled society. Broadband is today firmly on the political agenda.

But Europe faces important decisions about how to build a seamlessly connected digital economy poised for recovery. In addition, over the coming years the internet is expected to become an essential service, crucial for us to participate fully in society.

To seize these opportunities, the Commission calls on the Member States and on stakeholders to actively cooperate in the months ahead until early 2010 to draft a new digital agenda so that Europe can emerge from the current crisis with a stronger, more competitive and more open digital economy, driving European growth and innovation.

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Trends and main achievements

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European Commission
Europe's Digital Competitiveness Report

Executive summary

The i2010 initiative is successfully meeting its challenges and delivering on its promises. Take up of ICT by European enterprises and citizens has risen substantially over the past few years and the rapid spread of broadband is stimulating a more intensive use of advanced internet services. The quality of access has improved and has become cheaper, while use has intensified, in particular through the advancement of user-created content and social networks. More and more people are going online, including those belonging to more disadvantaged social groups. Use is becoming more interactive and sophisticated and the internet has become a popular tool for communication and entertainment services. This report analyses developments in Europe's information society and benchmarks Member States' progress in implementing the i2010 initiative. It also looks at developments in the ICT sector in the face of the economic crisis, with a focus on the impact it is having on R&D investment.

The i2010 approach has delivered important results on the supply side of information society developments, in particular in relation to broadband communications (Chapter 1). With 114 million subscribers, the EU is the largest world market for fixed broadband access with fast growth in penetration rates. Half of European households and more than 80% of European businesses have a fixed broadband connection, three quarters of them with average download speeds above 2 Megabits per second (Mbit/s). Broadband internet is available to 93% of the EU25 population, up from 87% in 2005. A number of coverage challenges remain, in a reduced number of Member States and in some rural areas. The EU recovery package, highlighting the role of broadband investments as smart spending to ensure the long-term sustainability of the upcoming recovery, reiterated the importance of ensuring broadband for all in the near term. Several initiatives have been announced by Member States with the objectives of complete coverage and infrastructure upgrades (Chapter 7).

The rapid spread of faster and cheaper internet access has boosted internet use. In 2008, 56% of EU citizens were using the internet on a regular basis, up from 43% in 2005, and nowadays three quarters of them do so every day. This goes in parallel with a rapid change in habits and in the adoption of new ways of communicating and sharing information (Chapters 4 and 5). In 2008, 35% of Europeans declared using the internet for advanced communication services, i.e. those services that go beyond the one-to-one communication systems and make possible the distribution and sharing of online information, content and applications. Although these services do not yet replace traditional forms of communication, they are getting increasingly widespread. Their adoption and use is very much linked to age: "Digital natives", i.e. people between 16 and 34 years old, and especially those aged 16 to 24, stand out as the most regular, intensive users. 73% of them have used the internet in the last three months for advanced communication services, more than twice as much as the population average, and they exceed other categories of the population in the use of the internet also for entertainment purposes. Digital natives are veritable users of an interactive borderless space in which content and services are made available for active users to download, exchange, create and re-create, distribute, share and re-use. This is confirmed by the rise in social networks and in user-created content in the past two years. The continued widening of the internet base and its increasing active usage strongly point to the rising social and economic importance of the internet and ICT (Chapter 4) and to the significance of the digital revolution challenges ahead, such as IPR and single market issues. The continued spread of these technologies

will constitute both an important starting point for a productivity-led and sustainable recovery and a promise for the further development of the sector.

Continued increases in usage however have not yet compensated for certain take-up gaps. While broadband is available to more than 90% of EU population, effective take-up attains 50% of households. The main reasons why households do not have an internet/broadband connection relate to a perceived lack of need, costs and skills. These barriers are greater for those on lower incomes. Most importantly, one third of European citizens have never used the internet. Large gaps in internet usage are observed both across countries and across socio-economic groups. Digital inclusion is largely driven by age and education/income levels: In most countries, the largest disparities in internet use relate to groups aged 65-74, the economically inactive and the low educated (Chapter 2). Meanwhile, a second digital divide, based on quality of use, is emerging. These results suggest the importance of demand-side policies which focus on stimulating the use of the internet, reducing psychological and skills barriers, increasing awareness on its possible benefits, facilitating access for the old and the disabled, reducing financial barriers and encouraging the acquisition of skills and life-long learning. Although most of these disparities are due to disappear naturally with the ageing of the "digital natives", the introduction of new technologies and devices may give rise to new disparities with similar characteristics.

The use and the development of ICT are also increasingly embedded in production processes throughout the economy. Policies aiming at fostering ICT take-up by businesses should remain mainstream. While take-up of efficiency enhancing technologies by large enterprises is widespread, SMEs are often lagging behind. Use of key business applications such as RFID is increasingly extensive for inventory management systems but also for the labelling of single product items. Innovative wireless technologies will play a more and more important role in the delivery of productivity gains for the European economy. Policies must ensure that European businesses successfully tap into the economic benefits these technologies can offer (Chapter 6).

The ICT sector is highly innovative and is being impacted by the economic crisis, albeit less than other sectors of the economy. While the downturn is expected to have a significant impact on all sectors, manufacturing segments are being hit more strongly than service segments. The telecom equipment industry, which is Europe's traditional strength, and semiconductors are suffering more than other ICT segments. Service segments (telecoms and software) are tempering the crisis thanks to sustained demand for traditional services, while searching for new sources of margins in otherwise mature markets. The internet industry, on the other hand, is weathering the storm better than any other part of the sector (Chapter 8).

The ICT sector is the biggest R&D investing industrial sector and provides other industries with productivity enhancing technologies. Firm-level analysis, based on companies' annual and quarterly reports up to the first quarter of 2009, indicates that the world economic crisis is already impacting on R&D levels. Reduced cash flows and credit constraints have resulted in R&D investment declining pro-cyclically (Chapter 9). Given the economic deterioration and the key role played by ICT in stimulating economic growth, policies that stimulate smart investment in ICT are crucial to ensure a sustainable long-term recovery.

In the context of i2010 ICT policies have been mainstreamed and have already produced tangible outcomes in terms of take-up by both citizens and enterprises (Chapter 7). In the future, national ICT policies need to build on the achievements of the past, both at a national level as well as by learning from best practices internationally. However, they also need to tackle ongoing problem areas as well as venture into new territory. The digital revolution is a prime driver of economic growth and social change. As such, ICT is at the very heart of the Lisbon strategy and essential to its success. In times of economic and financial crisis, it is important that this key role of ICT is not forgotten. Investments in ICT are 'smart' investments; helping to create and maintain jobs and growth now, to emerge from the crisis stronger and more quickly, while at the same time creating the basis for sustainable growth and jobs in the future. If we are serious about the Lisbon ambitions we must invest (as least) as much in the information highways of the future – a smart grid, broadband for all and better health care – as we do in more traditional infrastructure.

1 The Broadband Economy

Broadband is the basic infrastructure of modern knowledge economies and has been central to EU information society policy both in eEurope 2005 and i2010. One of i2010's main objectives was the development of a Single European Information Space offering affordable and secure high-bandwidth communications. Fast broadband access was then considered one of the main challenges posed by digital convergence, along with the need to promote new, rich online content, increase interoperability between platforms and devices and raise trust amongst investors and consumers through enhanced security.

Another objective of i2010 was to stimulate an inclusive Information Society that provides high quality public services and promotes quality of life. Digital convergence offers new opportunities but also brings new challenges, including the risk of a widening digital divide. i2010 aimed at expanding the geographical coverage of broadband to under-served areas. 90% of broadband coverage was one of the main objectives agreed by ministers in Riga[1] in 2006 and was already achieved by the EU25 in 2007. "Broadband for all" has been the goal of the "Bridging the broadband gap" initiative[2] as well as of the recent EU Recovery package[3], which earmarks around 1 billion euros for the development of broadband communications in rural areas. Given the differences in terms of broadband take-up and availability between the EU Member States and, within countries, between urban and rural areas, i2010 insisted on the importance of making sure that remote and less populated regions were not left behind.

This chapter analyses the main developments in broadband in recent years, focussing on performance indicators such as penetration, coverage, speeds and prices. It concludes with an update of the Broadband Performance Index, assessing the main strengths and barriers of EU Member States to continue progressing in the broadband economy.

1.1. Penetration of fixed broadband access between 2003 and 2009: Reducing the broadband gap

Since the launch of i2010 in 2005 the growth of fixed broadband connectivity in the EU has been steady, with high year-on-year growth rates that in some years equalled more than 20 million new broadband lines. This has brought about an increase in the number of households connected to the internet between 2004 and 2008, from 41 to 60%, of which 80% now have a broadband connection. In 2004, only 33% of internet

1 Proceedings of the ministerial and the Riga declaration are available at
http://ec.europa.eu/information_society/activities/einclusion/events/riga_2006/index_en.htm
http://ec.europa.eu/information_society/eeurope/i2010/digital_divide/index_en.htm#Broadband_Gap_Policy

2 More information can be found at http://ec.europa.eu/information_society/eeurope/i2010/digital_divide/index_en.htm#Broadband_Gap_Policy

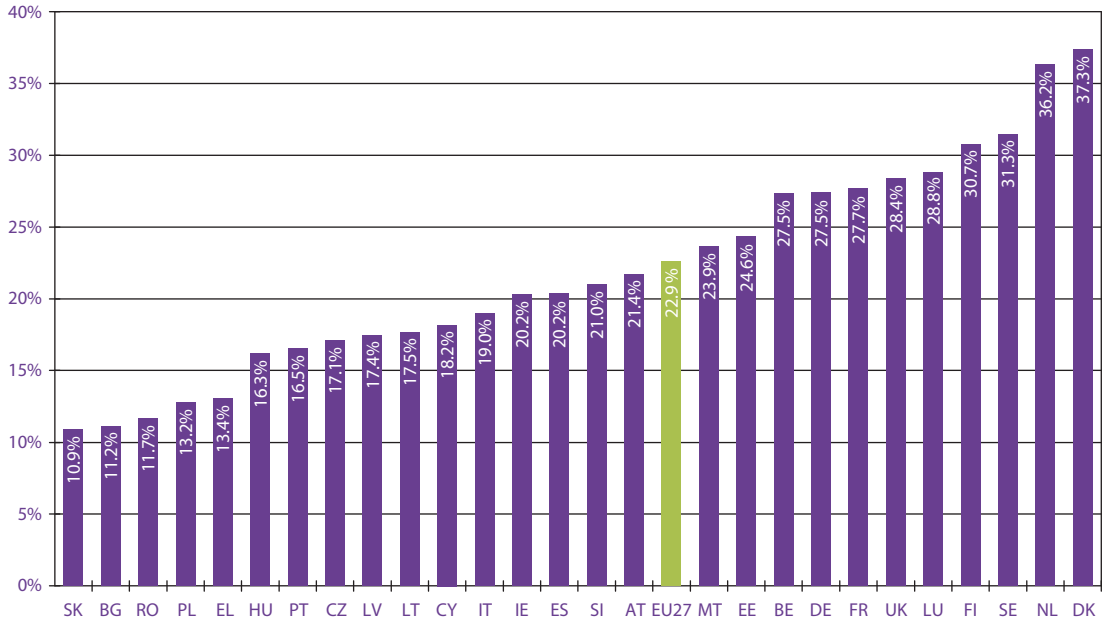
3 More information is available at
http://europa.eu/rapid/pressReleasesAction.do?reference=DOC/09/1&format=HTML&aged=0&language=EN&guiLanguage=en

households had a broadband connection. The percentage of enterprises connected to broadband has increased from 46.5% in 2004 to 81% in 2008.

The EU fixed broadband penetration rate (number of fixed broadband lines per 100 inhabitants, including both households' and enterprises' take up) as of 1 January 2008 was 23% (Figure 1), up from 6.1% in 2004. Alongside fixed broadband, wireless connections have started to gain importance in the last couple of years as an alternative way for EU consumers to benefit from this service, even though in general mobile technologies currently allow transmission speeds below those of wired technologies[4].

Take-up of broadband has been however uneven, resulting in significant fragmentation across Member States. In 2004 there were around 13.5 broadband lines per 100 citizens in Denmark and almost zero in Greece. The gap between the maximum and the minimum penetration rates increased in the aftermath of the 2004 enlargement of the EU to reach its peak at the end of 2007, when the difference between the countries with the highest and the lowest penetration rates attained 28 percentage points (p.p.). One of the main developments in 2008 was a change in this trend, as the gap between the highest and lowest figure reduced (albeit slightly) to 26.4 p.p. in January 2009 (Figure 2) and the dispersion of these figures for the individual countries also came down[5].

Figure 1: **EU Fixed broadband penetration, January 2009**



Source: Communication Committee (CoCom)

4 Reliable and meaningful data on effective wireless broadband lines are however not fully available and the Commission is working to improve this side of the i2010 benchmarking framework.

5 Dispersion of values, which increased in 2007 with the entry of BG and RO, also decreased significantly in 2008.

Figure 2: **The gap in broadband penetration in the EU**

Source: Communication Committee (CoCom)

The reduction in the gap is the result of two trends: On the one hand, growth in countries with the highest penetration rates has started to level off, as there is less room for organic growth in these countries. In 2008 growth in Sweden was nearly flat and limited to around two percentage points in the Netherlands and Denmark. On the other hand, countries with fewer broadband lines have experienced significant growth rates over the last year – 7 percentage points in Malta, and more than 4 in Poland, Cyprus, Greece or Lithuania. Yet this positive development did not suffice to curve the decline in the overall number of broadband lines net additions, which was of 14 millions in 2008, as against 19 million during 2007 and 21 million the year before. The current economic slowdown may put a further brake to the growth in broadband take up.

Finally, the use of a mobile phone via UMTS (3G) to access the internet is also increasing. Usage is high both in countries with high levels of fixed broadband, such as Sweden (9.5% of individuals) and Denmark (5.9%), but also in countries with low broadband take-up, like the Czech Republic and Slovakia, where respectively 5.3 and 4.8% of individuals used the 3G phone to connect to the internet[6].

1.2. Broadband coverage: Towards broadband for all

Avoiding a new digital divide - broadband have and have-nots - is another important objective of i2010. Broadband allows individuals and organisations to communicate and access services regardless of their geographical location. It enables businesses to communicate with clients and suppliers and limits business migration to urban areas. Broadband allows households to access advanced eGovernment, eHealth and eLearning services, improving their quality of life and their participation into the social and democratic life. By its own nature, broadband bridges distances and is particularly beneficial to the development and attractiveness of remote and rural areas. Nevertheless, broadband roll-out has been concentrating in more populated areas because of high investment costs due to distance and population scarcity.

Broadband access can be provided through different technologies, either wireline or wireless. As the footprint of the traditional telephone network, xDSL is the mostly deployed and used access technology in Europe. The

6 Source: Eurostat

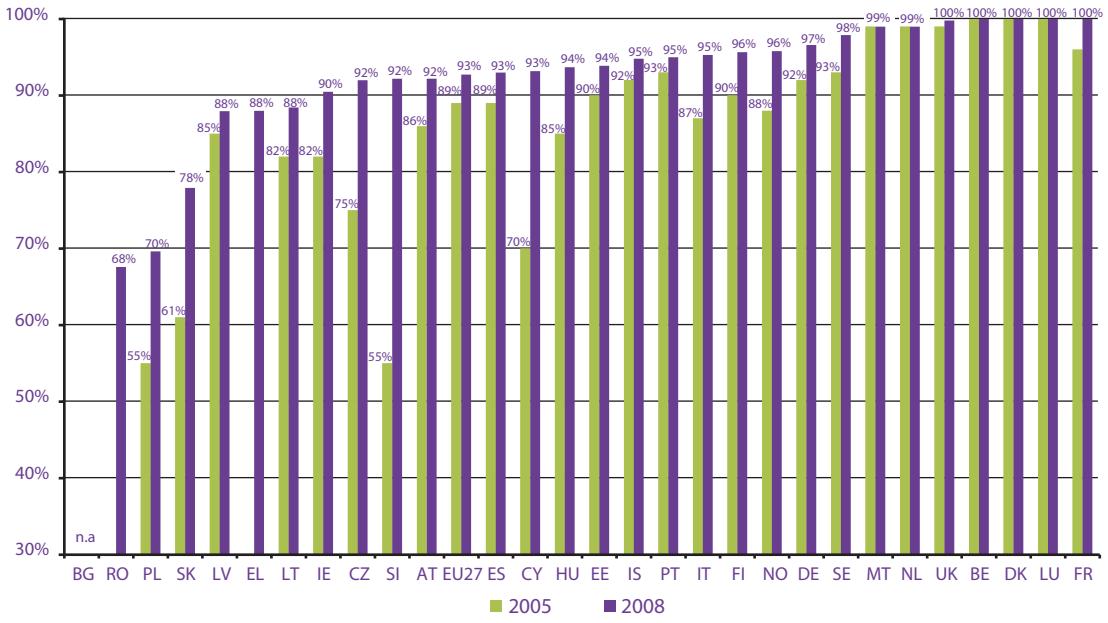
second most common fixed access technology is cable modem, although limited to a subset of Member States and mainly deployed in urban areas. Coverage of DSL and cable modem networks well summarises broadband coverage. As these two networks tend to overlap, DSL coverage has been used as proxy measurement for broadband coverage in Europe. Due to the orography and distribution of population in some countries, 100% coverage of wired networks will probably never be reached. Currently, only smaller and flat countries like Luxembourg, Denmark, the Netherlands and Belgium exhibit 100% rates of rural coverage. Several countries do not seem to manage increasing wired coverage beyond 90% of rural population.

The average national coverage of DSL networks in the EU has increased from 87% of population in 2005 to 93% in 2008. Important differences between countries in 2005 have been levelled off over time (Figure 3), increasing the average coverage rate. Countries with lower coverage rates have made significant efforts to improve their standing: Greece increased coverage from 12% to 86% in the relevant period. Significant progress has also been made by Slovenia, Cyprus, Poland and Slovakia.

Extension of broadband coverage in rural areas is more uneven and can still be considered a policy challenge in several countries where broadband access is available to less than 50% of rural population. But progress at EU level has been faster than for national coverage: the EU average rate has increased from 66% to 77% (Figure 4). Slovenia, Italy, Germany and Sweden concentrated their efforts in reducing the gap between national and urban areas with very positive results. Also Austria, Estonia and Ireland made further progress and in these countries the role of mobile technologies in filling the remaining gap seems to have been decisive. Further effort however is needed in Greece, Slovakia, Poland, Romania and Bulgaria, where between 45 and 80% of the rural population cannot yet subscribe to broadband.

Over the last years, advanced fixed technologies based on optical fibre but especially wireless technologies such as UMTS (3G), WiFi and WiMax and to a certain

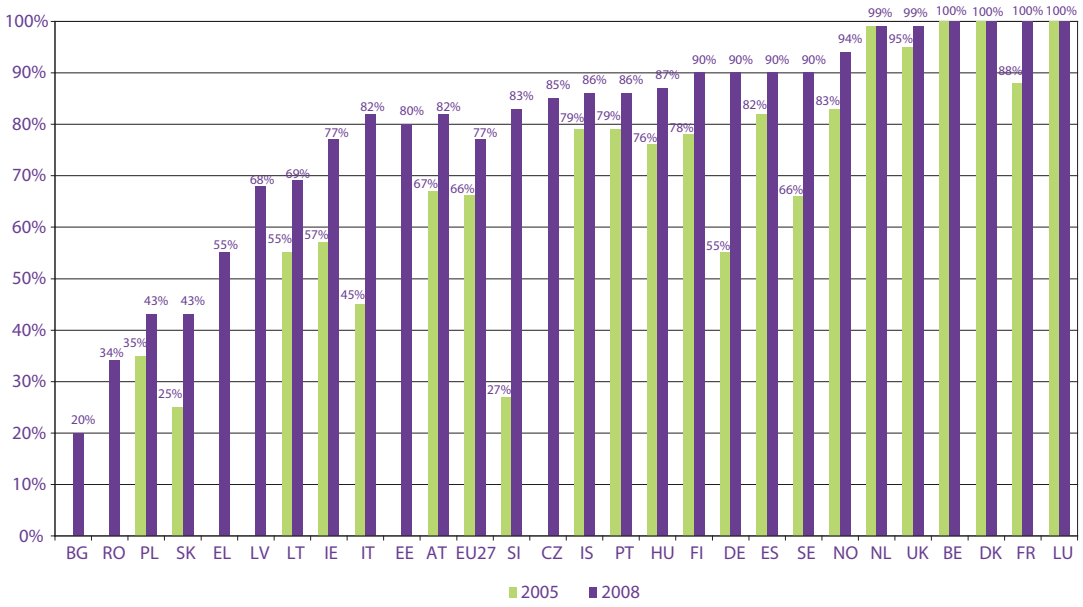
Figure 3: **Growth in DSL national coverage in the EU, 2005-2008 (in % of total population)**



Source: IDATE[7]

7 Study on Broadband coverage in Europe: Survey 2009 by IDATE Consulting and Research, forthcoming. Previous reports are available at http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm

Figure 4: **Growth in DSL rural coverage in the EU (in % of total population)**



Source: IDATE

extent satellite have made their inroads into the broadband market. Wireless access appears a more suitable technology to provide broadband local access in isolated and less populated areas and many national broadband policies have promoted their use in order to ensure universal availability. Fully comparable data on wireless broadband coverage are not yet available. The Commission has launched a study to gather further information on the actual coverage of wireless broadband networks as this form of access is becoming increasingly common in some Member States.

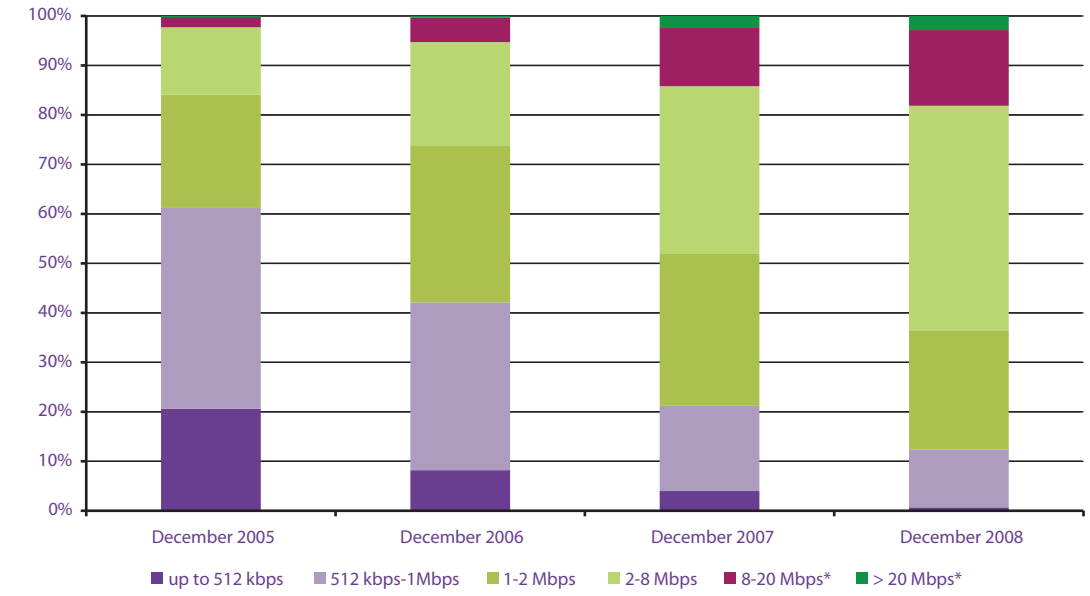
1.3. Increased competition brings higher speeds at lower prices

The average download speed of broadband subscriptions in the EU has greatly improved between 2004 and 2008. At the end of 2008 three quarters of EU broadband subscriptions are estimated to be associated to nominal speeds above 2 Mbit/s, a three fold increase relative to 2005. This increase in speed has driven (and has been driven by) growth in the use of new services which has enabled the rise of the Web 2.0. Speeds are expected to continue increasing as high definition video and IPTV become widely used, fast downloading and uploading requirements increase and shared internet use within households becomes more widespread.

In 2008 operators in many Member States continued to make plans to deploy very fast broadband connections based on fibre technologies. The extent to which the current economic downturn will impact on these plans is not clear yet. But Europe is still lagging behind the world leaders in high speed broadband especially as regards very fast connections. At the end of 2008 less than 5% of all fixed connections provided speeds in excess of 30 Mb/s (Figure 5).

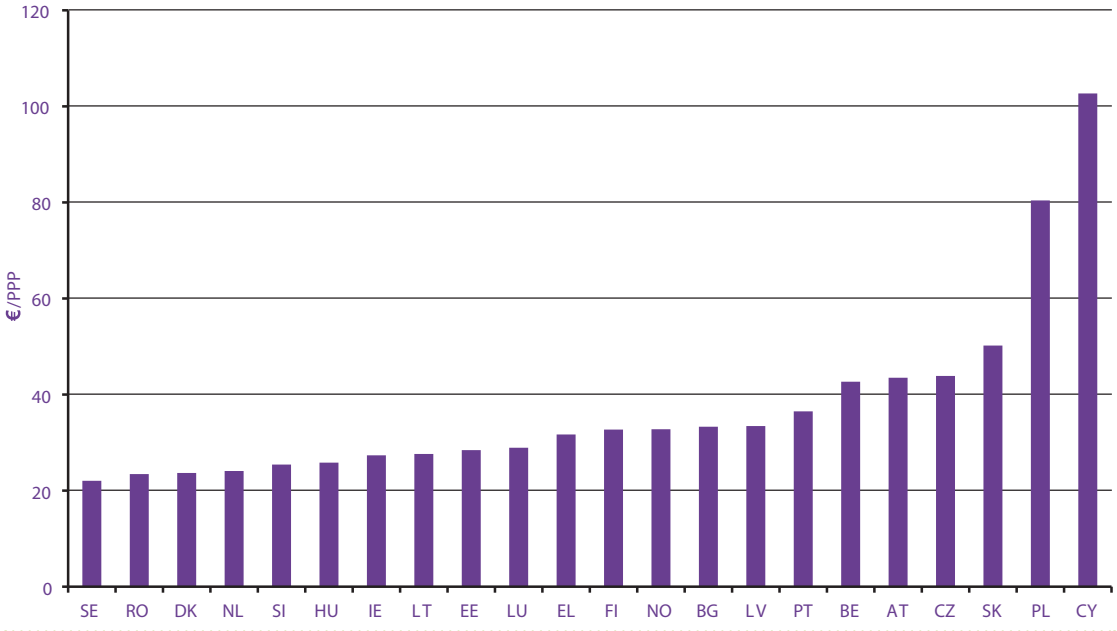
Improvements in average speeds have occurred in parallel with a reduction in prices for broadband products. Although retail broadband price comparisons are complex tasks because product characteristics, usage conditions and quality of service greatly differ across offers, data indicate that the average price for a broadband standalone service with download speeds between 2 and 4 Mbit/s has decreased from an average of around €/PPP 52 per month in April 2007 to about €/PPP 37 in April 2008 and €/PPP 29 in April 2009. Despite this reduction and a general trend towards providing more affordable prices, significant differences between countries still exist and the price for an equivalent product can be up to five times higher in the most expensive countries.

Figure 5: **Subscribers by download rates in the EU (DSL, cable modem and FTTH)**



Source: IDATE. 2008 data refer to 8-30 Mbps and >30 Mbps access lines

Figure 6: **Average monthly price of a 2-4 Mb/s broadband standalone access, April 2009**



Source: Van Dijk[8]

8 Study on *Broadband Internet Access Costs, 1st semester 2009*, by Van Dijk Management Consultants, forthcoming. Previous reports on broadband access costs are available at http://ec.europa.eu/information_society/eeurope/i2010/benchmarking/index_en.htm

These positive trends on speeds and prices are the outcome of a regulatory framework for electronic communication services focused on opening up competition, encouraging lower prices and investment and greater choice for consumers. The regulatory framework has imposed obligations on the former telecom national monopolies in order to facilitate the entry in the market of new providers of electronic communication services so as to create competitive dynamics. The market share of the new entrants has steadily grown over the last years and new operators now sell 54% of all broadband lines, up from 44% in 2004. However, this trend came to an end in 2008, a year in which former incumbent operators on average just lost 0.4% of the market share and actually increased their share in a number of countries (Belgium, Bulgaria, Germany, Spain, Ireland, Latvia, Austria, Portugal, Romania and Sweden).

But the relative weight of alternative operators is not the only indicator of a healthy competitive broadband market. Competition has resulted in significant level of investment in the broadband networks, both by incumbent and new operators. It has also brought about innovation and delivered more choice for consumers. New offers have emerged: at the end of 2007, about a third of European households[9] subscribed to two or more communication services as part of a bundle.

Data in this chapter refer to fixed broadband access exclusively. In 2008 use of mobile broadband for value added services have started to emerge, both in countries where fixed broadband penetration and use is very high as well as in some countries where the reach of fixed broadband networks is more limited and mobile broadband is used as a replacement. The Commission is working to gather data on mobile broadband and will report on this segment in future benchmarking reports.

1.4. Indexing Broadband Performance in 2009

Under the Mid Term Review of the i2010 strategy, the Commission announced the development of a Broadband Performance Index (BPI), which was presented in September 2008[10], following consultation with Member States. The BPI is used to measure the relative performance of countries in the wide broadband economy; to identify relative weaknesses and strengths of individual countries to fine-tune policy making; and to better understand the relative propensity of countries to progress in the broadband economy. It is structured along six dimensions (broadband rural coverage, degree of competition, broadband speeds, broadband prices, take up of advanced services and socio-economic context) that are selected on the basis of their relevance to the objective of the index.

This indicator can help the EU and its Member States to better identify strengths and weaknesses of their broadband economies. Recognition of barriers to further developments for example facilitates the design of policy responses. By summarising the various dimensions that characterise broadband economies, the BPI complements the information provided by penetration rates.

Given the changing nature of the broadband economy, including changes in consumption patterns, availability of offers and technological take up, the composition of the BPI has been slightly modified relative to 2008 (see the annex at the end of this section). Preference at this stage has been given to a better fine tuning of the index than to comparisons over time. The Commission and Member States have also agreed to revise the BPI in future to include data on the effective speed of broadband (rather than the nominal speed) as well as on mobile broadband.

Comparing 2009 results with the penetration rates (Figures 7 and 1 respectively), results show that countries such as France and the UK, with lower broadband penetration rates than Luxembourg or Finland, are closer to the best performing countries in the BPI ranking due to more positive results in competition, prices or speeds indicators. The BPI also highlights the very important role played by the socio-economic context, which includes indicators such as internet skills, penetration of PCs and effective use of 3G, which drives for example broadband performance in the Nordic countries.

The results of the BPI demonstrate, with just a few exceptions, that countries with the highest ranking have a balanced combination of the different factors. Both Sweden and the Netherlands have high levels of broadband coverage and competition, high average speeds and relatively cheap prices, with high levels of take-up of services and of the socio-economic context. Denmark, in third place, shares very similar features, but

9 E-Communications Household Survey, June 2008, available at http://ec.europa.eu/information_society/policy/ecomm/doc/library/ext_studies/household_07/eb68_2infsoecomm_full.pdf

10 http://ec.europa.eu/information_society/eeurope/i2010/bpi/index_en.htm

is lagging behind the others because of competition. These three countries are also those with the highest broadband penetration rates.

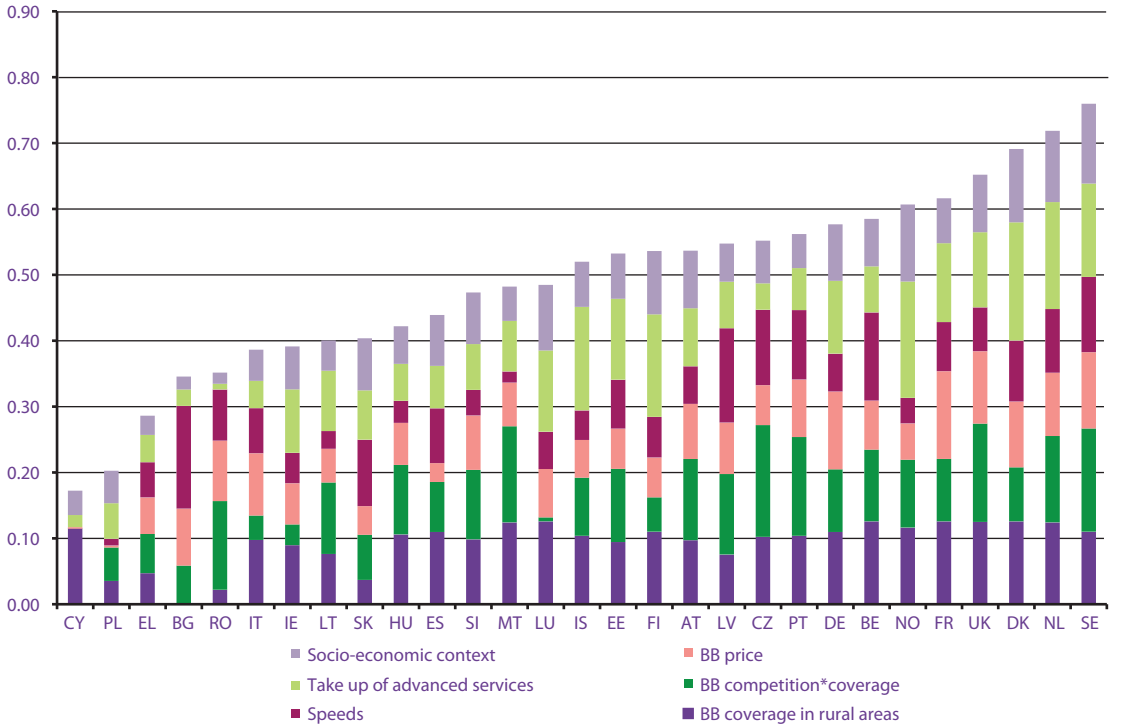
The second group of countries is characterised by having good scores in all dimensions except for one or two. For instance prices are relatively high in Belgium and Norway and average speeds are not particularly performing in the UK and Norway, while the socio-economic context is putting a brake on the overall ranking of France. But these four countries are better placed in the BPI ranking than in terms of broadband penetration rates.

In countries with lower scores there are imbalances in the performance of different indicators. Finland and Luxembourg, for instance, which are the countries with the fourth and fifth highest broadband penetration rates respectively, score very well in the take-up of services and in the socio-economic context, but have expensive prices and limited competition outcomes. In Austria and Germany speeds and take up of services do not appear in line with the good performance of other dimensions.

Conversely, the Czech Republic, Latvia and Portugal are characterised by good competition levels and average speeds but have a medium socio-economic context and take-up of services. These three countries have similar broadband penetration levels at around 17% of their population. Very low ranking in particular dimensions (competition and prices in Spain or speed in Malta and Slovenia) combined with medium socio-economic context and take-up of services brings these countries to their lower position. Other countries such as Hungary, Ireland, Italy or Lithuania have low scores in the socio-economic context as well, coupled with either high broadband prices or low speeds, low competition levels or low take-up of services.

Poland, Greece, Bulgaria and Romania are still severely affected by infrastructure problems and low coverage rates, with particularly low levels of competition (except in Romania) and high prices in Poland and Greece. Romania and Bulgaria, where brand new infrastructure is being deployed in the absence of traditional telephone networks, display good scores in speed and prices. Cyprus has the lowest scores in competition levels, price and speed. The ranking of all these countries, which have the lowest broadband penetration levels, is also negatively affected by low rates in the adoption of advanced services and by the socio-economic context.

Figure 7: **Broadband Performance Index, July 2009**



Source: Commission Services

1.5. Conclusions

Between 2005 and 2009, the European Union has made huge progress in progressing in the broadband economy. With 114 million subscribers, the EU is the largest world market and shows fast growth in penetration rates. Half of European households and more than 80% of European businesses have a fixed broadband connection, three quarters of them with average download speeds above 2 Mbit/s. Sector regulation has stimulated more competition, reducing prices and increasing average speeds of broadband connections. Broadband internet is available to 93% of the EU25 population, up from 87% in 2005.

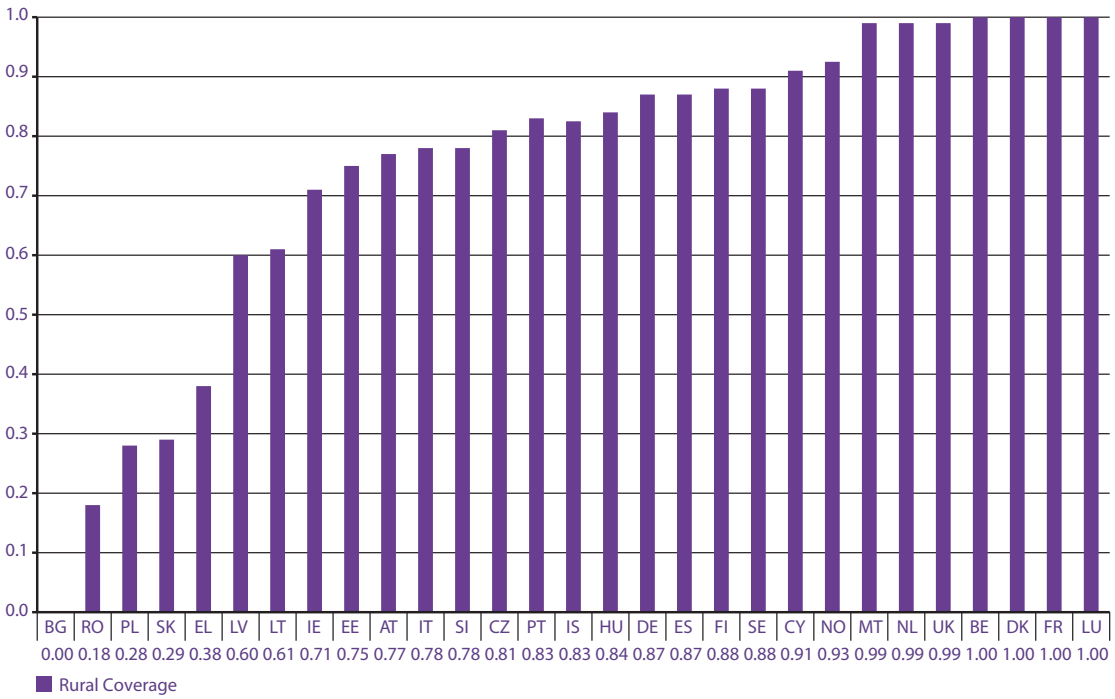
Nevertheless, coverage challenges remain, in a reduced number of Member States and in some rural areas. To support the European economic recovery and close the gaps in European broadband coverage, the European Economic recovery package has earmarked more than 1 billion euros for the development of broadband communications in rural areas to be distributed through the Rural Development Programme. To really make this work, Member States need to play an active role in targeting complete broadband coverage. Many have already taken up this challenge by aiming at 100% broadband coverage by 2010, or by 2013 at the latest. Others should follow their lead.

Another important area for policy action, highlighted in this chapter, is the need for Member states to adopt a more comprehensive approach to broadband roll out. Not only to support the supply side, but also to take measures to encourage broadband adoption. As availability of broadband now remains an issue only in limited parts of the EU, Member States should target broadband take up. While keeping a close eye on the evolution of competition, prices and infrastructure upgrades, demand-side actions on e-skills, online public services and awareness raising of the broadband benefits should help furthering citizens' uptake.

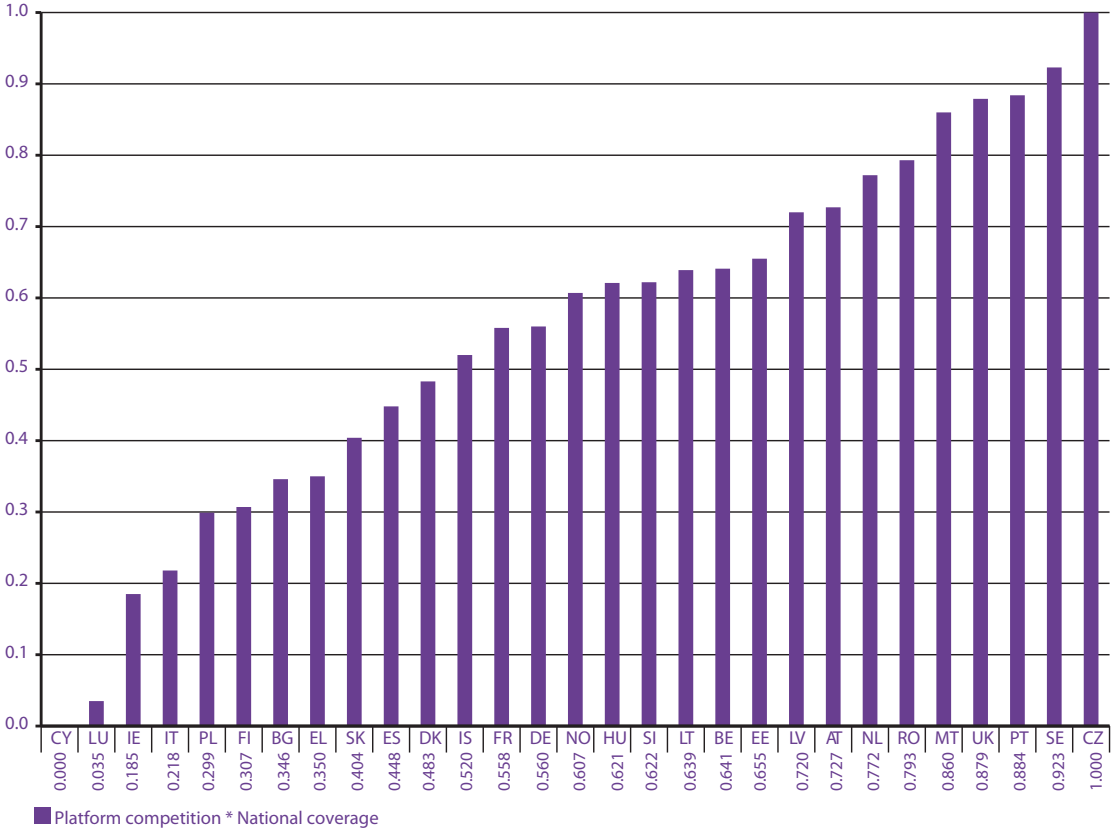
Annex: Composition of the BPI and detailed results by dimensions

RURAL COVERAGE	BB COVERAGE IN RURAL AREAS
COMPETITION BY COVERAGE	PLATFORM COMPETITION *NATIONAL COVERAGE
BROADBAND PRICE	BB ACCESS PRICES IN PPP - MEDIAN PRICE 2-4 MBIT/S
	BB ACCESS PRICES IN PPP - MEDIAN PRICE 4-8 MBIT/S
	MEDIAN OF THE NORMALISED PRICE
SPEEDS	AVERAGE SPEED
	% OF SUBSCRIBERS TO PRODUCTS WITH SPEEDS ABOVE 2 MBITS
TAKE-UP OF ADVANCED SERVICES	USE OF INTERNET SERVICES BY ENTERPRISES
	INDIVIDUALS DOWNLOADING SOFTWARE, MUSIC GAMES, E-GOV
	TRUST E-BANKING AND ONLINE PURCHASES (INDIVIDUALS)
SOCIO-ECONOMIC CONTEXT	E-SKILLS (INDIVIDUALS)
	PC PENETRATION AND USE OF 3G

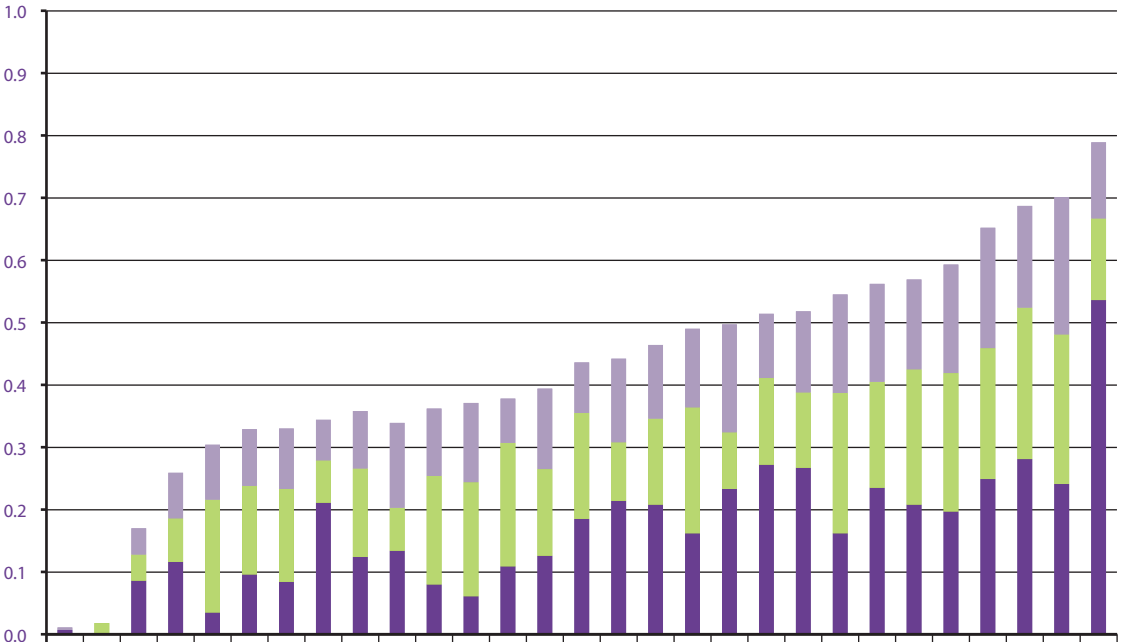
BB rural coverage (0 to 1)



BB competition and coverage (0 to 1)



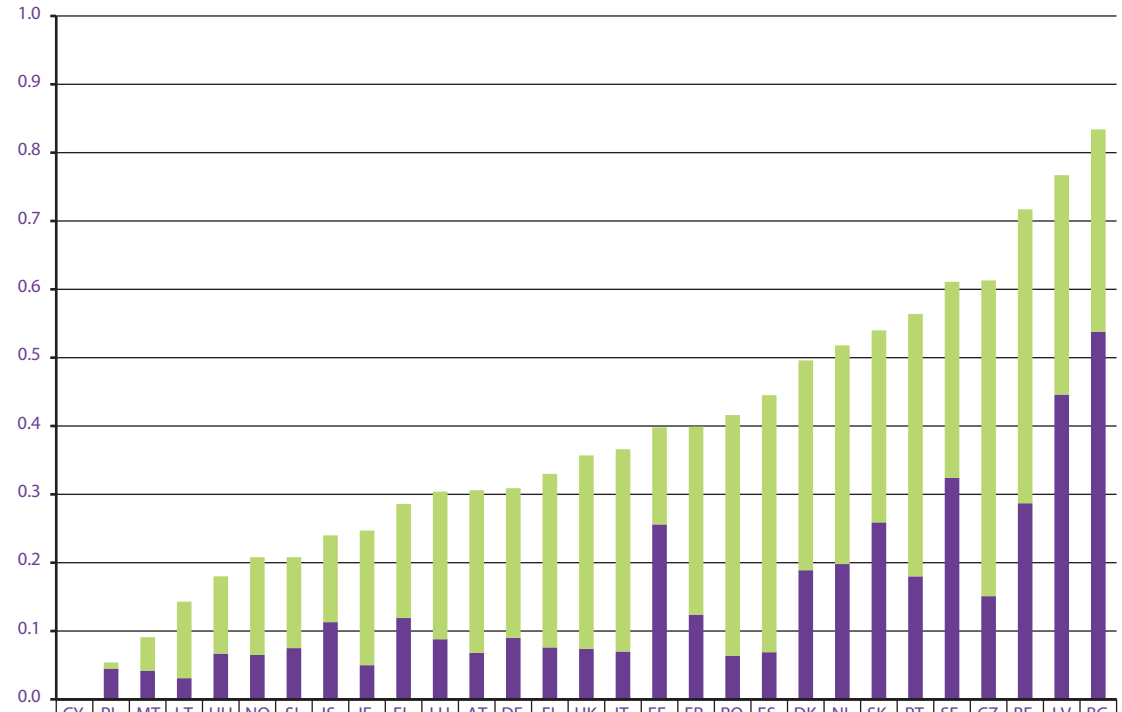
BB price (0 to 1)



CY	PL	ES	SK	LT	NO	EL	IS	FI	CZ	EE	IE	HU	MT	LU	BE	LV	SI	AT	BG	PT	RO	IT	NL	DK	UK	SE	DE	FR
0.004	0.000	0.042	0.073	0.088	0.091	0.097	0.065	0.092	0.136	0.108	0.127	0.071	0.129	0.081	0.134	0.118	0.126	0.173	0.103	0.130	0.158	0.157	0.144	0.174	0.193	0.163	0.220	0.122
0.000	0.018	0.042	0.070	0.181	0.142	0.149	0.068	0.142	0.069	0.174	0.183	0.198	0.139	0.170	0.094	0.138	0.202	0.091	0.139	0.121	0.225	0.170	0.217	0.222	0.210	0.243	0.240	0.131
0.007	0.000	0.086	0.116	0.035	0.096	0.084	0.211	0.124	0.134	0.080	0.061	0.109	0.126	0.185	0.214	0.208	0.162	0.233	0.272	0.267	0.162	0.235	0.208	0.197	0.249	0.281	0.241	0.536

BB price. Median offer. Basket 4Mbps-8 Mbps BB price. Median offer. Basket 2Mbps-4 Mbps Median of price/speed

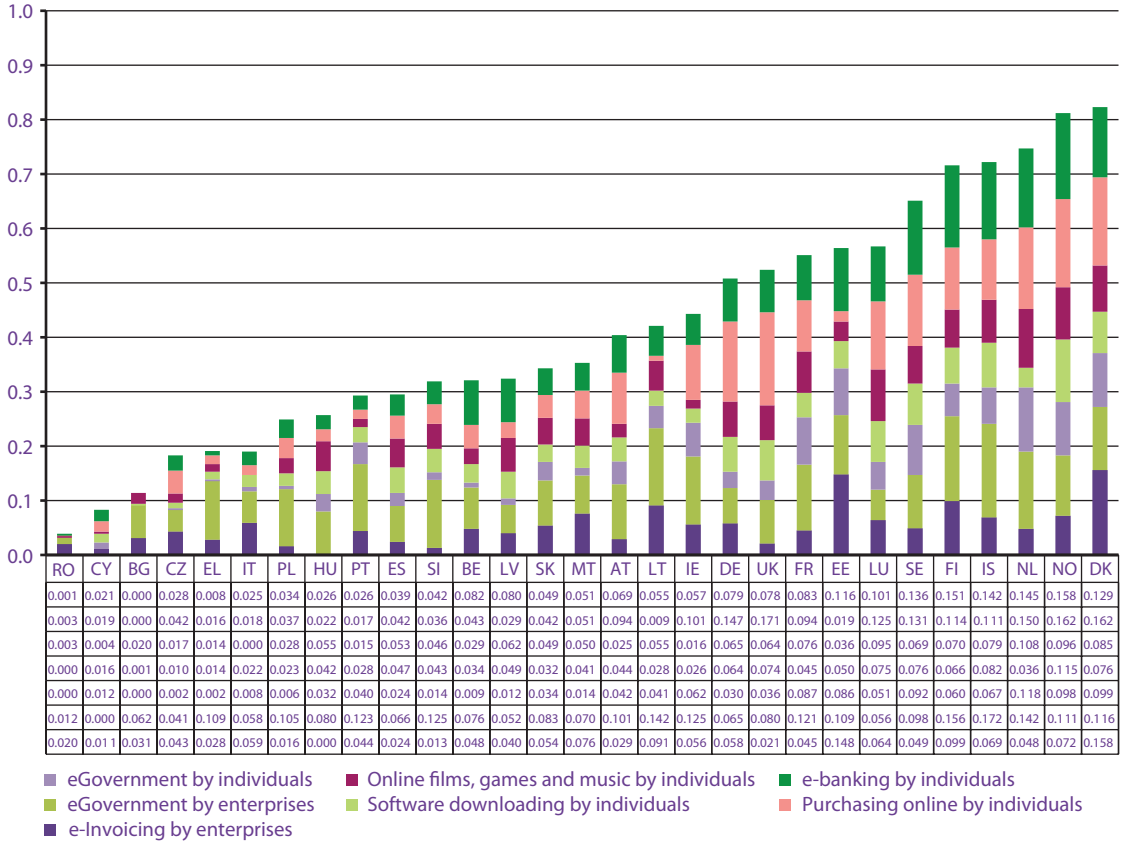
Speeds (0 to 1)



CY	PL	MT	LT	HU	NO	SI	IS	IE	EL	LU	AT	DE	FI	UK	IT	EE	FR	RO	ES	DK	NL	SK	PT	SE	CZ	BE	LV	BG
0.000	0.009	0.049	0.112	0.113	0.143	0.133	0.127	0.197	0.167	0.216	0.238	0.219	0.254	0.283	0.296	0.142	0.275	0.352	0.376	0.307	0.320	0.281	0.384	0.287	0.462	0.430	0.321	0.296
0.000	0.045	0.042	0.031	0.067	0.065	0.075	0.113	0.050	0.119	0.088	0.068	0.090	0.076	0.074	0.070	0.256	0.124	0.064	0.069	0.189	0.198	0.259	0.180	0.324	0.151	0.287	0.446	0.538

% of subscribers to products with speeds above 2 Mbps Average speed

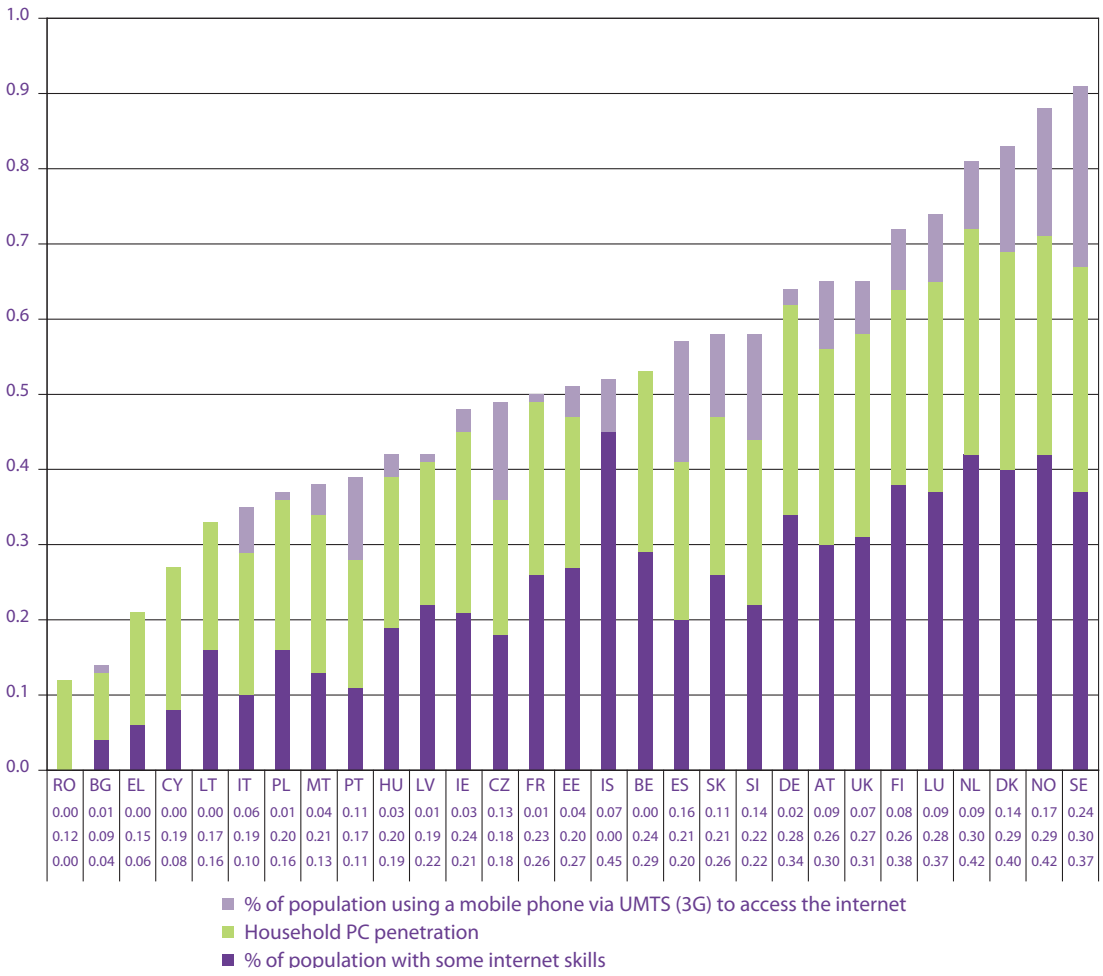
Take up of advanced services (0 to 1)



RO	CY	BG	CZ	EL	IT	PL	HU	PT	ES	SI	BE	LV	SK	MT	AT	LT	IE	DE	UK	FR	EE	LU	SE	FI	IS	NL	NO	DK
0.001	0.021	0.000	0.028	0.008	0.025	0.034	0.026	0.026	0.039	0.042	0.082	0.080	0.049	0.051	0.069	0.055	0.057	0.079	0.078	0.083	0.116	0.101	0.136	0.151	0.142	0.145	0.158	0.129
0.003	0.019	0.000	0.042	0.016	0.018	0.037	0.022	0.017	0.042	0.036	0.043	0.029	0.042	0.051	0.094	0.009	0.101	0.147	0.171	0.094	0.019	0.125	0.131	0.114	0.111	0.150	0.162	0.162
0.003	0.004	0.020	0.017	0.014	0.000	0.028	0.055	0.015	0.053	0.046	0.029	0.062	0.049	0.050	0.025	0.055	0.016	0.065	0.064	0.076	0.036	0.095	0.069	0.070	0.079	0.108	0.096	0.085
0.000	0.016	0.001	0.010	0.014	0.022	0.023	0.042	0.028	0.047	0.043	0.034	0.049	0.032	0.041	0.044	0.028	0.026	0.064	0.074	0.045	0.050	0.075	0.076	0.066	0.082	0.036	0.115	0.076
0.000	0.012	0.000	0.002	0.002	0.008	0.006	0.032	0.040	0.024	0.014	0.009	0.012	0.034	0.014	0.042	0.041	0.062	0.030	0.036	0.087	0.086	0.051	0.092	0.060	0.067	0.118	0.098	0.099
0.012	0.000	0.062	0.041	0.109	0.058	0.105	0.080	0.123	0.066	0.125	0.076	0.052	0.083	0.070	0.101	0.142	0.125	0.065	0.080	0.121	0.109	0.056	0.098	0.156	0.172	0.142	0.111	0.116
0.020	0.011	0.031	0.043	0.028	0.059	0.016	0.000	0.044	0.024	0.013	0.048	0.040	0.054	0.076	0.029	0.091	0.056	0.058	0.021	0.045	0.148	0.064	0.049	0.099	0.069	0.048	0.072	0.158

- eGovernment by individuals
- eGovernment by enterprises
- e-Invoicing by enterprises
- Online films, games and music by individuals
- Software downloading by individuals
- e-banking by individuals
- Purchasing online by individuals

Socio economic context (0 to 1)



2 Regular internet usage and the eInclusion puzzle: tackling digital divides

One of the goals of i2010 was to promote a more inclusive information society. The Riga Ministerial Declaration of 2006 set a number of targets with regard to improving eInclusion. They included the halving of disparities in regular internet use and digital literacy between disadvantaged groups and the EU population as a whole between 2005 and 2010.

This chapter looks at progress made in reducing disparities in the level of regular internet use and digital skills across socio-economic groups and countries. It also examines the barriers to internet and broadband take up and makes suggestions for future policy directions in the area of eInclusion.

The results show that regular internet use has grown substantially, from 43% in 2005 to 56% in 2008, and has become more frequent. It is also more inclusive, with the most disadvantaged groups having progressed the most. Nevertheless, large gaps still remain, across countries and socio-economic groups, and a second digital divide, based on quality of use, is emerging. Empirical evidence shows that digital inclusion is largely driven by age and education levels.

While educational levels are difficult to influence in the short-to-medium term, the results suggest the need for policies focusing on encouraging use of the internet, especially by the most excluded groups, by reducing psychological barriers and increasing familiarity with its possibilities/benefits, facilitating access for the old and disabled, reducing financial barriers and encouraging the acquisition of skills and their continuous learning (i.e. Life Long Learning).

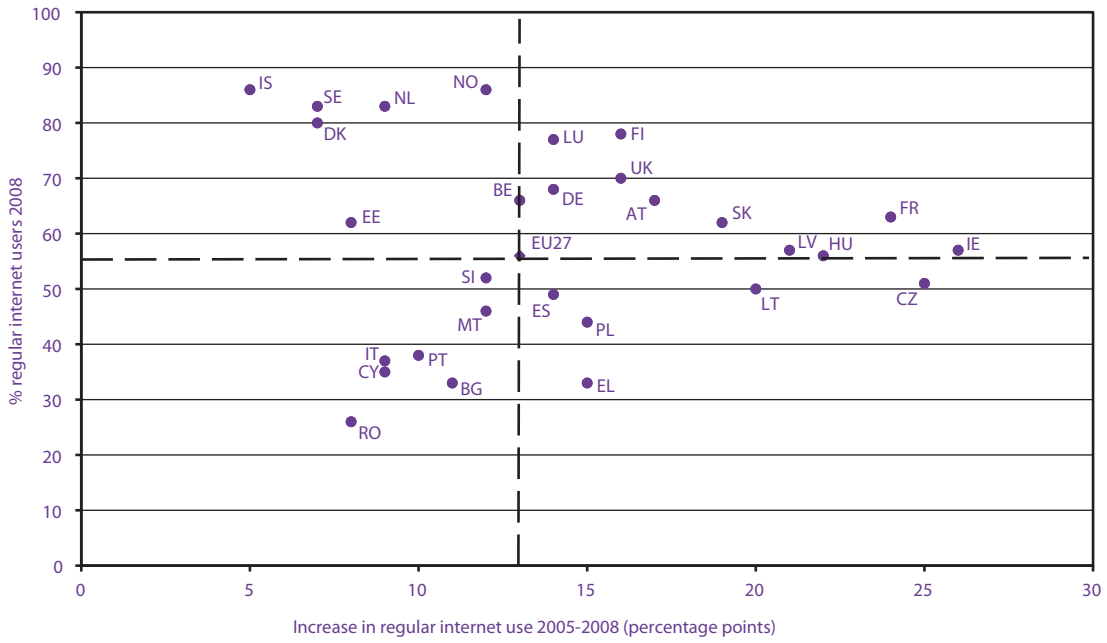
2.1. Regular internet use in the EU and its Member States

Regular use of the internet in Europe has increased markedly over the lifetime of the i2010 initiative. On average regular internet use, defined as at least once a week, has increased by 13 p.p. in the EU from 43% in 2005 to 56% in 2008 (Figure 1). This use has also become more frequent, with 43% of the population (i.e. 77% of regular users) now using the internet almost every day, compared to 29% in 2005.

Regular internet usage has risen in all EU 27 Member States and in 17 European countries at least half of the population are now regular internet users. The countries showing the biggest increases since 2005 are Ireland, the Czech Republic, France, Hungary, Latvia, and Lithuania. The countries with the least improvement are Iceland, Denmark, Sweden, Romania, Estonia, the Netherlands, Italy, Cyprus and Portugal. While low growth in regular internet use in countries such as Iceland, Denmark, Sweden and the Netherlands can be attributed to their already very high rates of internet usage, in others, such as Italy, Cyprus, Romania and Portugal, which have some of the lowest rates of regular internet use, it is a source of concern.

Despite progress, countries' relative rankings have changed little at either end of the scale. The best performers in 2008 were the Nordic countries, the Netherlands and Luxemburg. The worst performers remained Romania, Bulgaria, Greece, Cyprus, Italy and Portugal. As regular internet use in the rest of Europe

Figure 1: **Trend in % internet regular users in the EU, Iceland and Norway, 2005-2008**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

expands, these countries are being left behind. The two main exceptions are Ireland and the Czech Republic which have improved their positions significantly.

2.2. Disparities in regular internet use across socio-economic groups and the Riga goals

While progress in reducing disparities in regular internet use has certainly been made, more will need to be done if the Riga goals are to be achieved. The Riga Ministerial Declaration of 2006 set a number of targets with regard to improving eInclusion.[11] They included the halving of disparities in internet use and digital literacy between disadvantaged groups[12] and the EU population as a whole between 2005 and 2010.[13]

To monitor disparities in internet use and digital literacy over time, two penetration rate indices were developed. The first index measures disparity in regular internet use between a given disadvantaged group and the average for the total population. The second index measures disparities in digital literacy, through a combination of an individual's ability to perform one or more internet and computer related tasks.[14] A value of 1 for the index implies equality with the rate for the total population. Values below 1 imply a lower rate than the population and those above 1 imply a higher rate than the population. This section focuses on the first index, the one on digital literacy will be dealt with later.

The index of regular internet use has increased to 0.66 in 2008, from 0.60 in 2005, showing a marked improvement (Figure 2). The disadvantaged groups which have made the best progress are the low educated (+0.1 p.p.), inactive and aged 55-64 (+0.08 p.p. each). The least progress was made in the group of individuals living in sparsely populated areas (+0.01 p.p.). This means that the

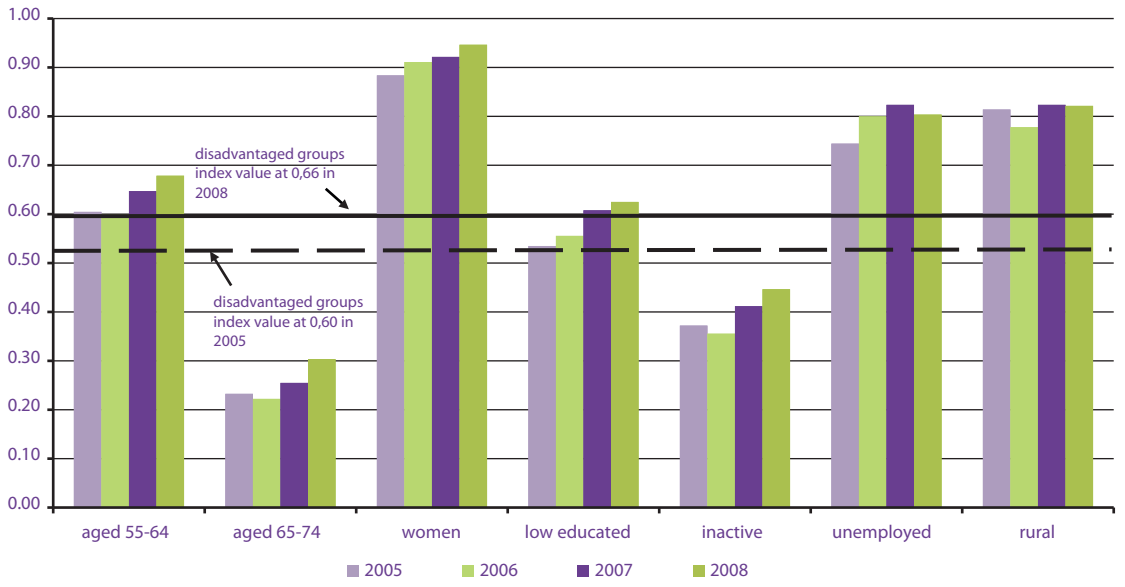
11 See http://ec.europa.eu/information_society/events/ict_riga_2006/index_en.htm.

12 Disadvantaged groups were defined as older people, people with disabilities, women, lower education groups, unemployed and residents in "less-developed" regions.

13 Other goals included a 90% target for broadband coverage, increased coverage of underserved locations and reduced regional disparities in internet access, a target of 100% accessibility of public web sites and commitments on fostering cultural diversity in the information society.

14 See "Benchmarking from a policy perspective – eInclusion report", December 2006.

Figure 2: **Trend in % internet regular users in the EU, 2005-2008**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

development in regular use of the internet for this group has been similar to that of the average EU population. While there has been good progress in reducing disparities with respect to the old, inactive and low educated, they remain to a large extent digitally excluded. In contrast, the category women, whose starting position was not that different from the average, has already achieved its Riga target.

Looking across countries, there remain substantial differences in disparities and a number of countries have substantially greater disparities in regular internet use between socio-economic groups than the EU average (Table 1). The countries with the largest disparities are Romania, Greece, Bulgaria, Cyprus, Portugal, Slovakia, Spain, Lithuania, Slovenia and Italy. By contrast, the countries exhibiting the strongest degree of equality are the Netherlands, Sweden, Norway, Denmark, Finland and Luxemburg. This pattern corresponds largely to countries' overall connectivity. Indeed the correlation coefficient between the percentage of regular internet users in the population as a whole and the degree of disparity in regular use across countries is 0.94.

When it comes to the performance of specific disadvantaged groups, again most countries have the largest disparities in internet use for the groups aged 65-74, the economically inactive and the low educated. The group which exhibits the largest variation in disparities across countries is for those aged 55-64.[15] While in countries such as Norway, the Netherlands, Denmark and Luxemburg there is very little inequality, in others, such as Romania, Cyprus, Greece and Bulgaria, there are very large disparities.

2.3. Barriers to household take up of the internet

Despite progress made in regular internet use, about a third (33%) of the population of the EU had never used the internet in 2008 (which is nevertheless a significant improvement over 2007, when the figure was 40%), 27% had never used a computer and an even larger number had no internet access at home (40% in 2008).

According to the Community Survey on ICT usage in households and by individuals (2008), the main reason for not having internet in the home relates to the perceived lack of need (Figure 3); 38% of households responded that this was a reason for not having internet at home. Other important factors are costs for equipment (25%) and access (21%), as well as a

15 Measured by the standard deviation.

Table 1: **Index of internet use in at risk groups by country in 2008**

	aged 55-64	aged 65-74	women	low educated	inactive	unemployed	rural	total at risk index
eu27	0.68	0.30	0.95	0.63	0.45	0.80	0.82	0.66
be	0.73	0.32	0.92	0.67	0.52	0.77	0.92	0.69
bg	0.33	0.04	0.97	0.45	0.15	0.55	0.64	0.45
cz	0.53	0.16	0.94	0.80	0.31	0.55	0.90	0.60
dk	0.85	0.51	0.98	0.85	0.56	0.84	0.94	0.79
de	0.76	0.37	0.91	0.87	0.54	0.84	0.87	0.74
ee	0.52	0.24	1.00	0.82	0.39	1.03	0.94	0.71
ie	0.54	0.26	1.00	0.53	0.53	0.77	0.82	0.64
el	0.33	0.03	0.85	0.27	0.18	0.85	0.70	0.46
es	0.43	0.14	0.92	0.51	0.29	0.88	0.78	0.56
fr	0.71	0.35	1.02	0.73	0.52	0.97	0.90	0.74
it	0.54	0.16	0.86	0.46	0.27	0.86	0.84	0.57
cy	0.31	0.11	0.91	0.37	0.29	1.00	0.69	0.53
lv	0.46	0.11	0.96	0.79	0.32	0.63	0.91	0.60
lt	0.44	0.10	0.98	0.68	0.24	0.62	0.84	0.56
lu	0.83	0.51	0.86	0.79	0.73	0.62	1.01	0.76
hu	0.61	0.27	0.98	0.61	0.45	0.71	0.86	0.64
mt	0.41	0.24	0.93	0.63	0.39	0.74	1.00	0.62
nl	0.88	0.49	0.96	0.78	0.70	1.14	0.95	0.85
at	0.68	0.35	0.89	0.65	0.52	0.88	0.89	0.69
pl	0.43	0.06	0.98	0.70	0.30	0.57	0.82	0.55
pt	0.45	0.11	0.89	0.58	0.21	0.76	0.76	0.54
ro	0.27	0.04	0.96	0.54	0.12	0.69	0.58	0.46
si	0.48	0.08	0.98	0.54	0.19	0.73	0.94	0.56
sk	0.45	0.10	0.95	0.66	0.27	0.45	0.97	0.55
fi	0.78	0.37	0.99	0.81	0.56	0.90	0.95	0.77
se	0.92	0.53	0.98	0.81	0.64	1.04	0.98	0.84
uk	0.79	0.41	0.94	0.47	0.56	0.83	0.90	0.70
is	:	:	:	:	:	:	:	:
no	0.88	0.45	0.97	0.86	0.66	0.91	0.99	0.82
Max.	0.92	0.53	1.02	0.87	0.73	1.14	1.01	0.85
Min.	0.27	0.03	0.85	0.27	0.12	0.45	0.58	0.45
Range	0.65	0.50	0.17	0.59	0.61	0.69	0.44	0.40
S.D.	0.19	0.16	0.04	0.16	0.18	0.17	0.11	0.12

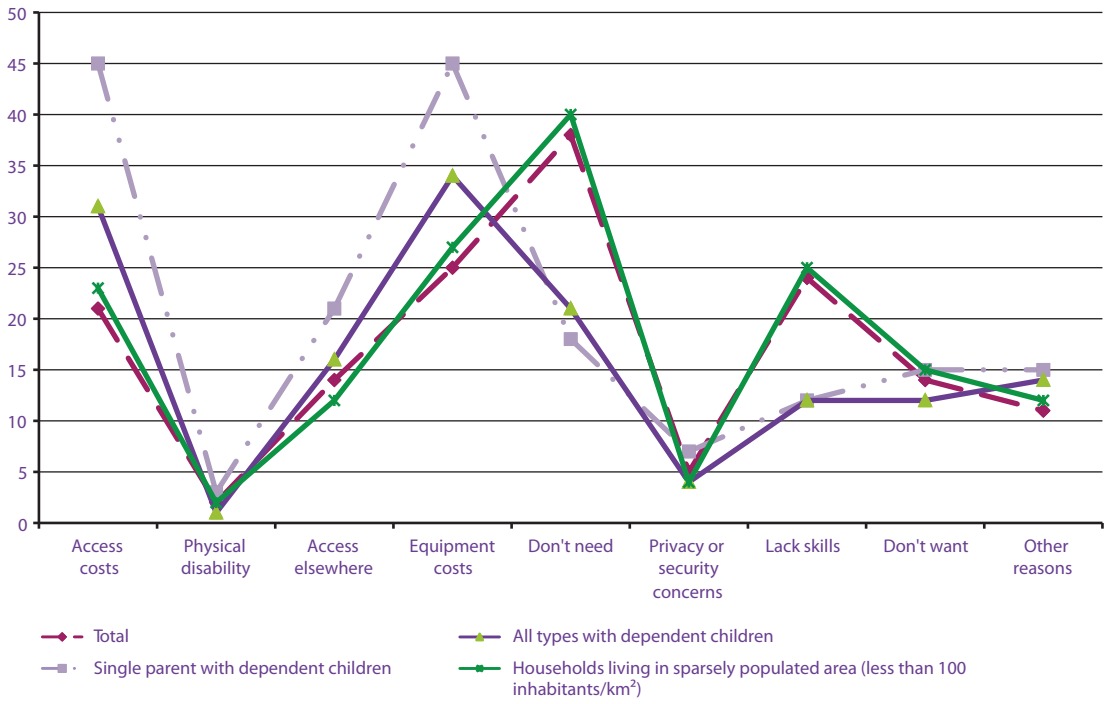
Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

lack of skills (24%). The least important reasons relate to privacy and security concerns[16] (5%) and physical disability (2%). The importance of these factors has not changed over time.

With regard to physical disability, however, this does not mean that it is not an important reason for not having the internet, only that out of all households it is only relevant for a small number of them. A more important question is whether and to what extent for disabled people their disability is a reason for not having the internet. Recent findings of a study commissioned by the European Commission on the status of 'eAccessibility' in Europe shows that people with disabilities do indeed continue to face significant barriers to usage of everyday ICT products and services (Box 1).

16 In a separate context, a 2008 Eurobarometer Survey on citizens' perceptions in relation to data protection showed that a large majority of respondents (82%) considers that data transmission over the internet is not sufficiently secure while only 15% of respondents trust data security transfers over the internet. See http://ec.europa.eu/public_opinion/flash/fl_225_en.pdf

Figure 3: **Reasons for not having internet at home (2008)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

BOX 1: OVERVIEW OF THE RESULTS OF THE STUDY ON "MEASURING PROGRESS OF eACCESSIBILITY IN EUROPE"

In 2005, the European Commission produced a Communication on eAccessibility[1] highlighting the need for improving access to Information and Communication Technologies (ICTs) by people with disabilities. Three key approaches for EU-level policy intervention were identified: the application of accessibility requirements in public procurement (utilising freedoms given to Member states in transposing the Public Procurement Directives); the introduction of a product and service certification scheme; and better use of existing legislation (e.g. in telecommunications and employment).It also announced that a follow-up on the eAccessibility situation would be made two years after the Communication, at which time the Commission might consider additional measures.

As part of the follow-up to the Communication, the "Measuring progress of eAccessibility in Europe" (MeAC) study was launched and the results of this study were first published in 2007. A follow up report on the eAccessibility status situation as well as detailed country profiles were elaborated one year after the main benchmarking exercise had been conducted in 2007. The evidence collated in 2008 suggested that no significant changes in the overall eAccessibility status had taken place since 2007 and that the main conclusions remained valid.

These conclusions were that there was only limited progress towards eAccessibility detected in Europe, and further EU-level measures needed to be considered to stimulate progress in eAccessibility. Three key findings underpinned this conclusion:

The eAccessibility 'deficit': People with disabilities in Europe continued to be confronted with many barriers to usage of the everyday ICT products and services that are now essential elements of social and economic life. Such eAccessibility deficits could be found across the spectrum of ICT products and services, for example telephony, TV, web and self-service terminals. With regard to the internet, it was found that very few websites met accepted international accessibility standards: in 2008, 20% were accessible based on automatic testing and only 2.9 % based on more stringent manual testing. The figures were somewhat higher for governmental websites, but significantly lower for sectoral/commercial ones.

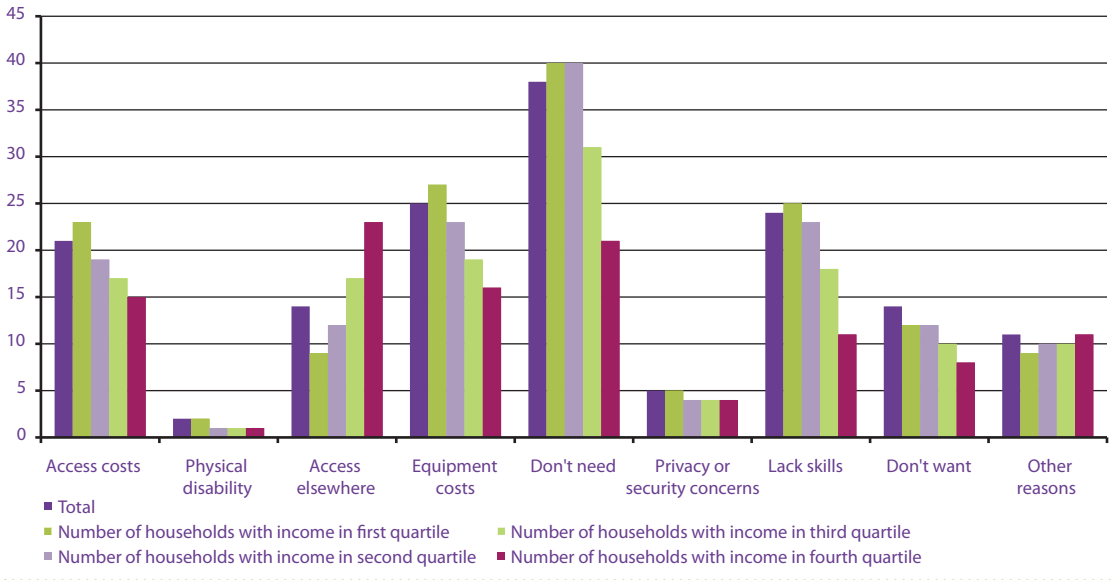
The eAccessibility 'gap': From a comparative perspective, the eAccessibility situation for people with disabilities across Europe as a whole, in terms of both eAccessibility status and eAccessibility policy, compared very unfavourably with that of comparison countries examined in the MeAC study (AU, CA and US). While, international comparison showed the relatively weak situation in Europe with regard to eAccessibility it also showed that it was not unrealistic to aim for a stronger one.

The eAccessibility 'patchwork': Finally, the situation across Europe for both eAccessibility status and eAccessibility policy was very much a 'patchwork'. The overall picture showed many important gaps, uneven attention across the spectrum of eAccessibility themes, and wide disparities across the Member States.

Further, the study also showed a strong relationship between eAccessibility status and policy, showing that good policy and good eAccessibility status were strongly linked, providing support for policies in the area of eAccessibility. The study also highlighted the positive impact that EU level policy had had, but also that further EU-level measures needed to be considered.

1 http://ec.europa.eu/information_society/activities/einclusion/policy/accessibility/com_ea_2005/index_en.htm

Figure 4: **Reasons for not having internet at home by income group (2008)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Across different socio-economic groups the picture varies somewhat. In particular, for households with children, the main reasons relate to access and equipment costs. This is even more so the case for single parents with children. On the other hand, for these two groups lack of skill and a perceived lack of need play a smaller role. This suggests that, for some groups, income/financial issues are still an important barrier to internet take up at home. Interestingly, the data also show that for those living in sparsely populated regions the reported reasons for not having the internet at home are basically the same as for the population at large, showing that living in a rural area does not affect people's perceptions.

Looking at reasons for not having the internet at home by income group confirms the importance of financial barriers for those on lower incomes (Figure 4). Access and equipment costs are, obviously, more important the lower the income. However, this also holds true for other reasons such as lack of skills, the perceived lack of need and not wanting internet at home. On the other hand, having access elsewhere is a more important reason for not having access at home the higher the income.

2.4. Barriers to broadband take-up

Given the strong correlation between internet and broadband penetration (0.92 across countries), it is not surprising that the barriers to broadband adoption are similar to those of internet use. Looking at the figures for broadband penetration across various socio-economic groups indicates a strong role for income in determining penetration rates (Figure 5). Households with income in the first, or lowest, quartile have a rate of penetration less than half that of those with income in the fourth quartile.[17] The data also show that households in sparsely populated and lagging regions also have significantly lower rates of penetration. By contrast, households with children have higher rates of take up.

Data also show that strong increases in broadband penetration have taken place across all groups. In particular the situation of single parents with children has improved markedly and whereas this group was lagging in 2005 it now has a higher rate of penetration than the average. Weakest progress has been made in least developed regions and sparsely-populated areas, which remain behind the average.

Turning to data on the reasons given for not having broadband at home also confirms the strong role of cost and a perceived lack of need (Figure 6). Another important reason is lack of availability. For people in sparsely populated regions this is the most important reason.

2.5. Results of econometric studies

Socio-economic characteristics influence each other. Therefore, in order to isolate the impact of individual factors on internet/broadband take-up it is necessary to undertake econometric analysis on microdata for individuals/households. Studies of this type suggest that age and education are the two most important factors influencing internet take-up (Figure 7).[18, 19]

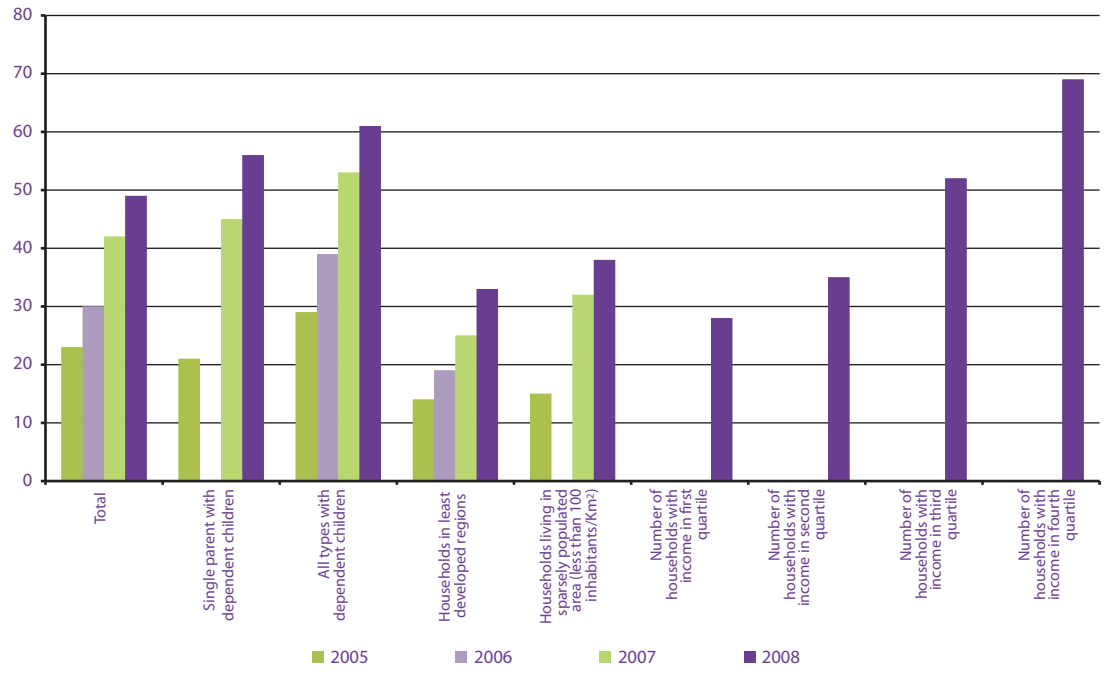
17 The lowest, or first, income quartile refers to the group of people falling into the lowest quarter of the income distribution. The fourth quartile is the group of people in the highest quarter of the income distribution.

18 As reported in OECD (2008), analysis of this kind, undertaken for France by Frydel (2006), shows that age and education are the main factors influencing internet access. A study for Japan, undertaken by the Ministry of International Affairs and Communication of Japan (2006), also showed that age was the most important factor, followed by income. Smaller impacts were observed for city size and gender. A cross-country study by Cette and Lopez (2008) also confirms the important role of education in determining cross-country differences in ICT usage. Another important factor is the role of labour and product market rigidities.

Analysis undertaken by European Commission staff based on micro data from the 2008 Eurobarometer survey and using the logistic method, found similar results for the EU. In particular, the analysis showed that the low educated (17.4%), inactive (21.1%), old (34.2%) and, to a lesser extent, the unemployed (49.3%) have significantly lower chances of being regular internet users than individuals not falling into these socio-economic groups.

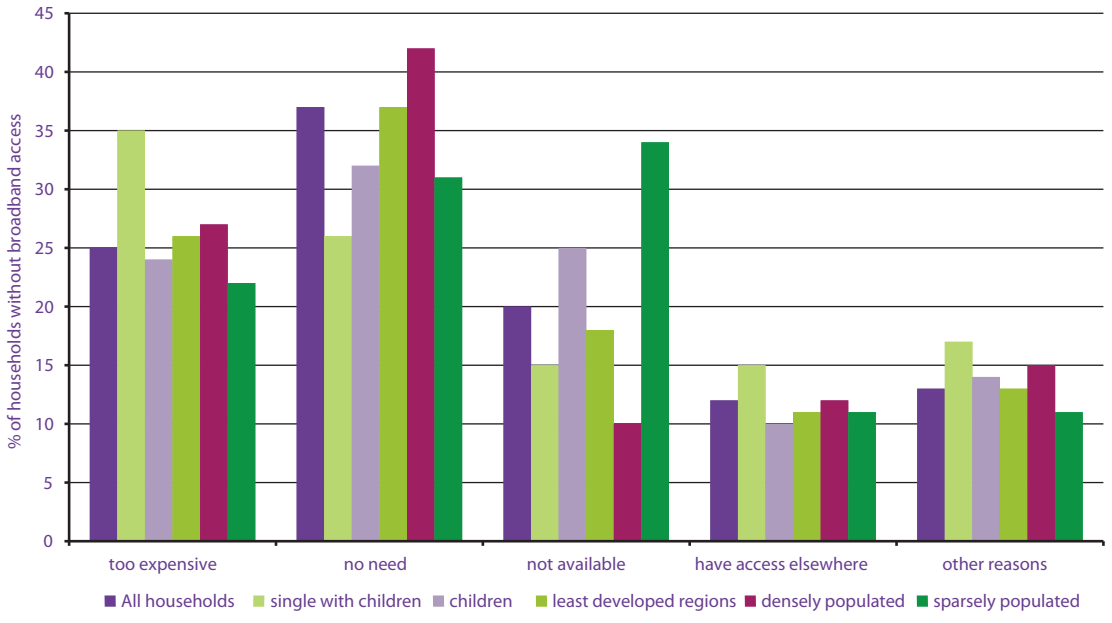
19 See also Eurostat (2008), Internet usage in 2008 – Households and Individuals. Data in Focus Issue no 46/2008, and JRC-IPTS (2008), Digital Competence for Lifelong Learning, JRC Technical Note: JRC 48708, available at http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1820

Figure 5: **Broadband penetration by type of household (%)**



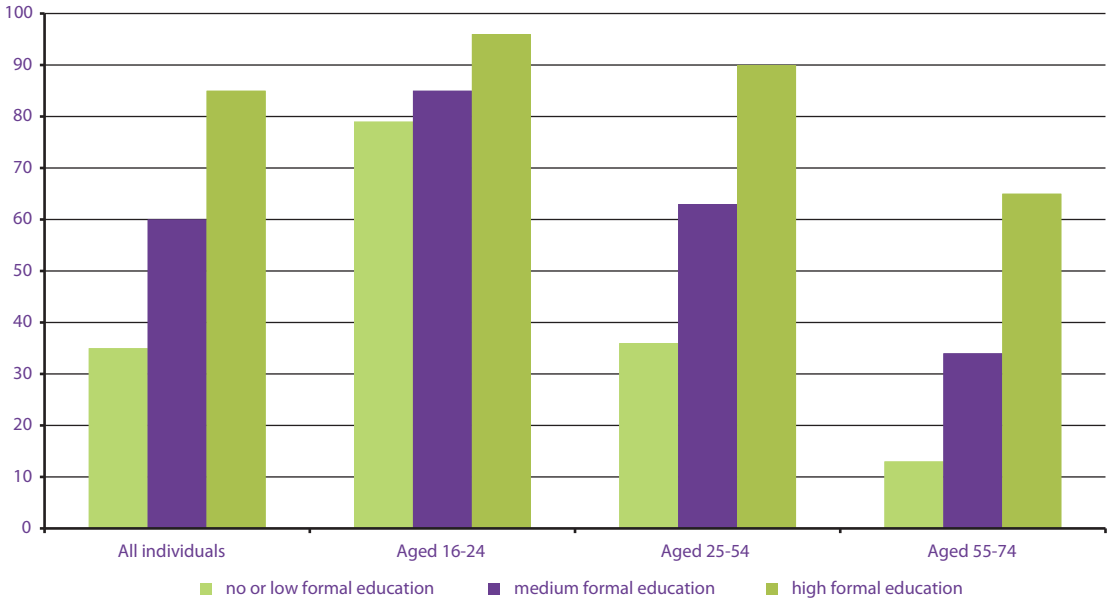
Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Figure 6: **Reasons for not having broadband at home (2008)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Figure 7: **Individuals who used the internet at least once a week, by age and level of education, EU27, 2008 (%)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

The important role of education in determining internet take-up is intuitively easy to understand, given the reported reasons for not having internet, as the level of education is an important determinant of income, is likely to affect levels of (digital) skills and could also influence the perceived lack of need for using the internet.

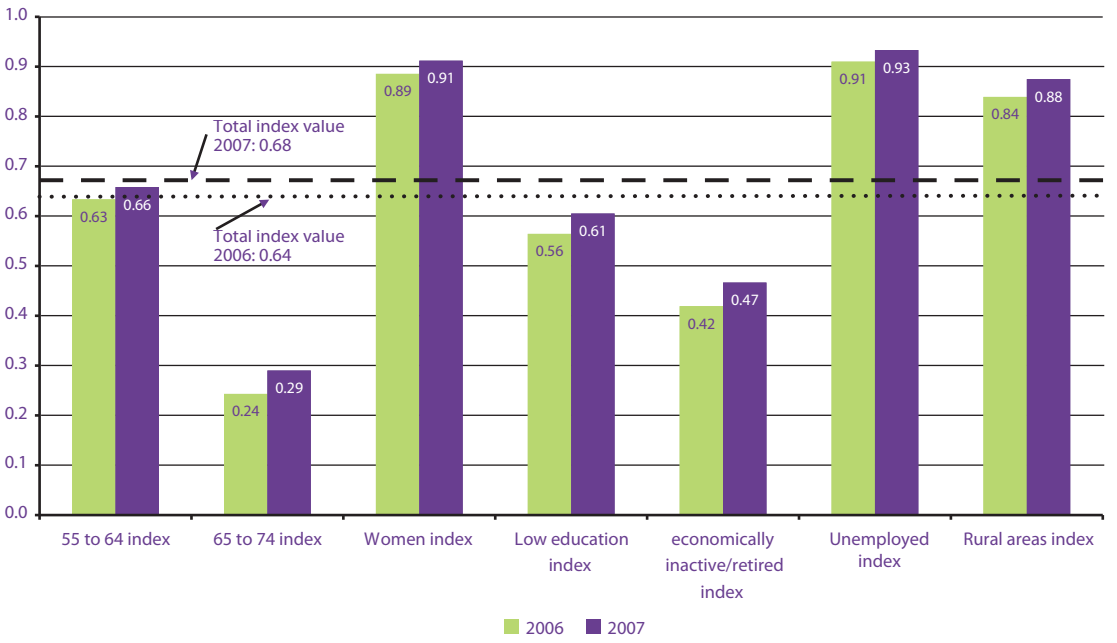
The finding that a large number of households without internet access respond that they don't need it will partly reflect choice and partly unfamiliarity with its benefits and the services available. In response, many countries are launching awareness campaigns to ensure citizens can make an informed choice. In relation to affordability, a gradual reduction in access and equipment costs, due in part to competitive markets promoted by the regulatory framework, will reduce this barrier. The importance of digital literacy policies is confirmed by the high proportion of households without internet access citing lack of skills as one of the main barriers to having internet at home.

2.6. Disparities in Digital Literacy

Since 2005, progress has also been made in reducing digital literacy disparities, though as with regular internet use, more will need to be done if the Riga targets are to be met.[20] Over the period 2006-2007 the digital literacy disparities index increased from 0.64 to 0.68, reflecting an overall reduction in digital literacy disparities (Figure 8). A reduction in disparities can be observed across all the disadvantaged groups, with the biggest improvements being made in the categories exhibiting the largest disparities: those aged 65 to 74, the economically inactive and the low educated (all +0.05 p.p.). However, those in categories exhibiting the largest disparities remain largely excluded. The categories showing the least improvement are those which are closest to representing the average: women and the unemployed (both +0.02 p.p.).

20 While the index can be calculated for the years 2005 to 2007, comparability over this period is hampered by a change in the questions related to computer skills, which differ between the years 2005 and 2006/2007 (no data on skills are available for 2008). As a result, on first comparison, it appears that digital literacy disparities have actually increased over the period 2005 to 2007, represented by a reduction in the index value from 0.69 to 0.68. However, looking at the comparable data for the years 2006 and 2007, an improvement can be observed.

Figure 8: **Digital Literacy Disparities (1 = digital literacy indicator average in total population)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Looking directly at developments in the rates of digital literacy (Table 2), the development in internet skills shows a positive trend over the period 2006 to 2007, both for the total population (+5 p.p.) as well as for individual disadvantaged groups, with in particular the unemployed showing a marked improvement (+7 p.p.). Computer skills have also increased across all groups, for the period 2006 to 2007, with this time the group of those living in rural areas showing the biggest improvement (+5 p.p.). The data show a very high correlation, almost one in 2007, between computer and internet skills within all the observed groups. As a result, the lowest level of both categories of skills is found among the old, inactive and the low educated.

Looking across countries shows that the pattern of digital literacy disparities is similar to that for "regular use" (Table 3). Indeed, the correlation across countries between the disparities index for "regular internet use" and "digital literacy" is greater than 0.95. The worst performers in terms of digital literacy disparities are Bulgaria, Romania, Latvia, Lithuania, Greece, Malta, Poland, Cyprus, Portugal, Slovenia, Italy, and Hungary. The best performers are Norway, the Netherlands, Sweden, Iceland, Denmark, Germany, Luxemburg and Finland.

In terms of specific disadvantaged groups, most countries have the largest disparities for the groups aged 65 to 74, the economically inactive and the low educated. The groups exhibiting least disparities are women, the unemployed and those living in rural areas. Indeed, in a number of countries, the digital literacy of women and the unemployed is greater than that for the population as a whole (i.e. greater than 1). The group which shows the largest variation in digital literacy disparities across countries, measured by the standard deviation, is the group of the low educated.

As with the total index, digital literacy disparities of specific disadvantaged groups are highly correlated with disparities in regular internet use. The main exception is for 'women'. However, this is mainly due to the lack of variation in the data for this group, given its overall high level of equality with the EU average for both regular internet use and digital literacy disparities.

2.7. The emerging Second Digital Divide

Going beyond basic use of the internet, policy on eInclusion also recognises the importance of reducing disparities in the quality of internet use, the so-called Second Digital Divide. Data show that digital disparities

Table 2: **Digital Literacy**

	internet skills							
	EU total	aged 55 to 64	aged 65 to 74	women	low educated	inactive	unemployed	rural
2006	55	34	13	51	32	22	48	46
2007	60	39	17	56	37	27	55	52
	Computer skills							
	EU total	aged 55 to 64	aged 65 to 74	women	low educated	inactive	unemployed	rural
2006	57	37	16	54	35	25	54	48
2007	60	40	19	57	38	29	57	53

Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Table 3: **Index of digital literacy disparities in at risk groups by country 2007**

	aged 55-64	aged 65-74	women	low educated	inactive	unemployed	rural	total at risk index
eu27	0.66	0.29	0.91	0.61	0.47	0.93	0.88	0.68
be	0.70	0.30	0.93	0.65	0.49	0.88	0.85	0.69
bg	0.37	0.04	0.74	0.28	0.12	0.42	0.60	0.37
cz	0.56	0.17	0.89	0.73	0.40	0.64	0.91	0.61
dk	0.86	0.58	1.09	0.95	0.60	0.97	0.93	0.85
de	0.81	0.44	1.03	0.93	0.60	0.93	0.95	0.81
ee	0.51	0.15	0.91	0.78	0.35	1.02	0.92	0.66
ie	0.50	0.25	0.94	0.46	0.54	0.90	0.88	0.64
el	0.30	0.07	0.74	0.25	0.25	1.30	0.84	0.54
es	0.42	0.15	0.90	0.52	0.35	1.00	0.82	0.59
fr	0.64	0.22	0.95	0.76	0.49	1.08	0.94	0.73
it	0.53	0.12	0.75	0.40	0.28	1.06	0.90	0.58
cy	0.35	0.11	0.82	0.31	0.33	1.27	0.70	0.56
lv	0.47	0.11	0.91	0.67	0.38	0.58	0.90	0.57
lt	0.35	0.07	0.87	0.65	0.23	0.58	0.78	0.51
lu	0.85	0.49	1.01	0.89	0.61	0.78	1.02	0.81
hu	0.60	0.19	0.94	0.52	0.41	0.64	0.83	0.59
mt	0.43	*0.21*	0.81	0.55	0.37	0.93	1.02	*0.55*
nl	0.81	0.52	1.08	0.89	0.68	1.13	0.98	0.87
at	0.71	0.40	1.00	0.70	0.57	*0.96*	0.92	*0.75*
pl	0.40	*0.07*	0.84	0.65	0.30	0.78	0.88	0.56
pt	0.46	0.10	0.80	0.56	0.23	0.98	0.80	0.56
ro	0.30	0.03	0.70	0.38	0.16	0.76	0.44	0.39
si	0.48	0.13	0.94	0.51	0.24	0.78	0.92	0.57
sk	0.43	0.14	1.02	0.65	0.37	0.75	0.97	0.62
fi	0.77	0.36	1.03	0.84	0.53	0.92	0.92	0.77
se	0.85	0.60	1.04	0.90	0.67	1.04	0.96	0.87
uk	0.78	0.37	1.00	0.41	0.57	*0.68*	1.02	*0.69*
is	0.87	0.65	1.14	1.04	0.62	0.81	0.95	0.87
no	0.80	0.67	1.10	1.02	0.68	1.01	0.96	0.89
Max.	0.87	0.67	1.14	1.04	0.68	1.30	1.02	0.89
Min.	0.30	0.03	0.70	0.25	0.12	0.42	0.44	0.37
Range	0.57	0.64	0.44	0.79	0.56	0.88	0.58	0.52
S.D.	0.19	0.20	0.12	0.22	0.16	0.20	0.12	0.14

Note: Figures in italics are for 2006 except for Malta where they are 2005.

also exist between socioeconomic groups with regard to the types of activities undertaken and the intensity with which they are performed. Results suggest that while all internet users, regardless of age or education, use the internet for communication and for access to information, there are sharp differences, particularly by age, for the more advanced services (Figure 9).

Users with higher educational levels use the internet more intensively, in particular for online transactions and electronic public services (Figure 10). Not only do those with higher education use these services more, they also use them to a higher level; using more, and more complex, functionalities. This is shown, for example, in the use of eGovernment services where those with tertiary education are far more likely to go beyond basic information and use the internet to submit forms and carry out transactions.

2.8. Conclusions

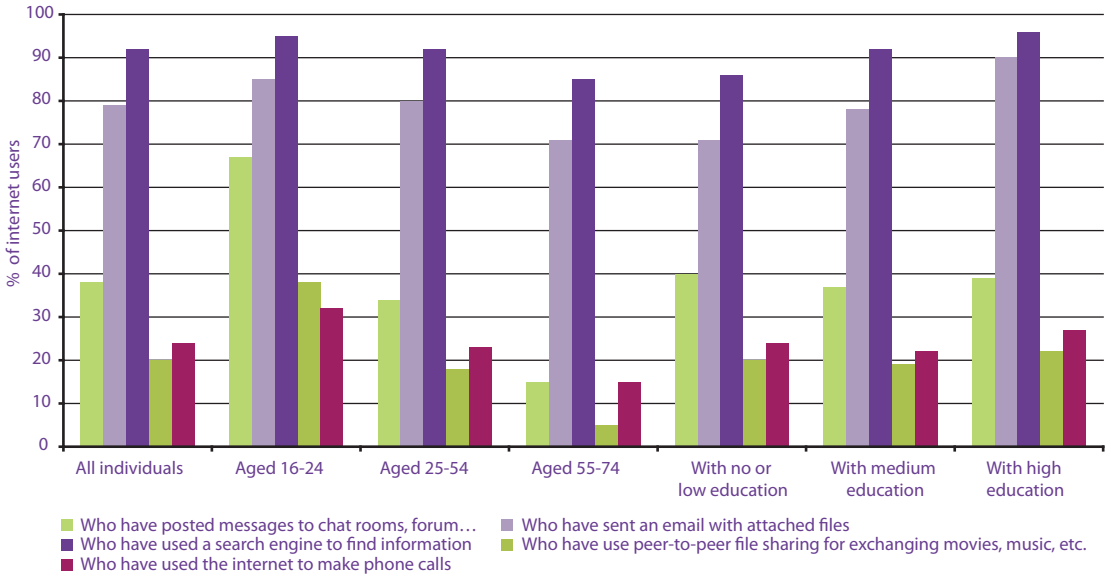
While i2010 has delivered significant progress in the area of eInclusion, it is clear that more will need to be done to close digital divides and achieve the ambitious Riga goals. Gaps continue to exist in regular use of the internet and digital skills, both across countries and socio-economic groups. In particular, the most digitally excluded groups at the start of the initiative remain so. Across socio-economic groups, the old, economically inactive and low educated remain to a large extent digitally excluded. In addition, there remain significant barriers to the use of ICTs by the disabled.

The evidence shows that the main reported reasons for households not to have an internet/broadband connection relates to a perceived lack of need, costs, and lack of skills. These barriers are larger for those on lower incomes. Empirical analysis shows that these factors are to a large extent related to age and education levels. They are also major factors determining the quality of use (the so called Second Digital Divide). Further, while only a small number of respondents report that disability is a reason for not having the internet at home, this remains an important barrier to internet access at home for the disabled; as confirmed by the results of a recent European Commission funded study on the status of eAccessibility in Europe.

While educational levels are difficult to influence in the short-to-medium term, these results suggest the need for policies focusing on encouraging the use of the internet, especially by the most excluded groups, by reducing psychological barriers and increasing familiarity with its possibilities/benefits, facilitating access for the old and disabled, reducing financial barriers and encouraging the acquisition of skills and their continuous learning (i.e. Life Long Learning). With regard to the latter, evidence shows that there is an increasing tendency for informal acquisition of ICT skills. Therefore, there is potential to encourage more formal training as well as informal training, which can be conducive to reducing both first and second digital divides.

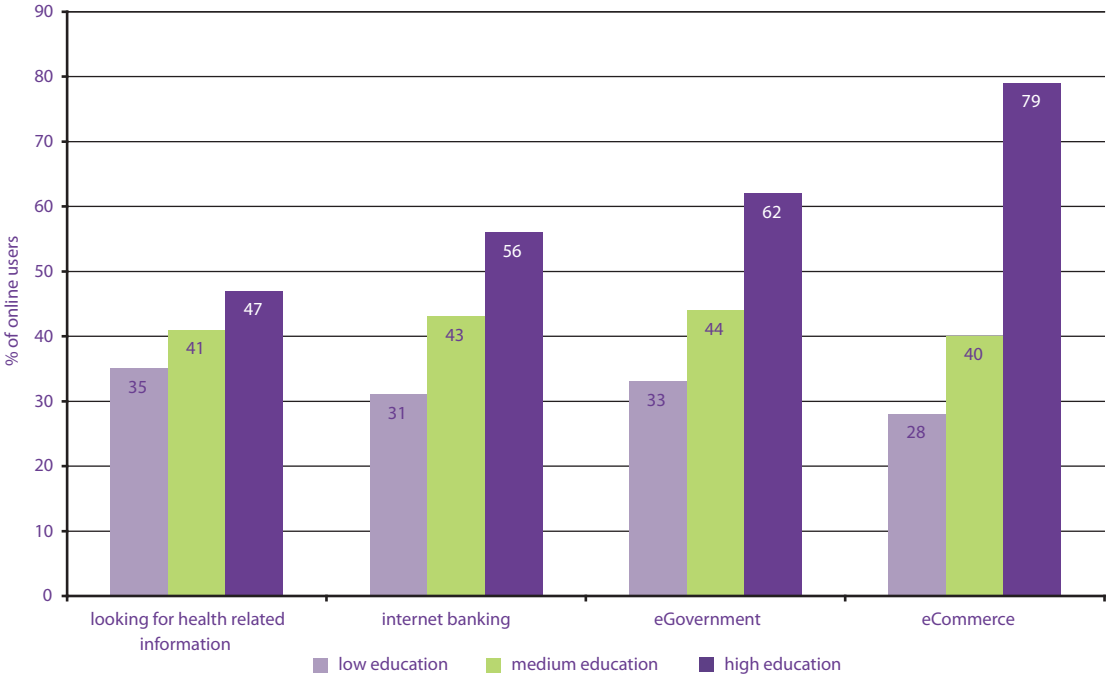
Finally, while perhaps intuitive, it should be highlighted that an eInclusion strategy focused on the inclusion of digitally excluded groups also targets an overall improvement in internet use. Supporting this intuition is the empirical evidence which shows that rates of regular use are highly correlated with measures of digital disparities.

Figure 9: **Quality of Use**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Figure 10: **The Second Digital Divide Level of Education and Use of internet, 2007**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

3 The impact of ICT on social capital

3.1. ICT and social capital

The term "social capital" refers to the norms and social relations embedded in the social structures of societies that enable people to co-ordinate action to achieve desired goals.[21] An ongoing Commission Study has analysed data from the 2008 Flash Eurobarometer survey: "Information Society seen by the citizens"[22] to draw conclusions on the relation between ICT take-up and social capital and, more in general, with the well-being of individuals.

Previous studies warned about potential negative effects of ICTs on social capital, as the internet may create superficial relationships as the time spent online reduces time devoted to face-to-face relationships. Further analysis showed that although this might be true, the internet appears to create a new type of social capital linked to community involvement, and that it might support existing face-to-face relationships by acting as an additional communication device, therefore increasing stocks of social capital.

The 2008 evidence above suggests that internet use is associated with increased likelihood that users engage in civic activities (participation in social organizations[23]) within similar social backgrounds. While about half of internet users reported their participation in social activities, only a third of non-internet users did so (Figure 1). Similarly, frequent internet use is associated with higher levels of generalised trust[24] (Figure 2).

The cross-sectional data used in the analysis do not allow concluding that the internet has a one way enhancing effect on social resources, as this can work the other way around too[25]. Those with less social resources may be the ones who have fewer motivations or opportunities for using ICT and those who are rich in social resources might be more motivated for using the internet more frequently. In fact, most of the available analyses on the digital divide do suggest that the interrelation is one of reciprocal amplification.[26]

Internet users are also much more active in social leisure activities than non-users (Figure 3). They are more likely to engage in active sport (64% of them weekly vs. 40% among non-users), more than twice as likely to go to the cinema/theatre/other performance and also more than twice as likely to visit a restaurant/café/pub/bar/club in a given period of time. They also tend to meet friends more often. Internet use is positively associated with engagement in social leisure activities independently from the socio-demographic background.

21 http://stats.oecd.org/glossary/detail.asp?ID=3560

22 http://ec.europa.eu/public_opinion/flash/fl_241_en.pdf

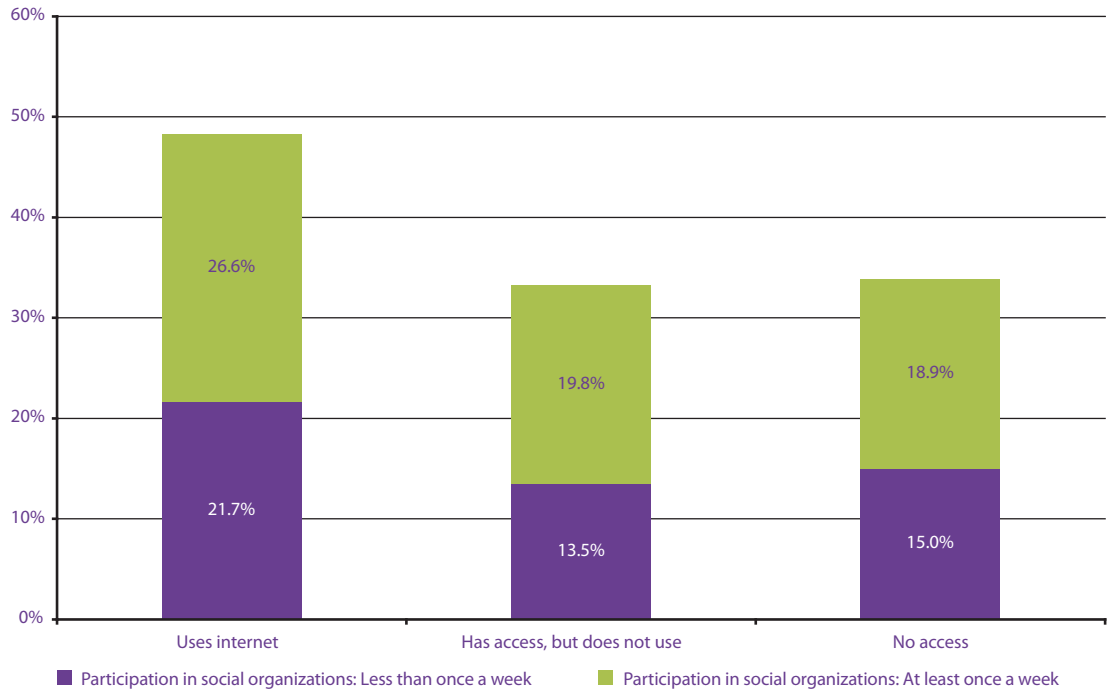
23 Like sports clubs, religious/voluntary aid organizations.

24 Trust is measured through the following question: "Generally speaking, would you say that you can't be too careful in dealing with people, or that most people can be trusted?" (0=no trust, 10=full trust). Having said that, medium level of trust corresponds to a score between 4 and 6 and high level of trust to a one from 7 to 10.

25 Causality testing would require the availability of panel databases to look at the changes in the social activities of individuals once they have started to use the internet. Neither panel data nor time series for this type of information are currently available.

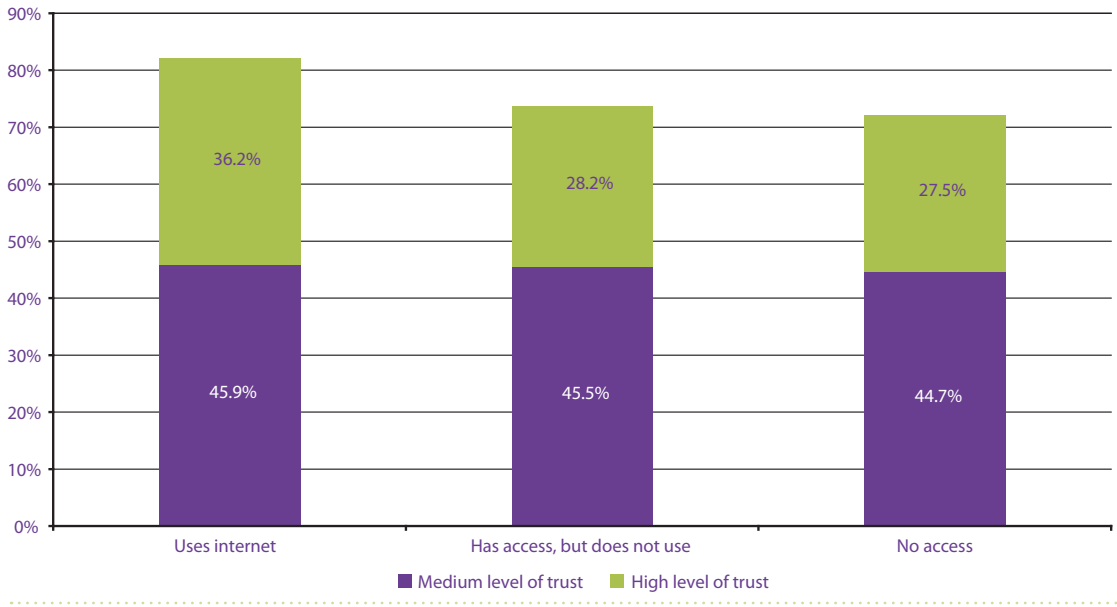
26 Van Dijk, J. (2005) "The deepening divide. Inequality in the information society", Thousand Oaks, Sage.

Figure 1: **Participation in social organizations and internet access/use**



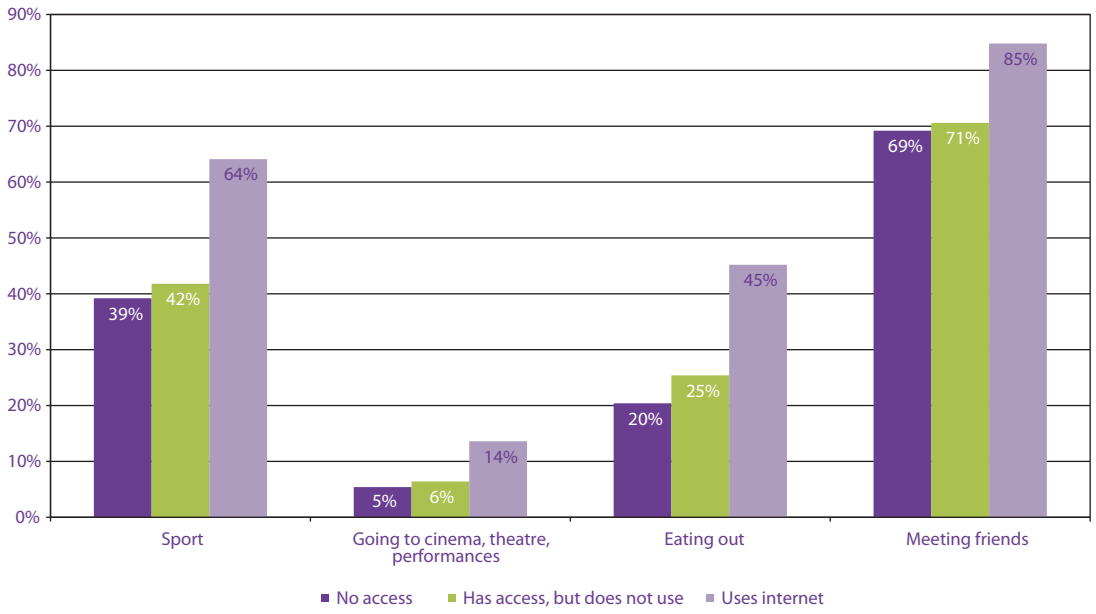
Source: Commission study on the Social Impact of IT, based on the Flash Eurobarometer – Information society seen by the citizens (2008)

Figure 2: **Trust and internet access/use**



Source: Commission study on the Social Impact of IT, based on the Flash Eurobarometer – Information society seen by the citizens (2008)

Figure 3: **Leisure activities (at least once per week) and internet access/use**



Source: Commission study on the Social Impact of IT, based on the Flash Eurobarometer – Information society seen by the citizens (2008)

internet use is generally expected to relate to a decline in television watching. TV watching is more frequent among older and lower educated people who typically do not use the internet. However, when comparing internet users and non-users of similar social background, there is no difference in the frequency of TV watching.

3.2. A typology of internet use

Multivariate analysis[27] has allowed the development of a conceptual typology of ways of internet use: recreational, resource enhancing and instrumental (Table 1). A person is considered to be a recreational, resource enhancing or instrumental user if she/he pursues more of the respective activities than the average user. Recreational use is associated with playing, downloading media or software, using social networking sites, sharing videos and photos, etc. Instrumental usage includes buying and selling, e-banking and dealing with the public administration. The resource-enhancing use includes eLearning, reading the news, social networking and work.

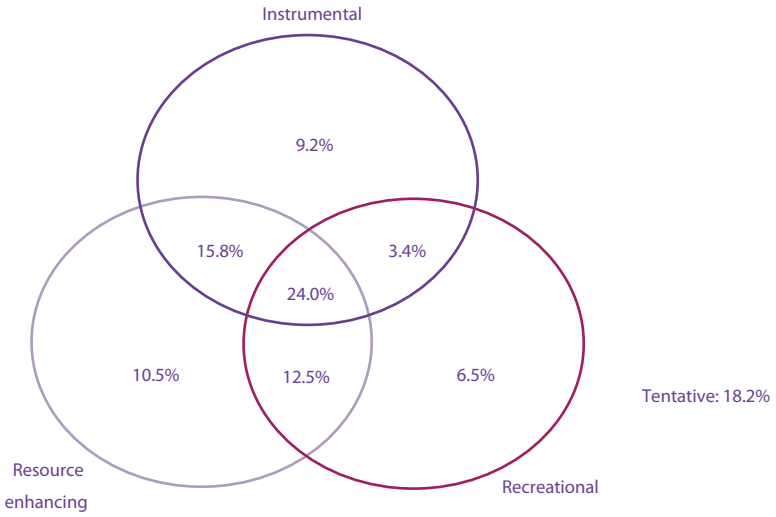
The categories are not mutually exclusive (Figure 4). About one quarter of EU27 internet users are "all-round users", meaning that they fall under all categories. On the

Table 1: **Typology of internet uses**

Recreation	Resource enhancing	Instrumental
Playing and downloading	Learning online	e-banking
Sharing media	Social networking	Buying and selling online
Transferring to other devices	Following the news	eGovernment
	Work	

27 As the term indicates, "multivariate analysis" refers to techniques dedicated to the analysis of data sets with more than one variable.

Figure 4:



contrary, 18% of EU27 users make "tentative users": they use e-mails and search engines but have not yet engaged in more advanced applications.

Results reveal that instrumental and resource enhancing users have higher chances to be active in civic organisations, coincide with an increase in general trust and are positively correlated with leisure time spent on social activities (Figure 5). When interpreting the results, it is important to bear in mind again that a clear causality cannot be established.

The previous chapter has highlighted the main sources of digital divides and indicated that people with different social backgrounds have different access to information technologies. Among internet users, younger people tend to use it more often than older people; more educated people use it more often than less educated people, and urban residents more often than people residing in rural areas. Non-working users feature a higher frequency of usage than working internet users (because the former group includes students).

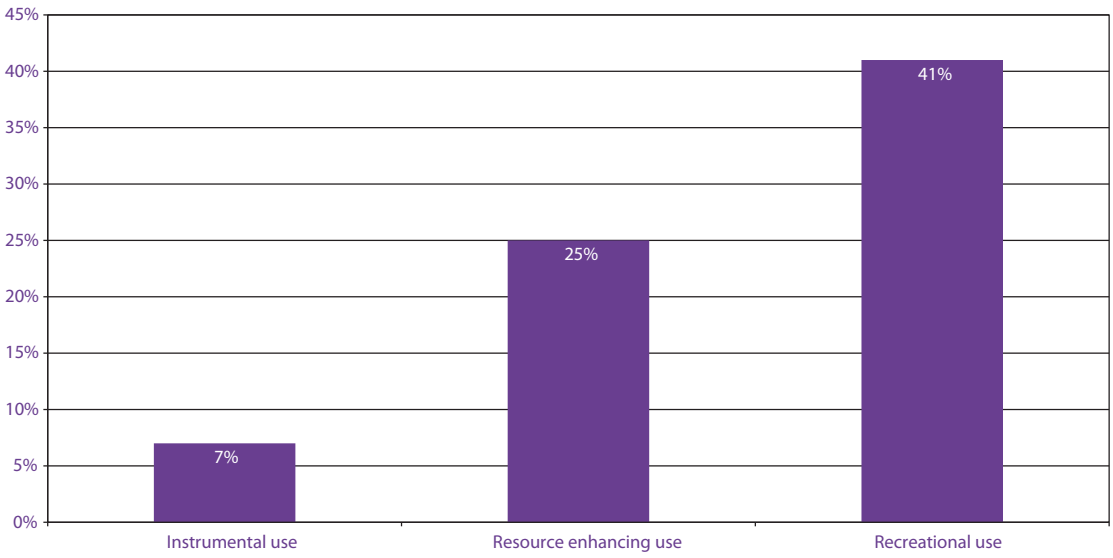
Recreational usage shows strong, negative association with age. The resource-enhancing mode of use also decreases with age. This trend does not emerge in the case of instrumental use (uptake is highest in the medium aged group). Each of the three types of use increases significantly with education, showing that less educated people tend to use the internet for fewer and less advanced purposes. Persons residing in urban areas tend to display an extensive rather than a tentative use of the internet. Finally, manual workers use the internet less often for resource enhancing and instrumental purposes than employees, but the intensity of recreational use among them is almost the same. This may indicate a situation where manual workers are less likely to use the internet as part of their job, and as such are less likely to learn about the manifold opportunities which the online world offers on top of its recreational functions.

3.3. Perceptions about the social impact of ICTs

The majority of internet users has a positive perception about the impact of the internet on everyday life and in particular on their resource-enhancing capabilities (learning, culture, health-related information and work). More than half of users feel that the internet has improved their relationship with family and friends while less than half says that the internet has added opportunities to meet new people or improved the way to deal with the public administration (Figure 6). As could be expected, higher actual use is correlated with positive opinions.

Internet users also expressed opinions on the costs of non-internet usage. The majority agreed that those who do not use the internet are less reachable for professional purposes, are at disadvantage during their career and risk missing good online shopping opportunities. Non

Figure 5: **The impact of type of internet use on having social leisure time**



Each bar indicates the changes of odds of having more social leisure time than the European average compared to the baseline category. Baseline category is that of the tentaive internet users.

Source: Commission study on the Social Impact of IT, based on the Flash Eurobarometer – Information society seen by the citizens (2008)

Figure 6: **The impact of the internet - % of users agreeing that the internet has improved different aspects of their lives**

Source: Commission study on the Social Impact of IT, based on the Flash Eurobarometer – Information society seen by the citizens (2008)

users, on the other hand, are more likely to report that they feel less threatened by internet-related risks such as online fraud and unintentional disclosure of personal data (Table 3). Interestingly, older Europeans are more likely to agree that non-users are missing opportunities than younger Europeans (with similar social and cultural characteristics), suggesting that older people are well aware of the benefits of the internet.

Most people, except for frequent users, disagree with the statement that non users miss the opportunity of socializing with friends and family. There is also a general disagreement with the idea that non users are less open and less informed, but frequent users tend to disagree less than non users do. Non-users, on the other hand, reported significantly more often that they can avoid frustration caused by complicated technologies, take less risk and have more time for friends, family and for themselves.

Nevertheless in all of these issues, in spite of the significant differences, both users and non users somehow similarly agreed or disagreed with the statements proposed in the survey. In particular, both users and non users agree (even if at different degrees) on the fact that not using the internet means having fewer chances of finding good bargains and being disadvantaged in the work carrier. There is only one item where the opinions of internet users and non-users diverged: the majority of internet users think that non-users take the risk of becoming old fashioned (Table 2).

With regards to the use of mobile phones, considering that penetration rates are roughly two times higher than for the internet, users were asked opinions about three main statements:

- Mobile telephony enables better management of leisure time, work and security;
- Mobile telephony leads to better or more contacts with family members, friends and the outside world.
- Mobile telephony results in more stress and higher costs.

Table 2: **Perceived implications of not using the internet (% of those who agree)**

"People that don't use the internet" …	Frequency of internet use				N
	No access	No or less than once a month	Once a day or once a week	Several times a day	
A. Miss the opportunity of greater contact with friends and family	42.1	35.1	43.7	53.5	11,237
B. Are at a disadvantage in their career prospects	57.1	56.2	60.7	64.5	14,673
C. Risk becoming old-fashioned	42.7	41.5	53.4	56.1	12,671
D. Miss the opportunity of finding good bargains online (including airline tickets and trips)	59.1	58.9	74.8	80.1	17,603
E. Are less open to the outside world	39.6	36.6	42.7	44.8	10,484
F. Know less and are not as well informed as other people	41.7	42.0	43.7	47.0	11,196
G. Have more time for themselves. family and friends	73.6	74.3	59.2	54.8	15,778
H. Take less risk because they don't get exposed to the risk of online fraud	77.2	76.0	68.9	62.9	17,025
I. Take less risk because they don't run the risk of other people finding out information about them	69.6	68.1	62.0	57.0	15,253
J. Are less reachable for professional purposes	63.2	59.0	65.7	70.1	15,920
K. Avoid the frustration of dealing with complicated technologies	57.1	55.3	55.6	53.2	13,210

Source: Commission study on the Social Impact of IT, based on the Flash Eurobarometer – Information society seen by the citizens (2008)

Frequent mobile users obviously tend to agree with the positive views. The young are less sensitive when it comes to stress and costs, but they do not appear to experience more contact benefits than older generations. The lower educated tend to be more enthusiastic about the positive effects of mobile phones, both in terms of time management and contacts. Negative perceptions about the impacts of the mobile phone, in particular in terms of costs and stress, are more likely among older individuals and in rural regions, among people outside the labour market and those with low educational attainment.

3.4. Conclusions

The results reported in this chapter on the social impact of ICT show that, contrary to previous predictions, internet use is positively associated with social capital. In general internet users are more likely to be active in social organisations and are more active in social leisure activities. They also exhibit higher levels of trust.

Furthermore, the general perception of internet users is that the internet has a positive impact on their everyday life, especially in relation to their resource enhancing capabilities. They also think that non-users incur costs, for example related to fewer chances to find bargains and being disadvantage in their careers. Many of these opinions were shared by non-users. Non-users emphasised worries over security and frustration related to internet use, as well as the time they had for friends/family/themselves.

This evidence suggests that there are strong social (and economic) benefits to internet use and that, even in their own opinion, non-users are missing out on the chances offered by internet use. It also shows that non-users have certain fears related to the social impact of ICT, which users do not share, suggesting that lack of familiarity with the internet may be an inhibiting factor. This confirms conclusions drawn in Chapter 2 in relation to the need of raising awareness of the benefits and opportunities of internet use.

4 The internet as a communication tool

Over the last five years the EU has witnessed great progress in the expansion of internet access, broadband connectivity and uptake of internet services, primarily through fixed access lines and very recently through mobile networks. The rate of households with access to the internet through broadband increased to 80% in 2008, up from 33% in 2004, and the percentage of population that accessed the internet on a frequent basis (every day or almost every day) increased from 23% to 43% over the same period. European consumers are rapidly changing their habits and increasingly adopting new ways of communicating, sharing information and interacting with business and public administrations. This change is growing in parallel to the take-up of broadband connectivity, which is gradually offering higher download and upload speeds at cheaper prices.

The percentage of the EU population using internet services has grown substantially since 2005 (Figure 1). The largest increases have occurred with respect to the proportion of the population using the internet for sending and receiving e-mails, as well as for finding information about goods and services, increasing by 11 p.p., to 53% and 50% respectively, over the period up to 2008. Government take-up has also grown, with 28 and 68% of citizens and business using eGovernment services respectively. Other less popular services which require more advanced internet skills have also grown markedly, with the proportion of the population using these increasing by between 6 and 10 p.p..

In order to measure the take-up of advanced services in the EU, i.e. all those services that go beyond the one-to-one communication systems and make possible the distribution and sharing of online information, content and applications, be it on wired or wireless networks, in 2008 Eurostat dedicated a special module of the survey on the use of ICT by households and individuals. The aim was to measure the use of these services, looking at the use of information and entertainment services, the use of mobile internet and the willingness to pay for audiovisual content. Data from the module provide rich information on the take up of advanced services by countries and by socio-demographic characteristics.

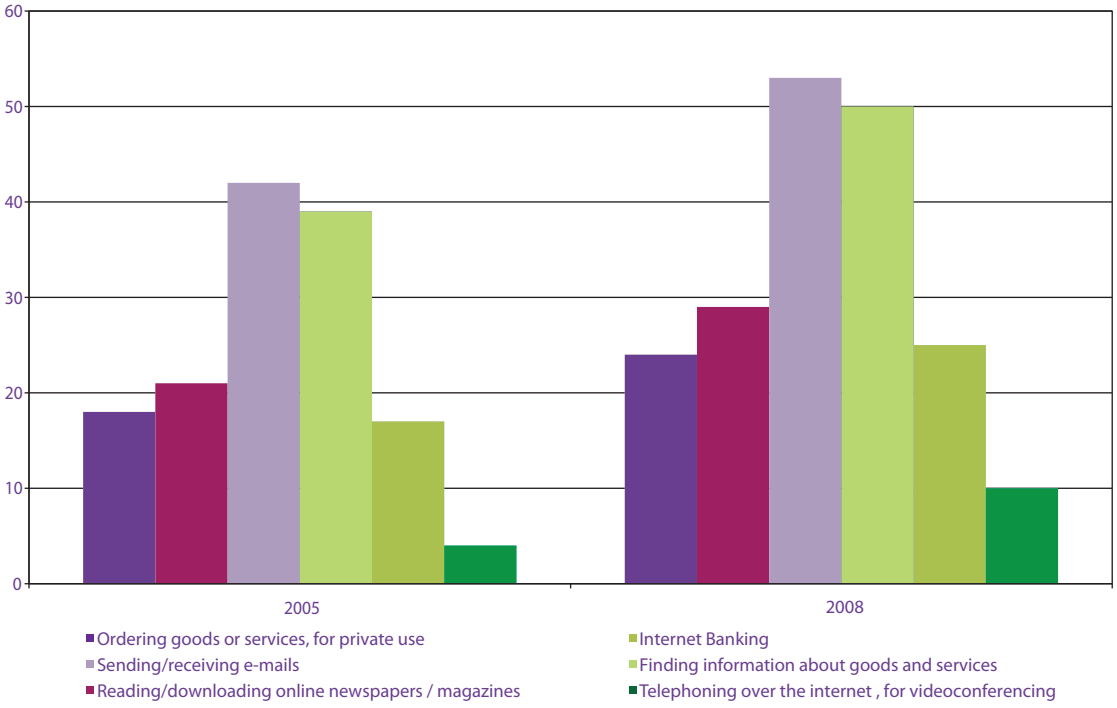
This chapter focuses on the results of the special module with regards to the use of the internet for advanced communication services. Section 1 focuses on how Europeans use the internet to communicate. While use of internet to communicate is growing, section 2 shows that internet does not yet replace other traditional means of communication. Section 3 spreads light on the intensive use by the younger cohorts of the population, while section 4, on the use of mobile phones for advanced communication services, demonstrates that advanced mobile communications still have a long way to go before reaching similar take-up levels.

4.1. How do Europeans use the internet to communicate?

Communication is at the origin of the internet and communication activities remain the primary action of internet users. E-mail was the first mass adoption service in the history of the internet and is now widely seen as a traditional means of communication; with 53% of the EU population in 2008 reporting they had used it within the last three months.

Use of advanced communication services is also on the rise. According to Eurostat figures, in 2008 35% of Europeans declared using the internet in the last 3 months

Figure 1: **Percentage of individuals doing specific online activities in the previous 3 months, EU27**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

prior to the survey for advanced communication services, which include creating or maintaining web logs, using instant messaging, posting messages to chat sites, newsgroups or online discussion forums, telephoning over the internet and video calls and reading web logs.

A key factor supporting both the more frequent use of the internet and the take-up of advanced services is the continuing spread throughout the EU of faster and cheaper broadband access. The data shows that there is a strong correlation between frequent internet use and rates of broadband penetration across EU countries (Figure 2).

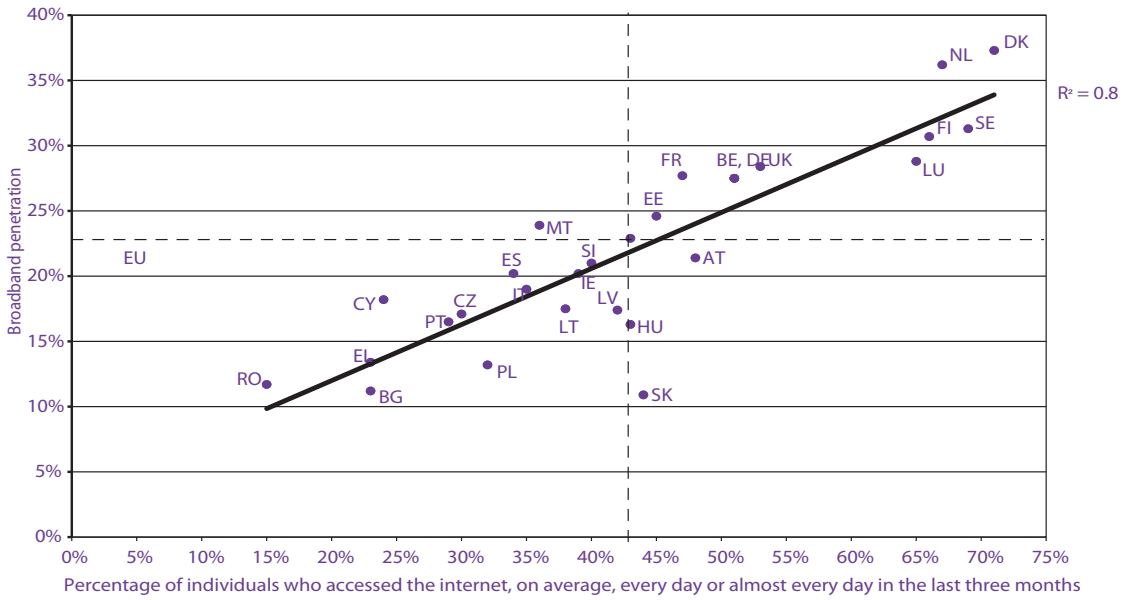
Adoption of advanced communication services is also correlated with the level of broadband penetration, although the correlation is somewhat weaker (Figure 3). The main outlier countries include Germany and Malta, which exhibit relatively low use of advanced communication services compared to their relatively high broadband penetration level, and Poland, Hungary, Latvia and, as with frequent use, especially Slovakia, which feature a relatively low level of broadband penetration despite having a high percentage of population using advanced services.

One of the reasons behind the weaker level of correlation is the fact that the take-up of advanced communication services that do not demand much bandwidth, like instant text messaging, is less dependant on the widespread availability of broadband. Spain, Estonia, Portugal and Poland are more intensive users of this service than other countries with higher broadband penetration rates.

Beyond broadband availability, other factors are also critical to the understanding of the different levels of adoption of the internet for communication services. Users' awareness and skills, preferences and price of traditional communication services, or other socio-economic factors may help to explain these differences. Users may also decide to subscribe to a broadband service not for communication purposes but primarily to get access to entertainment content and services.

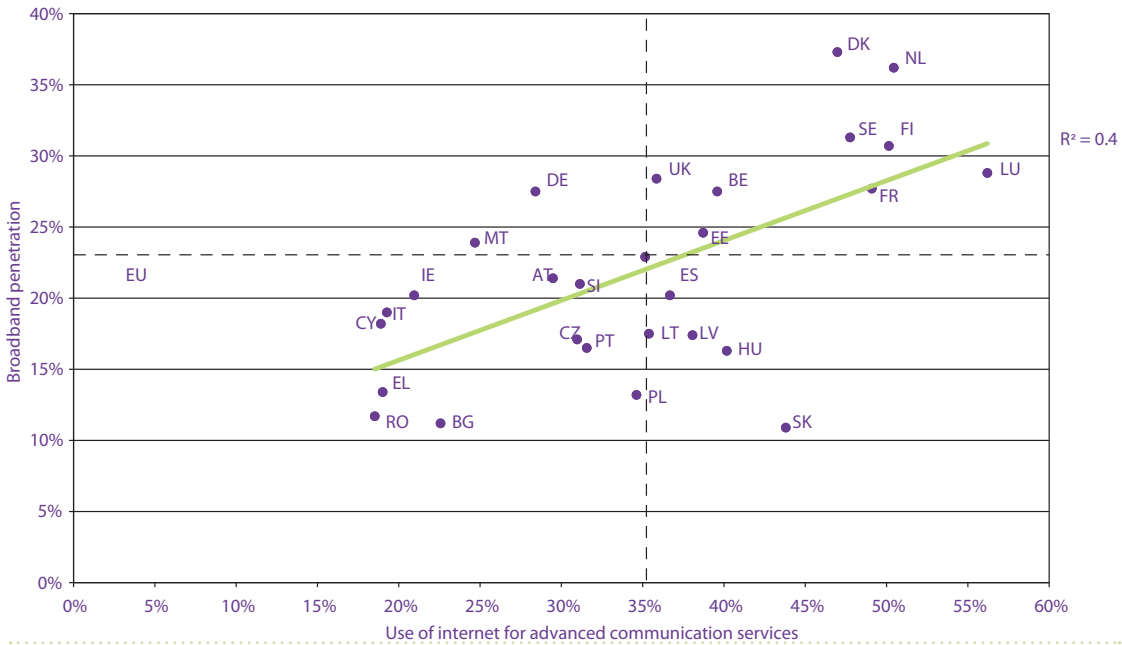
Sending and receiving e-mails is still the most popular communication service through the internet (Figure 1): in 2008, 53% of surveyed individuals reported to have sent or received an e-mail in the last three months. Within advanced services, instant messaging appears as the most attractive communication application of the internet with 22% of EU citizens using it (Figure 4), followed by internet telephoning and video calls (16%) and posting of messages to news groups and online fora (16%), along with reading blogs (15%).

Figure 2: **Daily internet access and broadband penetration**



Source: Commission services based on Eurostat Community Survey on ICT Usage by Households and by Individuals and COCOM data (2008).

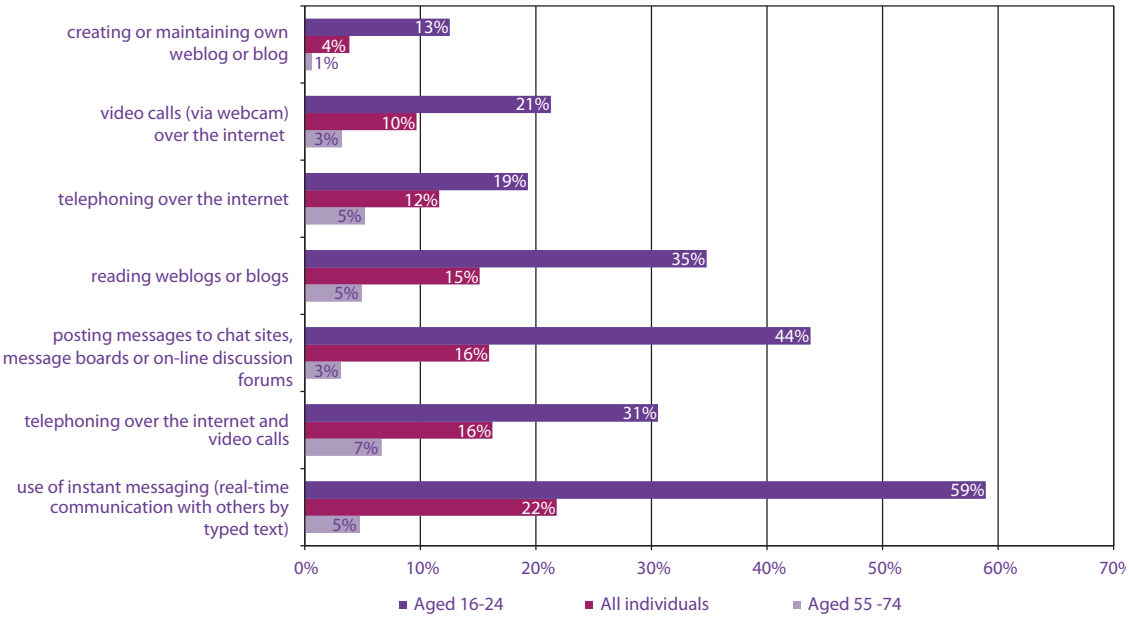
Figure 3: **Regular use of internet for advanced communication services and broadband penetration**



Source: Commission services based on Eurostat Community Survey on ICT Usage by Households and by Individuals and COCOM data (2008).

Predominance in the use of one or another service is very much linked to age. For younger people, e-mail is also a very dominant application (78%) closely followed by instant messaging (59%). Posting of messages (44%) and reading blogs (35%) are the following most common services. Interestingly, telephone over the internet and video calls is not one of the most demanded uses by younger users, exactly the opposite of what happens with people aged 55 to 74, of which 7% seem to find in internet telephony and video calls the most interesting service.

Figure 4: **Use of the internet as a communication tool in the last 3 months**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

4.2. Does the internet replace other means of communications?

Despite the significant growth in the use of the internet for advanced communication services, such services do not yet reduce the use of other means of communications, such as e-mail, fixed and mobile calls (Figure 5). Results indicate that there is no real substitution effect and new communication services are used along with the traditional ones, for which frequency and level of use may vary, but are still demanded.

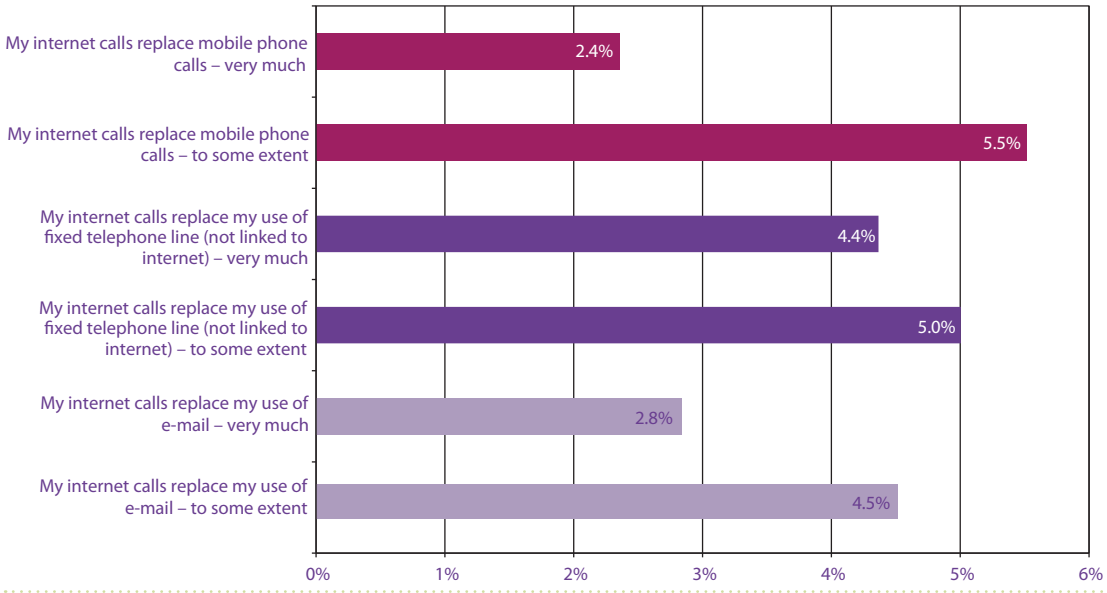
However, this conclusion only holds when looking at the general population. When considering internet users who made internet calls, evidence of the substitution effect starts to emerge. For approximately one third of the people using this service, online calls have replaced the use of mobile or fixed line calls. For 27% of users, the replacement effect on fixed line calls was even higher (Figure 6). Thus it appears that once one starts to use internet telephony, the uptake of traditional communication methods may decline. But since only 12% of the Europeans takes up the service, its total impact remains limited.

One could also expect that the increase in the use of instant messaging and posting of messages would affect the uptake of e-mail services. However the growth in the use of e-mail has been steady since 2004 (Table 1) and only 3% of individuals indicate that internet calls replace the use of e-mail. Some research points to the shift by young users from e-mail applications to instant messaging services, although preferences for a particular service do not necessarily entail a significant drop in other communication channels. Another reason for the growth in the use of e-mail is that, for many new internet users, this application still appears easy to grasp relative to other interactive services which require more advanced skills.

Similarly, the internet can be used for making calls and video calls and, depending on which application is used, at zero cost. However, the rate of substitution is not very high, suggesting that users are not yet abandoning traditional communications means. Only 2% of the population acknowledge an intensive replacement of mobile calls by internet calls, a figure that is also low (4%) in the case of fixed calls.

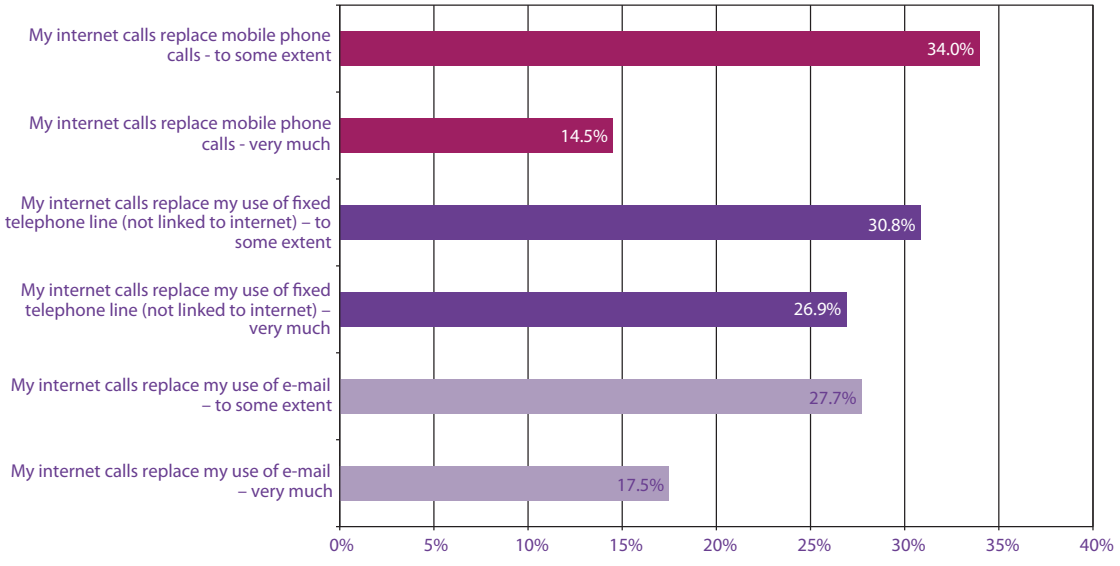
Since most users of advanced communication services rely on a fixed connection and only 3% of the EU population uses a third generation mobile phone to access the internet, internet calls will not fully replace mobile calls in the near future, despite the fact that more and

Figure 5: **Use of advanced communication services to replace traditional services**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

Figure 6: **Substitution effect for users who made internet calls**



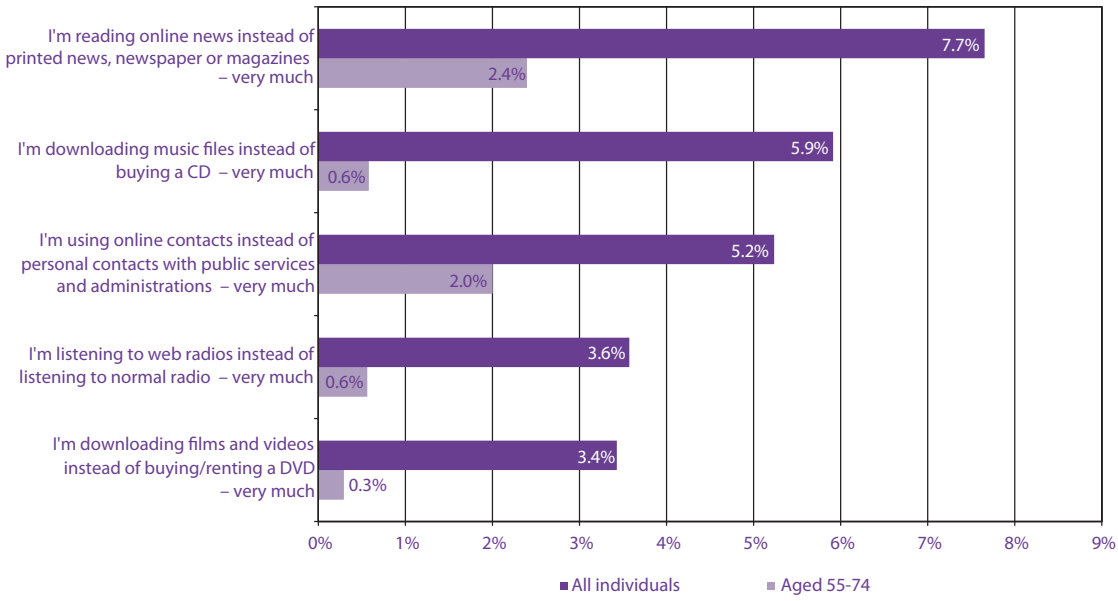
Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

Table 1:

	2004	2005	2006	2007	2008
Percentage of individuals who used the internet for sending and receiving e-mails in the last three months	37%	42%	42%	48%	53%

Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Figure 7: **Use of advanced services to replace traditional services (2)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

more mobile calls are also made from home or the work place, where fixed internet connections are available. In the case of fixed telephony, new pricing models for fixed calls and the rise in the number of bundled broadband packages offering free voice telephony as a free service on top of the broadband connection may partly explain why users do not feel the need to replace their fixed telephone line with internet communications services.

Similar conclusions can be drawn in relation to entertainment services (Figure 7). There still remains a significant part of the population which refuses to adopt advanced information/entertainment services. On average, 3% of the population download films and videos instead of buying/renting a DVD; 4% is listening to web radios instead of listening to normal radio and 6% prefers to download music files instead of buying music CDs. Similar percentages are observed with regards to the use of online contacts instead of personal contacts, with public services and administrations or the reading of online news instead of printed news, newspaper or magazines. These rates are particularly low for those aged 55-74.

4.3. Youngsters are the most intensive internet users

Young people are active users of the internet as the main channel for information and communication purposes (Figure 8).

"Digital natives", i.e. people between 16 and 34, and especially those aged 16 to 24, most of them students, stand out as the most regular, intensive users of internet advanced services. There is an evident, profound break with previous generations in the attitude towards the use of internet services. This is linked to the level of internet and informatics skills. The percentage of young people with medium internet skills is twice as much the European average (for all individuals aged 16-74) and the number of individuals aged 16 to 24 with IT skills obtained through formalised educational institution is three times higher than the average (Table 2).

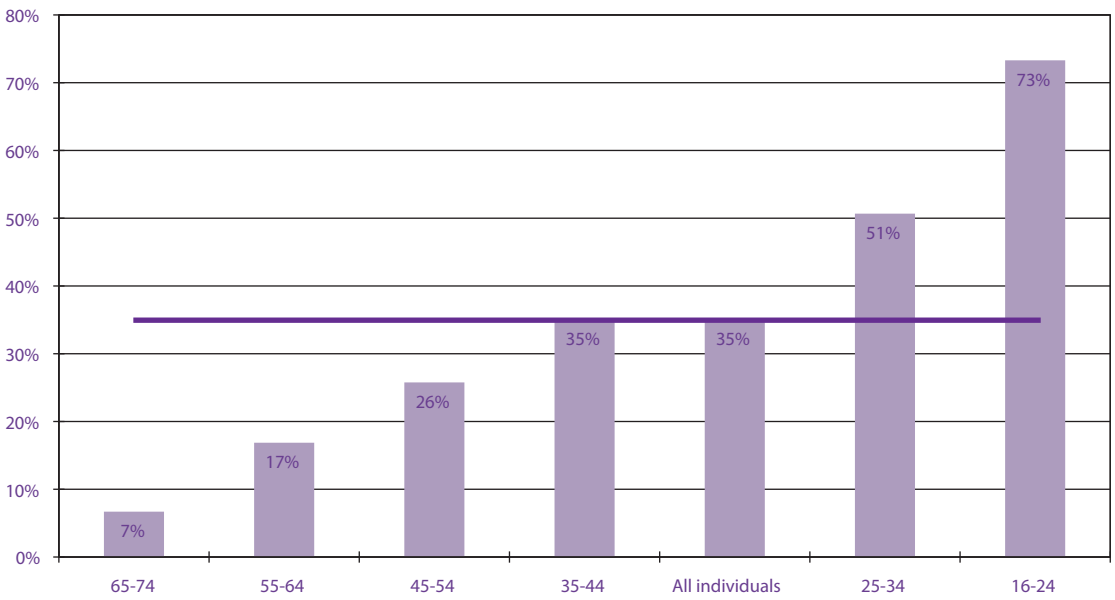
On average 43% of EU population accessed the internet everyday or almost every day (Figure 9). However, this percentage increases more than 20 p.p. when it comes to people aged 16-24, with 66% of them accessing the internet everyday. In the most advanced countries, around 90% of young people connect on a daily basis. With the exception of Romania and Cyprus, in all countries the percentage

Table 2:

	16-24	25-34	35-44	EU avg.	45-54	55-74
Percentage of individuals who accessed the internet, on average, every day or almost every day in the last 3 months (2008)	66	57	49	43	39	20
Percentage of individuals who have obtained IT skills through formalised educational institution (school, college, university, etc.) (2007)	65	38	16	22	8	3
Percentage of individuals who have carried out 3 or 4 of the internet related activities (medium internet skills) (2007)	43	33	24	23	17	8

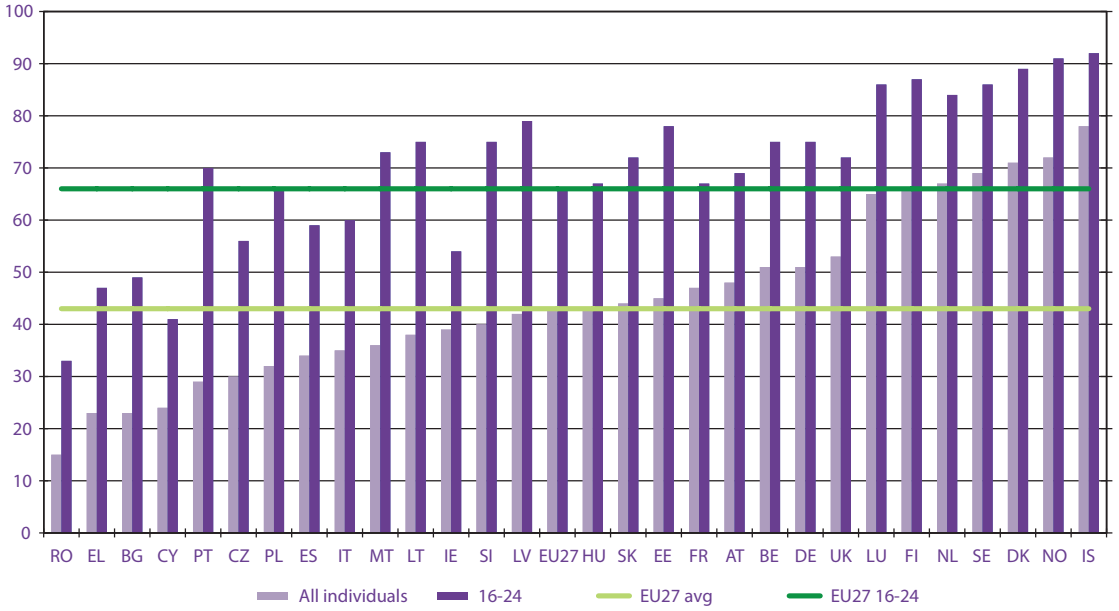
Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

Figure 8: **Percentage of individuals by age group that have used internet, in the last 3 months, for advanced communication services, EU27 (2008)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

Figure 9: **Percentage of individuals who accessed the internet, on average, every day or almost every day in the last three months**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals

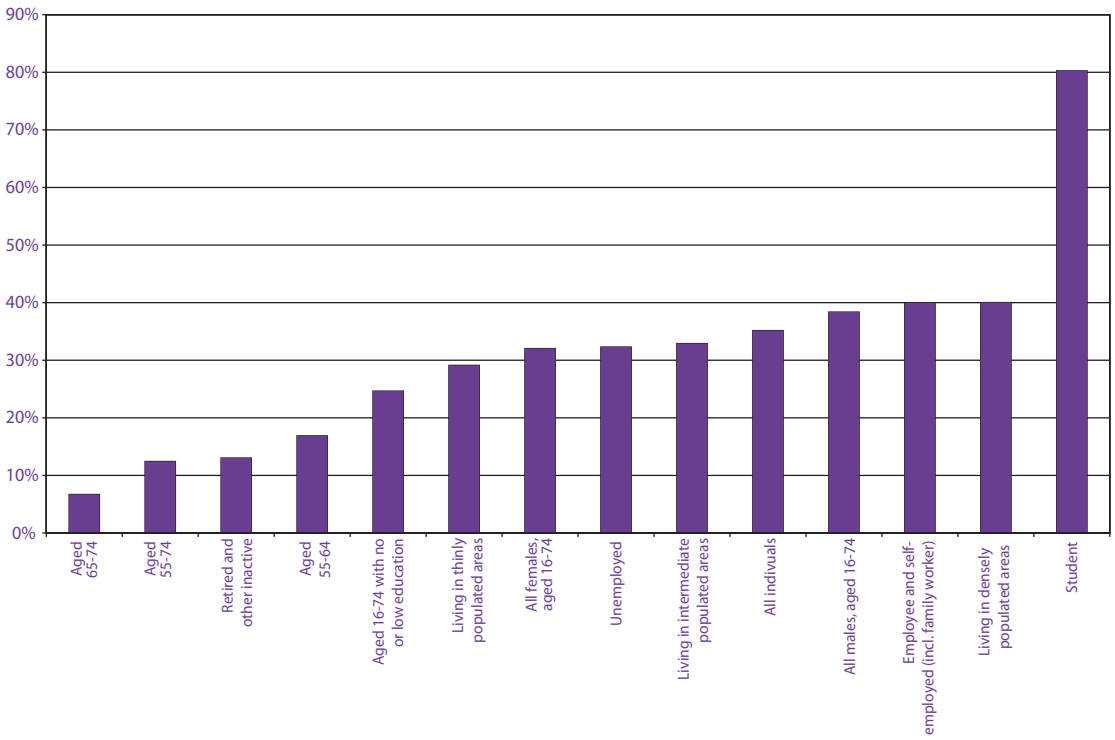
of young people connecting to the internet everyday is higher than the average of the whole EU population. The difference between the whole EU population and the youngest users is about 23 p.p.. This difference lessens in the most advanced countries to about 18 p.p., but can be more than twice as much in the less advanced countries (Romania, Greece, Bulgaria, Portugal).

It is also worth noting that differences between countries are reduced when the 16-24 age group is taken as a reference. Besides the most developed countries, young people in Latvia, Portugal or Poland have similar frequency of use as in the UK, Germany or Belgium.

80% of students and 73% of the EU population aged 16-24 have used the internet in the last 3 months for advanced communication services (Figure 10). This is twice as much the amount of regular users in the employees and self employed category and 45 p.p. higher than the 35% of the EU population. In all other types of services, both for communication and entertainment purposes, students and young people always exceed other categories of population. Their attitude towards the web is different in that most of them are not passive consumers of web pages or static online content pushed by a reduced number of content generators, but veritable users of a borderless space in which content and services are made available for active users to download, exchange, create and re-create, distribute, share or re-use.

This is confirmed by the shift in the focus from availability of online content to the significant rise of social networks and user created content in the last two years. Young internet users are intensive consumers that fully exploit the many possibilities offered by the web.

Figure 10: **I have used internet, in the last 3 months, for advanced communication services**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

4.4. The mobile phone for advanced communication services: An emerging service

Advanced services are mostly being used through fixed broadband connections and the role of mobile services is not yet tangible. Only 3% of the EU population aged 16-74 uses a third generation mobile phone to access the internet. Interestingly, a heterogeneous group of countries are the top performers, with Nordic countries along with Spain, Slovenia, Czech Republic, Slovakia and Portugal. Some countries with good levels of fixed broadband penetration are amongst the laggards: Belgium and France for example have usage rates similar or below Bulgaria, Poland and Latvia (Figure 11).

These data refer exclusively to the use of third generation (3G) mobile phones to access the internet. In many countries the use of 3G networks via USB dongles and datacards to get a broadband access for a laptop or a desktop is much higher[28].

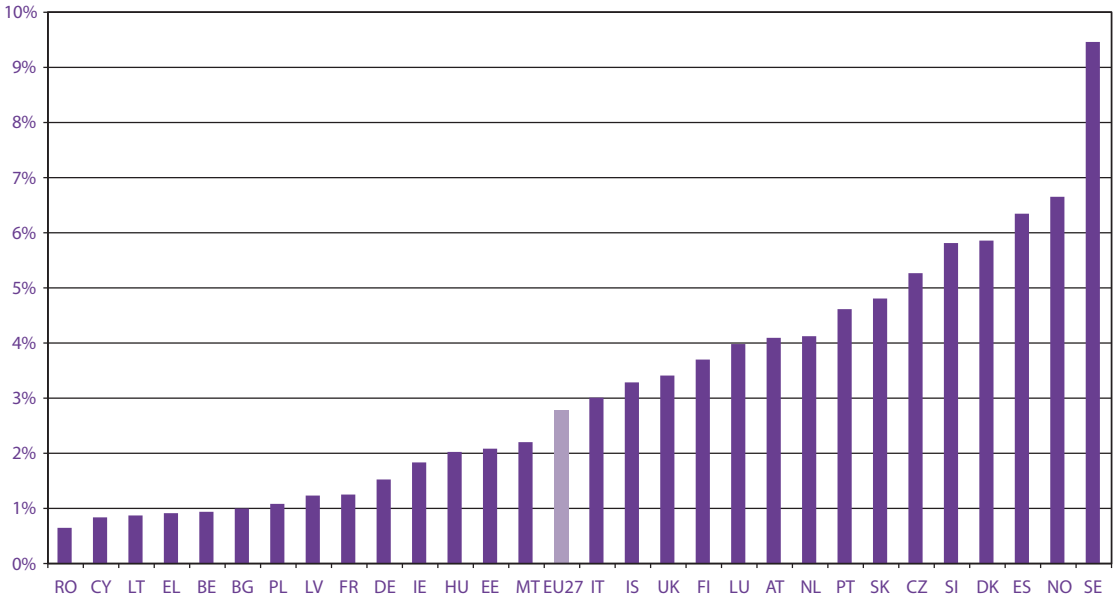
Although 3G broadband access has a number of advantages over fixed broadband access - it can reach areas not covered by fixed broadband access, there is no need to pay a line rental and it provides access everywhere and connection is immediate, as a USB key just needs to be connected to a computer - it appears that 3G is not yet a full substitute of fixed broadband technologies for private consumers, especially in less densely populated areas.

One reason for this lack of full substitutability is that third generation mobile technology provides much lower access speeds than fixed broadband access. Enhanced 3G mobile technology, also called 3.5G, offers much higher speeds, but coverage of 3.5G networks is limited to major cities with high population density[29]. This compares to coverage rates of around 90% for DSL technologies in most

28 See the 14th Progress Report on the single European electronic communication market, available at http://ec.europa.eu/information_society/policy/ecomm/library/communications_reports/annualreports/14th/index_en.htm

29 Around 60% of the overall population according to Screen Digest

Figure 11: **Percentage of individuals who use a mobile phone via UMTS (3G) to access the internet (2008)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

countries. Outside areas with 3.5G coverage, only third generation coverage is available and in many cases this technology has to rely on low-speed second generation mobile networks to guarantee full national coverage.

Another reason is the different price and usage conditions of mobile and fixed access, resulting in higher monthly consumer prices for mobile services. Contrary to the pricing system of fixed broadband access, based on unlimited consumption in exchange of a flat rate in most EU countries, pre and post-payment are still predominant pricing models for mobile phones. On average 41% of EU citizens subscribe to post-payment contracts and 35% to pre-paid packages. Only 4% of the EU population pay a flat rate for internet access via the mobile phone in connection with post-payment schemes, but this situation is expected to change in the future as more and more mobile operators start offering flat rate packages in an attempt to increase take-up of advanced services as well as frequency of access[30].

Mobile handsets have come a long way since the first models appeared on the market and their ergonomics and usability has improved significantly, on top of being capable of many more functionalities. Despite these improvements, it is clear that for a number of applications and services mobile handsets cannot compete against laptop or desktop computers as performance is still better, both at hardware and software level. It also appears that many sites and services are not yet fully adapted for being browsed or used with a mobile handset. These factors altogether can explain the low adoption of mobile handsets as a tool for using advanced internet services. However, smartphones are developing quickly and several companies are strongly competing on the Mobile Operating Systems arena, which will certainly lead to an increase in the growth of mobile applications.

Sending photographs or video clips via MMS messages represent by far the most popular advanced services via a mobile phone (Figure 12). When asked, 18% of EU population said they had sent a photo or a video clip in the last three months, a figure that rises to 40% in the case of young people. Internet browsing and e-mail reading are the next most regular applications, but the level of adoption is much lower at 6 and 5% of the EU population,

30 Eurostat data used in this report were collected in the first half of 2008. According to the OECD, data caps / bitcaps were applied to 36% of all broadband connections in the OECD in September 2008. The percentage was much higher for wireless broadband over satellite and fixed-wireless networks at 63%. Broadband plans over mobile networks were the most restrictive, with 89% of offers imposing a data limit each month. However, many new tariff plans for mobile services, including flat rates, have been made available since the second half of 2008.

Table 3: **Average hours per week using fixed online and mobile data applications**

	16-24	25-34
Fixed		
Internet blog	0.52	7%
Photo blog	0.28	18%
Video blog	0.34	36%
Instant messaging	1.30	26%
Chat rooms	0.50	15%
Social communities	0.80	22%
Fixed average	**0.62**	**21%**
Mobile		
Mobile blog	0.09	61%
Mobile photo blog	0.07	35%
Mobile video blog	0.09	39%
Mobile instant messaging	0.33	46%
Mobile chat rooms	0.12	49%
Mobile social communities	0.13	45%
Mobile average	**0.14**	**46%**
Total for fixed and mobile	**0.69**	**23%**

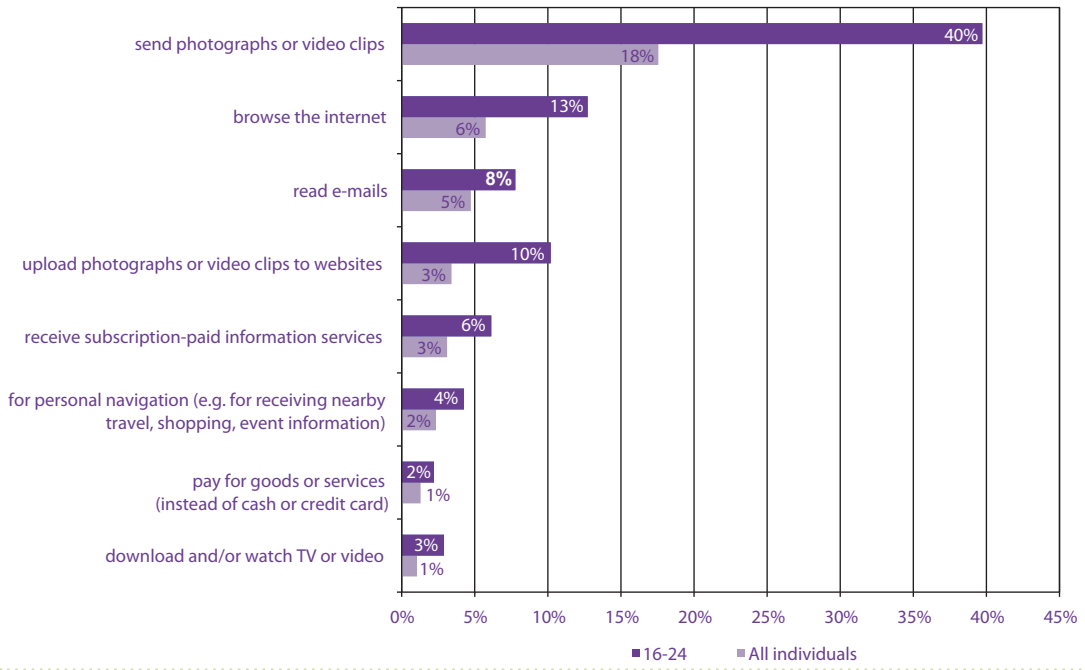
Source: Gartner

respectively. Use of these services by younger generations follows the same patter, i.e. around twice as many the numbers of users. Use of other services (subscription-paid information services, personal navigation, mobile payments and TV and/or video watching) are still marginal activities.

Gradual adoption by the population of mobile services is expected to increase mobile traffic at a much higher rate than fixed, though from a lower basis. However, according to recent literature, by 2020 consumers will still spend much more time using fixed online data applications than mobile (Table 3)[31].

Provision of mobile content by mobile operators was initially not very successful, mostly due to low quality services and bad pricing conditions. The spread of 3G networks, new pricing conditions including flat rates and the entry into the mobile content market of handset manufacturers and of open distribution platforms are expected to contribute to change the situation. At the moment, the very gradual development of mobile broadband networks is enabling content companies that are leaders in the fixed segment to take the lead in the mobile broadband content arena, a situation that is not

Figure 12: **I have used a mobile phone, in the last 3 months, to**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

31 Gartner's User survey analysis: Next-Generation Communications Consumer, Worldwide, 2020, February 2009

likely to change. The growing mobile content market is therefore becoming very similar to the fixed broadband one.

4.5. Conclusions

Use of advanced communication services is on the rise. In 2008, 35% of Europeans declared having used the internet in the last three months for advanced communication services. The continuing spread of faster and cheaper broadband communications has been one important factor behind these results. Sending and receiving e-mails is still the most popular communication service through the internet. Predominance in the use of one or another service is however very much linked to age.

There is an evident, profound break with previous generations in the attitude towards the use of internet services. In the most advanced countries, around 90% of young people connect on a daily basis. However, across all EU Member States, use of advanced services is significantly higher among the young and the gap between countries for this age group is smaller. More frequent and advance use is linked to the higher level of internet and informatics skills of this generation, to a large extend obtained though formalised education. Their behaviour as regards the internet is also somehow different from the rest of the population: in particular, the young are more extensive users of advanced internet services. 73% of them access advanced communication services. The next chapter will look at further implications of such behaviour.

As such, the young – and in particular students - can be considered as lead users of advanced internet services, showing the way for other groups in society. The phenomenon is a clear indication of the economic and social impact the internet will carry in the future and of the size of the change brought about by the digital revolution. It is also a positive indicator for future declines in the digital divide. Nevertheless, this does not mean that social differences in internet use will disappear and policy action should continue to be taken to minimise these differences.

5 The use of the internet for entertainment purposes and its impact on content markets

The diffusion of broadband has brought about growth in a variety of online activities. Next to the online distribution of professionally-produced media content, such as music, films, video games and publishing content, 2008 has been characterised by the explosion of social network services, notably Facebook (Annex: most viewed websites) and Twitter, confirming the trend started a few years ago towards a more participative use of the web[32]. The diffusion of high capacity internet has also brought about a rise in the illegal distribution of online copyrighted material and, according to the content industry, levels of internet piracy are very high in some EU Member States.

The previous chapter highlighted the emergence of a generation. These young users also stand out from the rest of the population in their attitude towards the payment of online content and the perception that many of the services and content are available on the internet free of charge or simply provided in exchange of a flat rate internet connection.

This stylised fact is posing a number of challenges to policy makers, regulators and industry. In the context of the review of the EU regulatory framework for electronic communications, for example, the introduction of an amendment by the European Parliament in May 2009, after reaching an agreement, was motivated by the treatment of file sharing over the internet. Decisions on key aspects of the telecoms reform were put on hold because of a question relating to internet use rather than to traditional telecom aspects.

While Europe is one of the most creative regions of the world in terms of production of quality content and features high rates of broadband take up, it is yet to take full advantage of digital content markets, including the advertising market which represents the biggest online content market in revenues followed by online games, music and videos.[33] Technological advances in ICT, together with the increasing internationalisation of audiovisual markets, are the two main challenges for policy-making in the audiovisual sector today.

The regulatory framework has been reviewed to respond to the increasing importance of on-line delivery of audiovisual content. The Audiovisual Media Services Directive adopted in 2007 sets European standards for the new services so that national borders don't stand in the way of reaching viewers and users. It has to be implemented by Member States by the end of 2009[34]. In relation to support instruments the MEDIA 2007

32 In February 2009, for example, Nielsen estimated that memberships for micro-blogging service Twitter rose more than 1,300%. In the same month, Nielsen claimed that Facebook - already the largest online social network - saw growth of 228%. Source: Datamonitor "The Rise of Social Networking and Emerging Channels in Customer Service"- quoting research by Nielsen.

33 OECD Information Technology Outlook 2008

34 Available at http://ec.europa.eu/avpolicy/reg/avms/index_en.htm

programme seeks to ensure that the latest ICTs and trends are incorporated into the business practices of beneficiaries[35].

Apart from challenges posed to audiovisual regulatory and support instruments the overall development of online distribution of creative content in Europe, regardless of its origin needs to be addressed. The online distribution of creative works such as music, films, video games and publishing content is transforming the creative industries in Europe. Sales of content on packaged media are rapidly decreasing, but online distribution does not yet compensate for these falling revenues, despite the high potential that clearly exists. De-materialisation of creative content distribution is shaking up the business models of the creative industries, with both potential opportunities and potential losses and bringing new players into the media industries' landscape.

By way of a response to these transformations, the European Commission launched the "Content Online in the Single Market" initiative[36]. This initiative included the "Content Online Platform", a stakeholders' discussion and cooperation platform (creators, rights holders, content providers, consumer associations, internet service providers and the telecommunication industry)[37]. One of the main issues that the Content Online Platform focused upon was improved availability of creative content through the establishment and development of new online business models.

The Platform considered that in most cases, online offers are not yet sustaining. Due to the "prototype" business model widely applicable to creative content in Europe, it is difficult to attract risk capital for new online business models and it is difficult in the short term to finance the transition to digital distribution with the revenues of physical sales as these are shrinking for a number of types of content[38].

Established business models of the traditional media companies are based on sophisticated approaches to advertising and subscription models built upon the presumptions of both the ownership or control of intellectual property (i.e. content) and the ownership or control of expensive distribution networks (so that the content can reach the audience).

Consumers expect easy access and cross-platform availability, including across borders. Their willingness to pay for legal online offerings and to accept limitations to the availability of content is depending essentially on an accurate pricing, but also on how they can use legally acquired content, including copying it. The – legal - availability of creative content online is intrinsically tied to the issue of licensing, as creative content is only – legally - offered online when it is licensed accordingly. Discussions within the Content Online Platform have shown that, in general, on the level of licensing and rights management, workable solutions responding to these challenges have yet to emerge.

5.1. Willingness to pay for content

Results from the 2008 survey reveal that less than 5% of Europeans had paid for online content in the last 3 months. For the youngest age group (16-24), this figure is twice as high. When looking at the individuals that did not pay for online audiovisual content, half of them state that nothing would make them change their minds. For approximately 30% of them, lower prices would be an incentive to pay, while other improvements (wider choice or availability, enhanced quality, better payment methods, the right to share material) or the lack of freely available content would convince between 15 and 20%. Interestingly, the willingness to pay of youngsters and the general population is very similar (Figure 1).

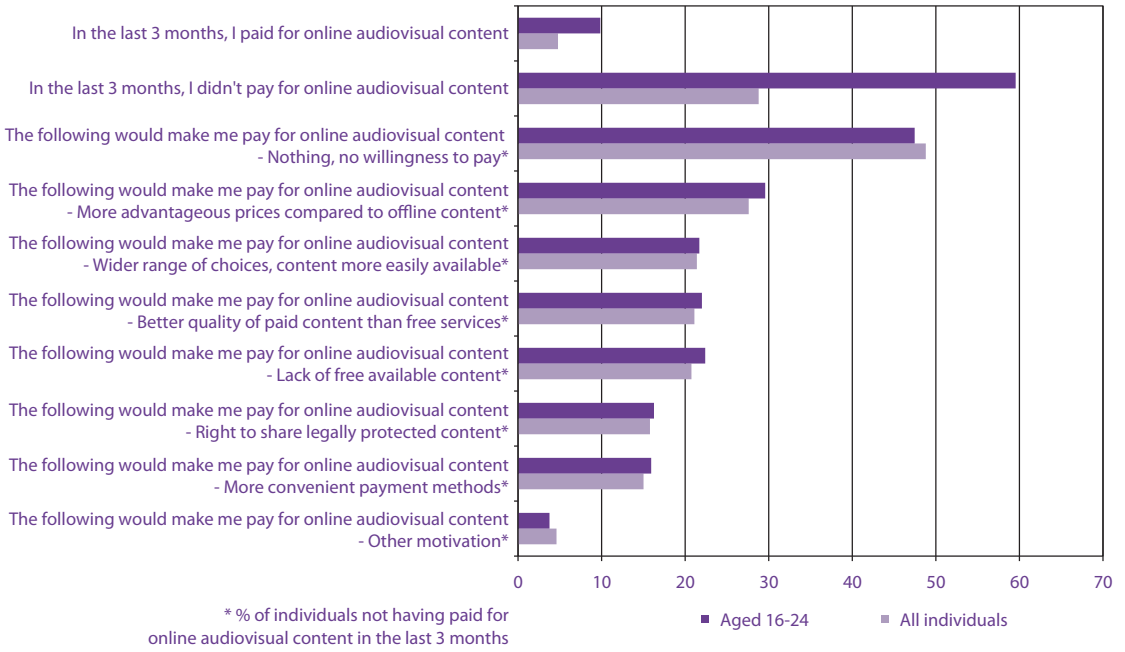
35 After exploring new ways of distributing European content through pilot projects, the Commission published a first call for proposals entirely dedicated to Video on demand three years ago: in the first year 11 VOD platforms with a majority of European content were supported for a total amount of € 4.2 million. In response to this year's call 17 legal offers of shorts, documentaries and features films with a broader European coverage will receive around € 5.75 million.

36 See: http://ec.europa.eu/avpolicy/other_actions/content_online/index_en.htm.

37 The Final Report of the Content Online Platform was published on 12 May 2009: http://ec.europa.eu/avpolicy/docs/other_actions/col_platform_report.pdf

38 This does not seem to apply to videogames, that were "born digital", nor to books whose physical sales remain stable and have even increased in some markets.

Figure 1: **Paying for content (2008, %)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

The limited willingness to pay in return for service improvements suggests that the take up of advanced content services is linked to the perception that many of these services are free or are provided in exchange for a flat rate internet connection. For many users, and especially the younger cohorts, adoption of advanced services seems to be driven by the principle of "eat as much as you can" in exchange of a fixed fee. Once the connection to the internet is established, it is just a matter of streaming or downloading and copying the content of choice. Along with free applications – chats, internet telephony and videoconferencing, open source applications and free content, web pages, radio and TV, blogs, user created content - a number of other applications and content services are available on the web and can either be legally purchased or illegally downloaded and shared for free.

Moreover, the low percentage of individuals that consider the possible lack of freely available online content as a reason for paying, calls into question the argument put forward by representatives of the content industry that European consumers will in the long term suffer from a lack of commercial availability of high quality content if the current model of audiovisual content distribution, based on illegal copying, is not curved.

The exchange of digital content is evolving dynamically over the internet. Peer to peer (P2P) solutions are being improved and new platforms to store data are flourishing, making content more available than before. It is very difficult to measure the exchange of content over the internet. A proxy measure is the rise in visits to websites offering IP addresses to content in P2P networks (sometimes without retribution to its creators, such as The Pirate Bay) or stock websites (such as Megaupload).

5.2. New content and new platforms for exchange: User Created Content

Business models based on "user created content" can be established much more easily than professionally-produced content offers, simply because they carry lower development costs. The opportunities it represents are exploited more by new entrants in the media industry, such as YouTube, than by "traditional" media distribution companies which are lagging behind.

BOX 1: DIGITAL CONTENT ILLEGAL EXCHANGE

There are currently no official statistics on online piracy in the internet. Peer-to-peer traffic gives an approximation on the size of the phenomenon, as these protocols are mainly used to exchange files. Other sources are based on industry claims and surveys on usage.
Industry[39] claims that online music piracy accounts for 95% of the total digital music market. The situation is not very different in the online video market. It is estimated that worldwide only one out of five movie downloads is carried out legally[40].
Some evidences of illegal downloads in European Member States are provided by studies carried out for the industry that illustrate to a certain extent the current situation:

- **France:** 13.7 million films were distributed on P2P networks in May 2008, compared with 12.2 million cinema tickets sold[41].
- **Germany:** P2P traffic was more prolific than all other internet traffic combined and represented nearly 70% of all traffic[42]. Over 45% of all files transferred on eDonkey2000 were music files
- **Spain:** There were an estimated 1.6 billion songs downloaded illegally in 2008[43], compared to 2 million legal "à-la-carte" downloads. This means that just 0.1% of total tracks downloaded in Spain was legal. Digital sales are flat at 10% of the market.

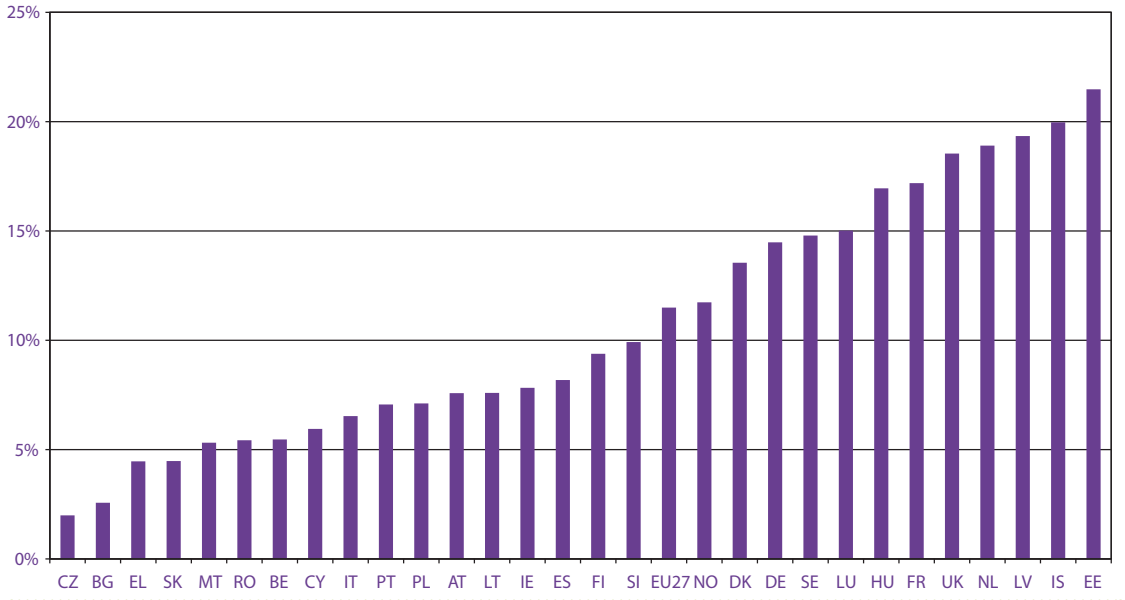
User Created Content refers to content made publicly available through telecommunication networks, reflecting a certain amount of creative efforts and created outside professional routines and practices.[44] There are very few official figures regarding the diffusion of User Created Content. The assessment of the magnitude of the phenomenon is based on usage statistics and user data from the main websites.

User Created Content sites are mainly financed through advertising and the vast majority of users are not remunerated. It is important to note that because of the high costs of storage and delivery of this content, together with the uncertainty of the associated business models (the share of advertising expenditure associated with user created content is less than 1.5% in Western Europe[45]), only large companies can nowadays afford to underwrite such sites. The most important platforms for User Created content are located in the North America[46]. These platforms are social networks like Youtube (specialised in videos), MySpace (specialised in music) or flickr (specialised in photographs).

With regards to the uploading of content, Estonia is the leading Member State with 21% of citizens declaring to have uploaded content in the last 3 months. In Latvia, the Netherlands and the UK almost 20% of citizens have declared to have done so. In the countries lagging behind (Czech Republic, Bulgaria, Greece and Slovakia) less than 5% of the population has declared to have uploaded content in the recent months (Figure 2).

39 IFPI (International Federation of the Phonographic Industry) Digital Music Report 2009: http://www.ifpi.org/content/library/DMR2009.pdf
40 NPD Group - IFPI Digital Music Report 2009
41 Equancy and CO and Tera Consultants - IFPI Digital Music Report 2009
42 Ipoque - IFPI Digital Music Report 2009
43 Promusicae/Gfk: http://www.promusicae.org
44 Study on *User-created content: Supporting a participative information society* IDATE for the European Commission December 2008.
45 Study on *User-created content: Supporting a participative information society* IDATE for the European Commission December 2008.
46 According to the Alexa, the US were the leading country regarding MySpace (66.9% of the users), flickr (31.5% of the users) and You Tube (22.63% of the users).

Figure 2: **I have used internet, in the last 3 months, for uploading self-created content (text, images, photos, videos, music, etc.)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

5.3. The use of the internet for entertainment purposes and to replace other means of communications: a challenge for the content industry

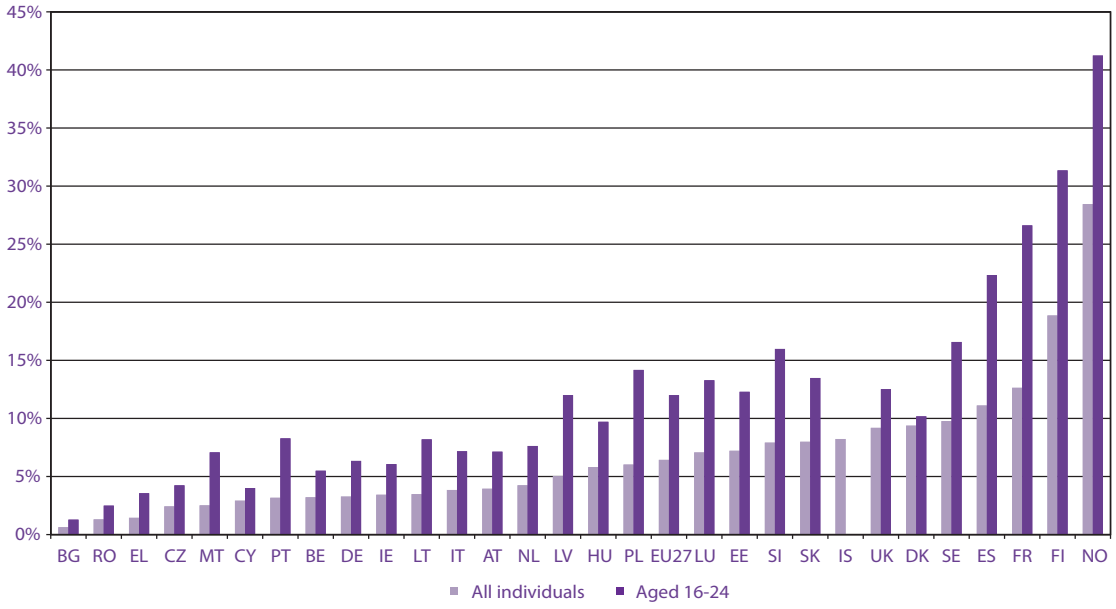
Increased adoption of broadband with higher download and upload speeds is enabling the emergence of a multicast Web 2.0 model which strongly differs from the traditional one-to-many information/content model. This new paradigm calls into question the traditional broadcasting and content industry business models in which professional communicators and content creators had the technical and financial means to address a wide and rather passive audience.

The newspaper industry, for instance, is struggling to survive amidst falling readership and advertising revenues, a trend set in motion by the emergence of the new internet services and exacerbated by the economic crisis. European newspapers have the advantage of much stronger balance sheets than their US counterparts, unencumbered by debt, but even so the combination of recession and structural change is very challenging.[47] Most publishers' websites do not make money and are subsidised out of print revenues. An increasing number of users get informed through personal web pages based on the RSS[48] Technology (Figure 3), which allows receiving up-to-date information from other websites in a different number of formats; the number of blogs which can be labelled as online citizen journalism are counted by millions. Also news sites that aggregate headlines from many different sources are increasingly being used by web users as the main source of daily information, a controversial trend from the publishers'

47 See for instance, Andrew Currah, *What's happening to our news: An investigation into the likely impact of the digital revolution on the economics of news publishing in the UK*, Oxford University, Reuters Institute for Journalism, January 2009

48 RSS means Really Simple Syndication: according to Wikipedia, a family of web feed formats used to publish frequently updated works—such as blog entries, news headlines, audio, and video—in a standardized format.

Figure 3: **I have used internet, in the last 3 months, for browser based news feeds (e.g. RSS) for reading new content on websites**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

viewpoint, concerned for their copyrights and revenue opportunities.

8% of EU citizens now read online news instead of printed magazines and newspapers. This figure increases to 18% in the case of occasional online readers. The impact of the Web 2.0 in the written press is undeniable and may be compounded by neighbouring developments such as the roll-out of ebook readers, intended to replace newsprint.

The radio is another visible example. The rate of replacement for radio is not very high yet (4%), but 11% of EU citizens do, on some occasions, listen to web radio instead of listening to the "normal" radio. While it is true that television and radio are also using the internet as a new distribution platform, the distinctive element in all cases is the notion that "pull content"[49] allows users to choose what to watch listen or read, when and where. 20% of EU citizens used the internet in the last 3 months, for listening to web radios and/or watching web television.

Most of the content downloaded in Europe comes from the US, where the most used internet services and online content shops are located. Most downloaded movies are produced in the US[50].

In terms of use, downloading of music is the main activity performed by Europeans in 2008 (Figure 4), carried out by 24% of EU individuals and followed by listening to web radios and /or watching web television (20%). Movie downloading is also a very common activity. Playing networked games with others (7%) and activities requiring uploading of information (images, photos, videos or music) (12%) are not yet as widespread as content downloading. Only 7% of respondents have declared to have used peer-to-peer.

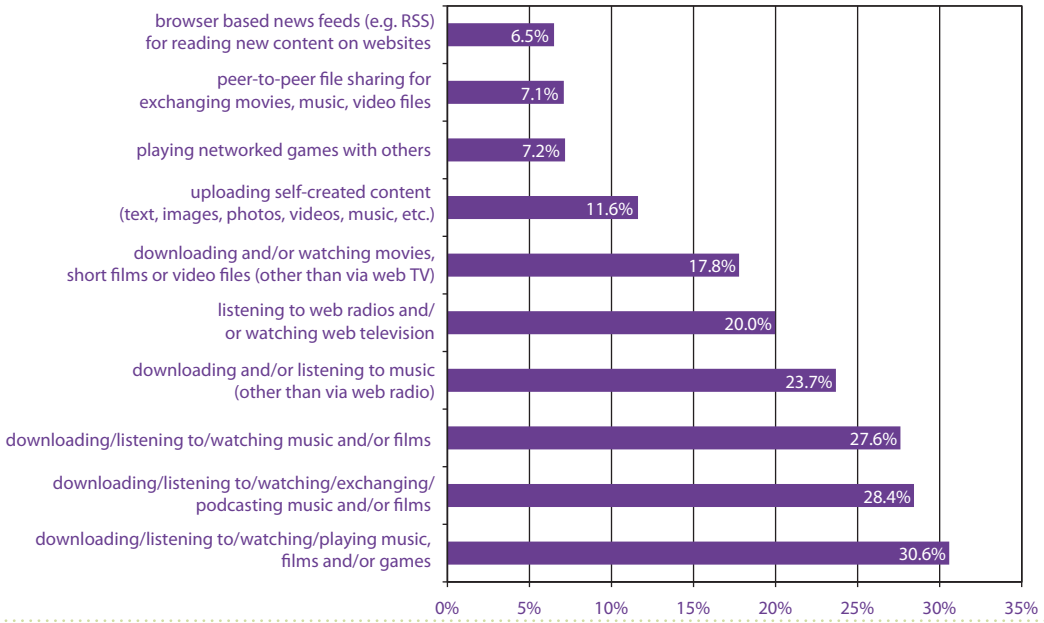
5.3.1. Online music

About a quarter of European citizens have downloaded and/or listened to music online in 2008 (Figure 5), with large disparities between Member States. In the Netherlands or Norway, 40% of citizens listen or download music, and in 16 other countries over 20% do so. The difference with the laggards reaches up to 25 percentage points.

49 Consumers can either "pull" the information they demand at their own request or receive information that is "pushed" by content suppliers

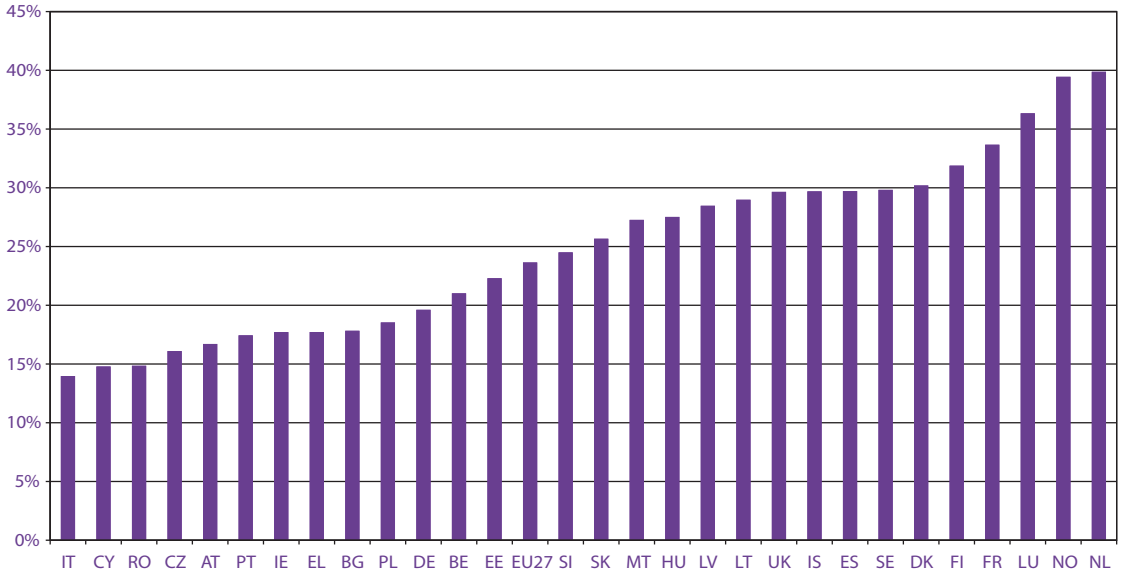
50 According to iTunes, 8 of the top 10 movie downloads through this online shop in May 2009 were US productions.

Figure 4: **Content - I have used internet, in the last 3 months, for**



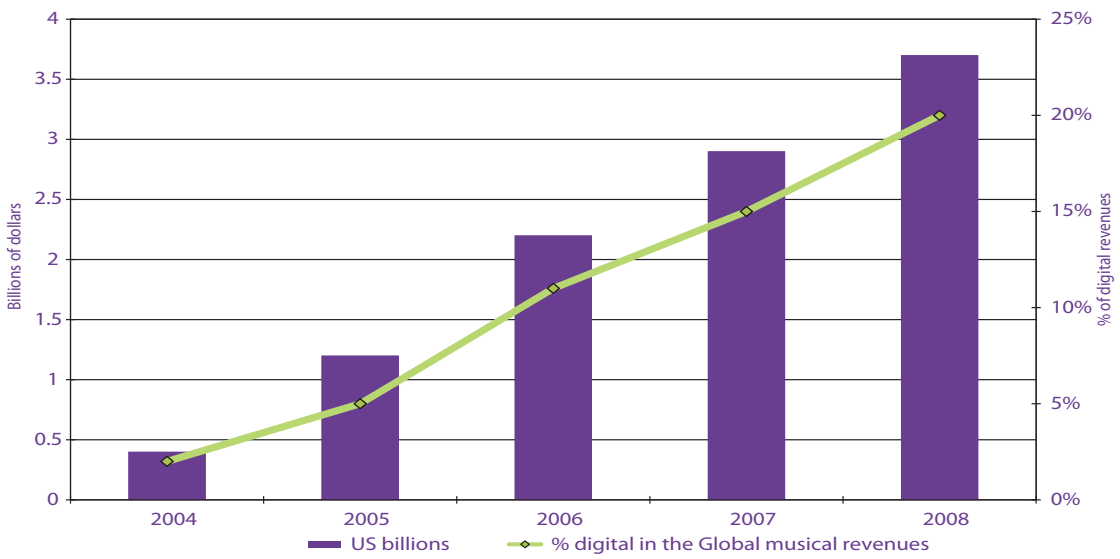
Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

Figure 5: **I have used internet, in the last 3 months, for downloading and/or listening to music (other than via web radio)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

Figure 6: **Global digital music revenues (2008)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

According to industry reports, digital platforms now account for around 20% of recorded music sales, up from 15% in 2007 (Figure 6). The digital music business in the world in 2008 experienced a sixth year of expansion, growing by an estimated 25% to US$3.7 billion in trade value.

In Western Europe[51] music downloads have grown by 76%. The industry is working to try to find successful and sustainable business models in an environment dominated by free solutions. 2008 has been the year where the bulk of business models has migrated from being based on sales from downloads to being based on the access to the music financed through advertisement[52]. These models are based on subscription fees or advertisement and/or are bundled with other services and devices (like Apple's iPhone).

A related successful model in 2008 is digital music associated to videogames (for example Guitar Hero or Rock Band franchises): music games were responsible for 15% of all games sales in the first half of 2008 and for 22% of the year-on-year growth of the videogames sector.[53]

5.3.2. Online video

Less than 20% of European citizens used the internet for online video in 2008. This includes both short video clips like the ones available on You Tube as well as video streaming and downloading. There are again significant differences between Member States: In Latvia or the Netherlands almost 30% of citizens regularly download and watch movies, and this figure is higher than 20% in 10 other countries. The difference with the laggards reaches up to 20 percentage points.

Business models providing free video content, financed through advertisement, dominate video consumption as the PC remains the most used device for video through the web. The YouTube website is the most popular access to video streaming (Table 1), although video streaming websites are not yet profitable[54].

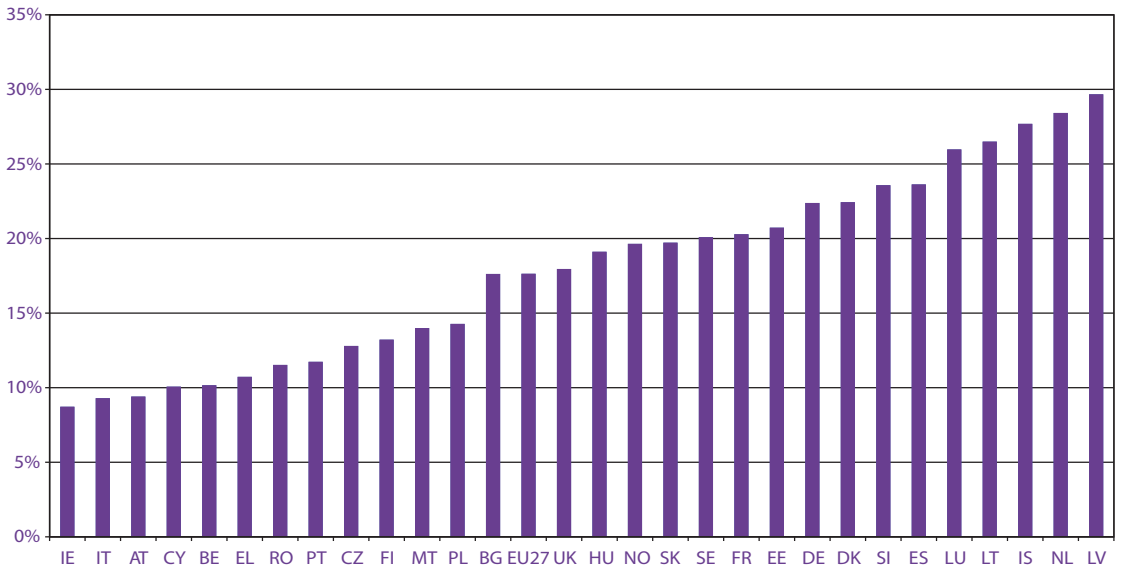
51 Screen Digest. Western Europe: Austria, Belgium, Denmark, France, Finland, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK

52 With the success of websites like Spotify

53 NPD Group - IFPI Digital Music Report 2009.

54 According to Google's financial statements, Youtube has 1.65 million $ of daily losses.

Figure 7: **I have used internet, in the last 3 months, for downloading and/or watching movies, short films or video files (other than via web TV)**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

Table 1: **Number of videos viewed from the top three sites June 2008 (excl. ad-networks[55])**

UK	FRANCE	GERMANY	USA
YouTube (1.4 billion)	YouTube (0.5 billion)	YouTube (1 billion)	YouTube (4.2 billion)
BBC (45 million)	DailyMotion (0.3 billion)	ProSieben (40 million)	MySpace (0.5 billion)
MSN (22 million)	TF1 (37 million)	RTL (32 million)	Yahoo (0.3 billion)

Source: Screen Digest 2009

The paid market for online video has not yet proved a sustainable model overall, because of high bandwidth storage and delivering costs together with low paid consumption. Unprofitability has led to the closing of several online stores in 2008. iTunes remains the most successful store, managing content over revenue-generating platforms such as the iPod digital media players as well as the iPhone.

Against this background the video-on-demand sector is still growing and several business models are being tested by different providers in almost all Member States[56]. 256 services were available in November 2008 through a variety of platforms: internet (168 services), IPTV (74 services), cable (23 services), satellite (12 services) and Digital Terrestrial TV (1 service). Business models range from free to subscription services, from rental to download-to-own and services linked to the ownership of dedicated players, etc. However, rental access to individual services remains the most used model. Most of the services are restricted to users resident in certain countries; only a minority is open to a supra national audience. France is the country where VoD services are most developed.

Video on demand is considered by many as a competitor or a substitute for the rental or sale of DVDs. Recent evidence from some of the most developed markets shows however that the revenues generated from VoD services (mainly through the IPTV mode) remain modest and are unable to compensate for the decline in revenues from the sales and renting of DVDs. In France[57], in 2008 revenues from DVDs totalled almost € 850 million (- € 88 million vs. 2007) while VoD (mainly through IPTV services) totalled € 53 million (+ € 24 million vs. 2007). The same patterns were recorded in the UK[58], where falling DVD

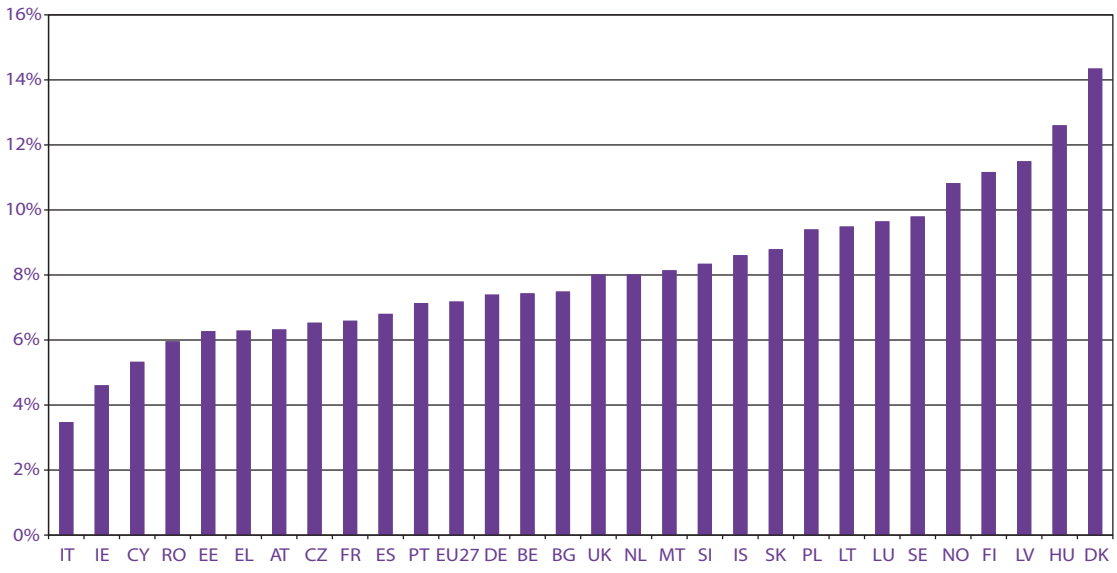
55 An ad – network is a company that connects web sites that want to host advertisements, for instance video advertisement, with advertisers.

56 European Audiovisual Observatory, 2008 Yearbook

57 CNC, Bilan 2008

58 UK Film Council, 2009 Statistical Yearbook

Figure 8: **I have used internet, in the last 3 months, for for playing networked games with others**



Source: Eurostat Community Survey on ICT Usage by Households and by Individuals .

revenues (- € 64 million vs. 2007) were not compensated for by surging of VoD revenues (+ € 27 million vs. 2007).

5.3.3. Videogames

Around 7% of Europeans have used the internet (in the last three months) for playing networked games. About 10% have done so in Denmark, Hungary, Latvia, Finland and Norway, while less than 4% have followed in Italy (Figure 8).

Out of the main online content markets, the videogame segment has featured the highest growth rates over the last 3 years, driven by the introduction of generations of game consoles enabled for internet surfing. Video Games are increasingly segmenting and furthering audiences reaching beyond hardcore gamers. In the last years, companies like Nintendo have launched videogames targeting adult population attracted by technical aspects such as graphics and sound effects.

Global revenues for the video games industry account to 48.3$ billion in 2008 and are projected to grow to 68.3$ billion by 2012. The online video game market is expected to double between 2008 and 2012. Other software segments will continue to grow but at a lower rate.[59]

Sources of growth are new models of online gaming and mobile gaming. Vivendi's World of Warcraft is a European success story and its subsidiary Activission Blizzard is the world's number one developer of videogames when only software is taken into account.

The use of mobile terminals for gaming has increased, in the last year, due to the development of mobile broadband flat rates and casual gaming platforms such as AppStore. Casual gaming represents a major revolution in the videogame industry and expands its consumer base. The casual games sector drives a third of the industry's total revenues and is expected to account for half of it by 2012[60].

5.4. Conclusions

The diffusion of broadband has brought about rapid growth in the distribution of online content, legal as well as illegal. While young users are at the forefront in the use of the internet for content and entertainment activities, they also

59 IDATE Communications and Strategies, New Challenges for the video game industry, 1st Quarter 2009

60 IDATE Communications and Strategies, New Challenges for the video game industry, 1st Quarter 2009

stand out from the rest of the population in their attitude towards the payment of online content; they are generally unwilling to pay for many of the services, except those providing some additional added value over and above that provided by those services they can obtain for free.

This stylised fact is posing a number of challenges to policy makers, regulators and industry. While Europe is one of the most creative regions of the world in terms of production of quality content and features high rates of broadband take up, it is not yet taking full advantage of digital content markets. American content and online shops have to a large extent cornered the market, raising revenues through online advertising, and experiencing success stories such as Appstore.

For Europe to successfully compete in the market for content, solutions to these problems need to be found; through finding innovative and sustainable business models as well as a favourable regulatory environment.

Annex: Most Viewed websites

Top 5 internet sites per country May 2009[61]

	1	2	3	4	5
Belgium	Google.be	Facebook.com	Windows Live	YouTube.com	Skyrock
Bulgaria	Google.bg	Vbox7.com	Google.com	Zamunda.net	Abv.bg
Czech Republic	Seznam.cz	Lide.cz	YouTube.com	Szn.cz	Google.com
Denmark	Google på dansk	Facebook.com	YouTube.com	Google.com	Windows Live
Germany	Google.de	Google.com	YouTube.com	Ebay	Wikipedia
Estonia	Google.ee	YouTube.com	Google.com	NETI	Delfi
Greece	Google.gr	Facebook.com	YouTube.com	Google.com	Yahoo!
Spain	Google.es	Windows Live	YouTube.com	Google.com	Facebook.com
France	Google.fr	Skyrock	Facebook.com	Windows Live	YouTube.com
Ireland	Google.ie	Google	YouTube.com	Yahoo!	www.bebo.com
Italy	Google.it	Facebook.com	YouTube.com	Windows Live	Yahoo!
Cyprus	Google.com	YouTube.com	Facebook.com	Windows Live	Yahoo!
Latvia	Google.lv	Draugiem.lv	Inbokss	One	Delfi
Lithuania	Google.lt	one.lt	Google.com	YouTube.com	Delfi
Luxembourg	Google.lu	YouTube.com	Facebook.com	Google.com	Windows Live
Hungary	Google.co.hu	Iwiw.hu	YouTube.com	Google.com	Origo Freemail
Malta	Google.com.mt	Google.com	YouTube.com	Facebook.com	Windows Live
Netherlands	Google.nl	Hyves.nl	Windows Live	YouTube.com	Google.com
Austria	Google.at	Google.com	YouTube.com	Facebook.com	ORF ON
Poland	Google.pl	Nasza-klasa.pl	Onet.pl	Allegro	Wirtualna Polska
Portugal	Google.pt	hi5	Windows Live	YouTube.com	Sapo - Portugal Online!
Romania	Google.ro	Yahoo!	YouTube.com	hi5	Google.com

61 www.alexa.com

Slovenia	Google.si	Google.com	Facebook.com	YouTube.com	24 ur - Naslovnica
Slovakia	Google.sk	Azet.sk	YouTube.com	Zoznam.sk	Google.com
Finland	Google.fi	YouTube.com	Google.com	Facebook.com	IRC-galleria
Sweden	Google.se	YouTube.com	Google.com	Facebook.com	Windows Live
United Kingdom	Google.co.uk	Facebook.com	Google.com	YouTube.com	Yahoo!
United States	Google.com	Yahoo!	Facebook.com	YouTube.com	Myspace
Japan	Yahoo.co.jp	FC2	Google日本	YouTube.com	楽天 rakuten
China	Baidu.com	QQ.COM	新浪新闻中心 新浪新闻中心 sina	Google.com	淘宝网 taobao

Source: Screen Digest 2009

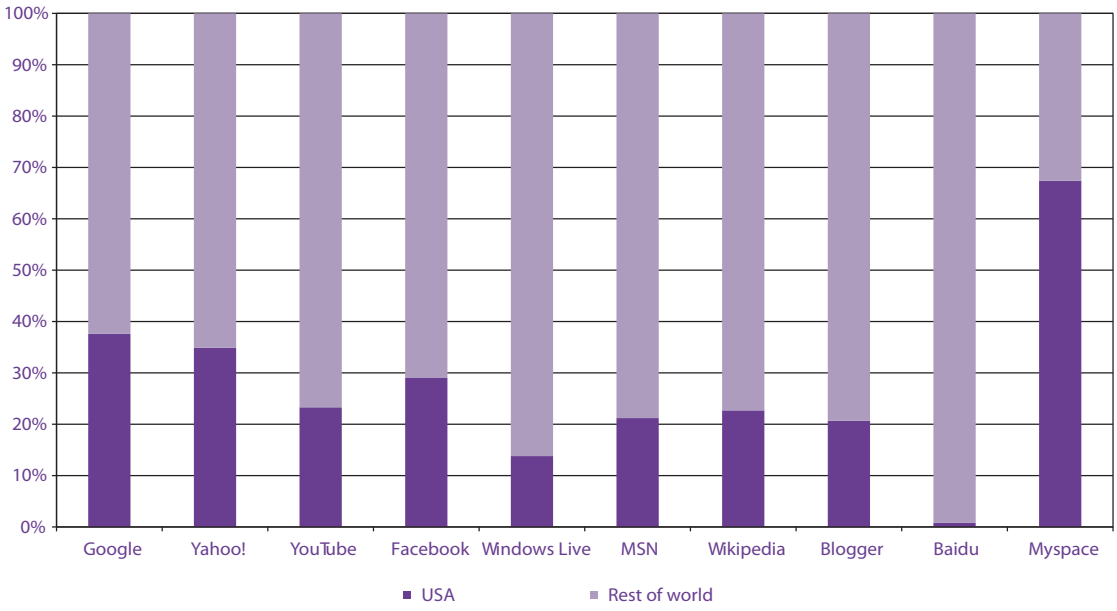
The most viewed sites on the internet in EU-27 are:

- Search services such as Google and Yahoo
- Social networks such as facebook
- Video services like Youtube
- Collaborative/Web 2.0 websites like Wikipedia

It is interesting to note that most viewed websites in Europe are almost the same as in the US and Japan (dominated by American companies) while in China, the top three websites are Chinese.

Google websites are the most viewed in 26 of the 27 member States, showing that search is the top activity on the web and therefore advertisement in this category is one of the main sources of revenues in the industry. The other two main categories in the internet are online free video and social networking. The only country where the most viewed website in Europe is not owned by Google is the Czech Republic with www.seznam.cz (a local web dedicated to search, email services, news and weather forecasts among other services).

Global top 10 websites (in terms of traffic) and their users



Source: Alexa.com, 13.05.2009.

6 ICT uptake by european businesses and productivity impacts

Economic theory attributes an important role to the ICT take up of businesses for increased efficiency, innovation and growth. Therefore, the take up of ICT by European businesses is crucial for the raising of Europe's productivity potential and future growth prospects. This chapter looks at recent progress made in the take up of ICT by European businesses and recalls the importance thereof for the economy. The next section, section 6.1, provides an overview of recent trends in the take up ICT by EU businesses. Section 6.2 looks at the status of supply chain management. Finally, section 6.3 reviews the theory and evidence on the economic importance of ICT.

6.1. Developments in ICT uptake by EU businesses

Developments in ICT uptake by EU businesses over the period 2005 and 2008 show a mixed picture. In some areas significant progress has been made. For example, connectivity has increased strongly, with the percentage of enterprises having a broadband connection climbing from 62% in 2005 to over 81% in 2008 (Figure 1). Progress has also been made in the area of e-Banking, with use rising from 70% to 78% over this period. Significant improvement in the uptake of online public services has also taken place, with half of EU enterprises using the internet for sending filled forms to the public administrations in 2008, compared to 33% in 2005. This steep increase reflects efforts made by the public sector with regard to electronic public services, as public services are increasingly becoming available online.

Less progress, on the other hand, has been made in the area of electronic transactions. Only 12% of total enterprise turnover is made online, an improvement of only 2 p.p. with respect to 2005. Therefore, while connectivity is now high, the actual implementation of use of ICT in business processes, especially those involving relations with customers and suppliers, remains limited.

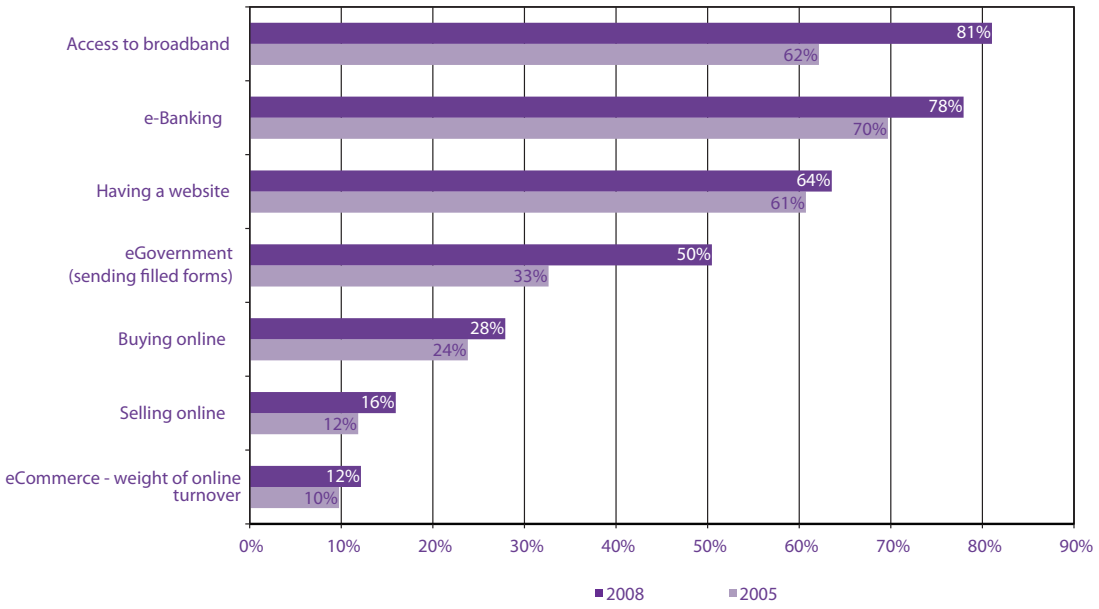
Additional evidence on eCommerce take-up available from statistics on website functionalities (which does not account for enterprises selling online through external providers) shows that while having a webpage is quite common among EU businesses (64% penetration in 2008), availability of services through the internet is limited and this applies especially to those offering a high value added to customers. In particular, while 57% of websites contain product catalogues and/or price lists, 26% allow for online ordering/booking and a mere 10% for payment (Figure 2). Interactive customisation of content and the possibility to design products tend not to be widespread either and limited to slightly more than 10% of websites. Finally, roughly one fourth of website shows advertisement of available jobs.

There are, however, large differences across industries, reflecting their activities. For example, the percentage of websites having an ordering/booking functionality is equal to 75% in the hotel industry and goes down to 33% and 19% in the trade and manufacturing sectors. The possibility to personalise content is relatively high in financial services websites (28%) and quite uncommon in the manufacturing sector (8%).

Furthermore, statistics on the take-up of advanced solutions aimed at supporting enterprises business processes reveal the following (Figure 3):

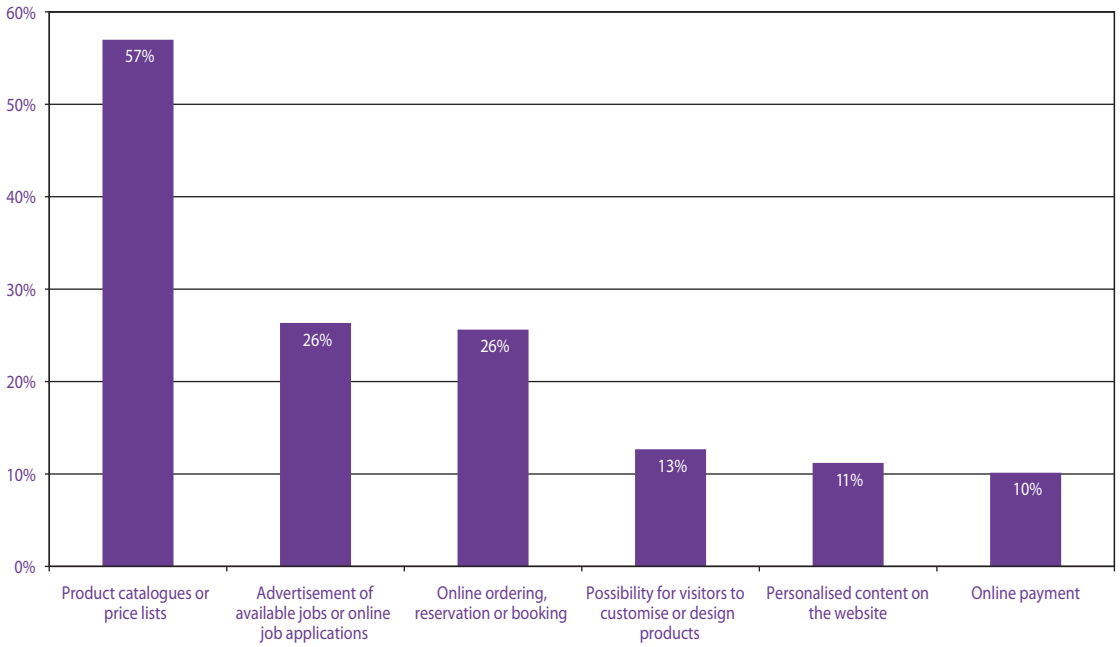
Use of ICT for the automation of internal business processes through the automatic exchange of information

Figure 1: **ICT use by enterprises (EU average, in 2008)**



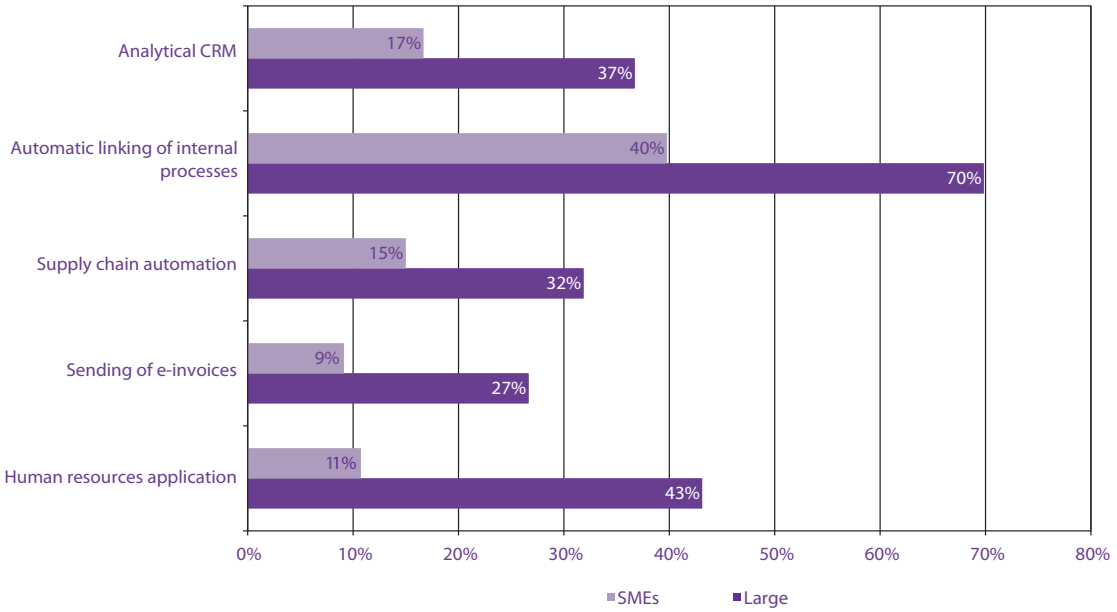
Source: Eurostat, Survey on ICT in enterprises (10+ employees, excluding the financial sector)

Figure 2: **Availability of websites with specific functionalities (EU average, in 2008)**



Source: Eurostat, Survey on ICT in enterprises (10+ employees). 100 = enterprises having a website.

Figure 3: **Use of eBusiness applications (EU average, in 2008)**



Source: Eurostat, Survey on ICT in enterprises (10+ employees).

and for the management of human resources is quite common, especially among large enterprises.

eBusiness applications enabling the automatic link with business partners, including those automating the supply chain and the transmission of invoices, are still used by a minority of EU enterprises. In fact, when ICT is used for integration with customers and suppliers a wide range of issues ranging from technical, business and legal ones have to be dealt with, increasing the complexity of the exercise.

Firm size is still an important factor when looking at uptake. Use of advanced applications tends to require heavy investments, strong ICT and eBusiness skills for which economies of scale matter.

6.2. Supply chain management

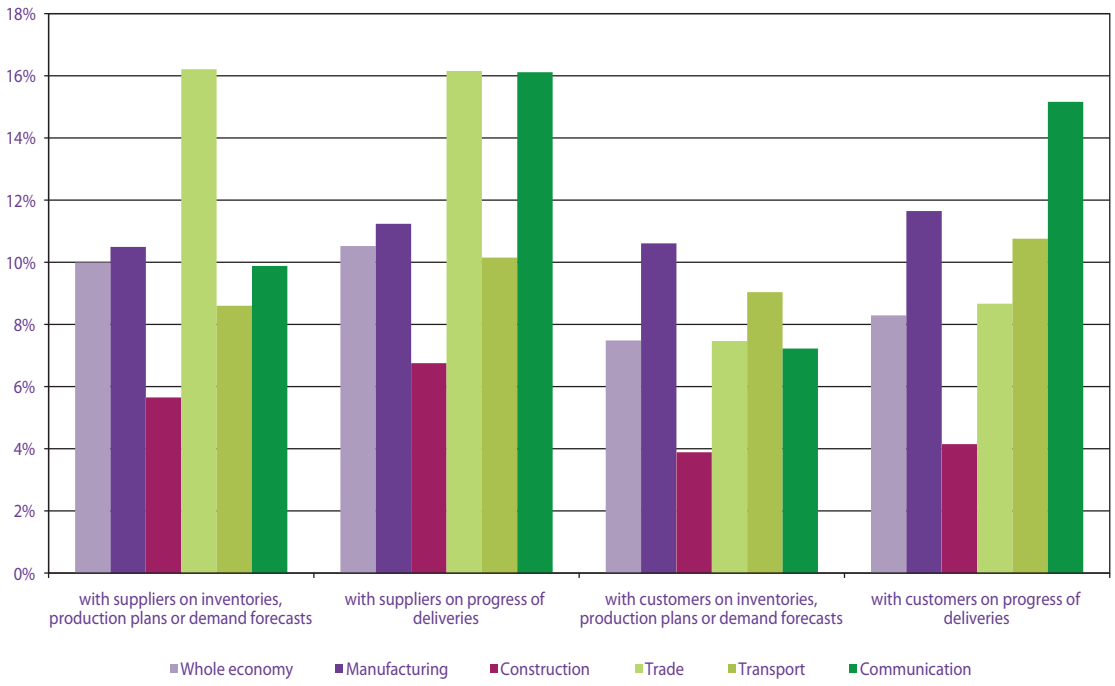
Supply chain management is one of the areas in which ICT can bring strong benefits in terms of efficiency gains. Nevertheless, evidence shows that penetration of applications for supply chain automation is still relatively low throughout the economy (Figure 4). In wholesale and retail trade, e.g. the industries in which these applications are most heavily used in relative terms, the electronic share of information with suppliers is limited to 16% of businesses. In addition, only 10% of businesses in manufacturing industries are using ICT for integrating vertically along the supply chain. Companies dealing with postal services, transportation, logistics and telecommunications (transport and communication sectors) show higher propensities to the use of applications enabling the automatic detection of the status of delivery, though even here they are still quite small in absolute terms.

The size of enterprises is an important factor to take into account: use of e-supply chain management in large enterprises is about twice as much as that of SMEs. According to the "hub and spoke model"[62], large enterprises tend to be connected with their business partners, often SMEs, through common networks in which they represent the centre. According to this model, large enterprises have sufficient bargaining power to impose common business and technical standards to their partners[63] and often cover a share of the fixed investment

62 The model describes a value chain where a large enterprise (the hub) is dealing with several SMEs (spokes).

63 This is the case, in particular, of large manufactures and retailers.

Figure 4: **Electronic share of information along the supply chain (EU 2008)**



Source: Eurostat, Survey on ICT in enterprises (10+ employees).

needed to build up the network. Conversely, in supply chain markets where transactions take place among small enterprises, no actor can set a common standard and afford building the network architecture with a negative impact on the take up of solutions for process automation. Data weighted by enterprise size reveal that the impact of eBusiness solutions like supply chain management is larger than that suggested by un-weighted data: while 15% of enterprises are exchanging information with suppliers and/or customers electronically, these enterprises represent 30% of the economy in terms of persons employed.

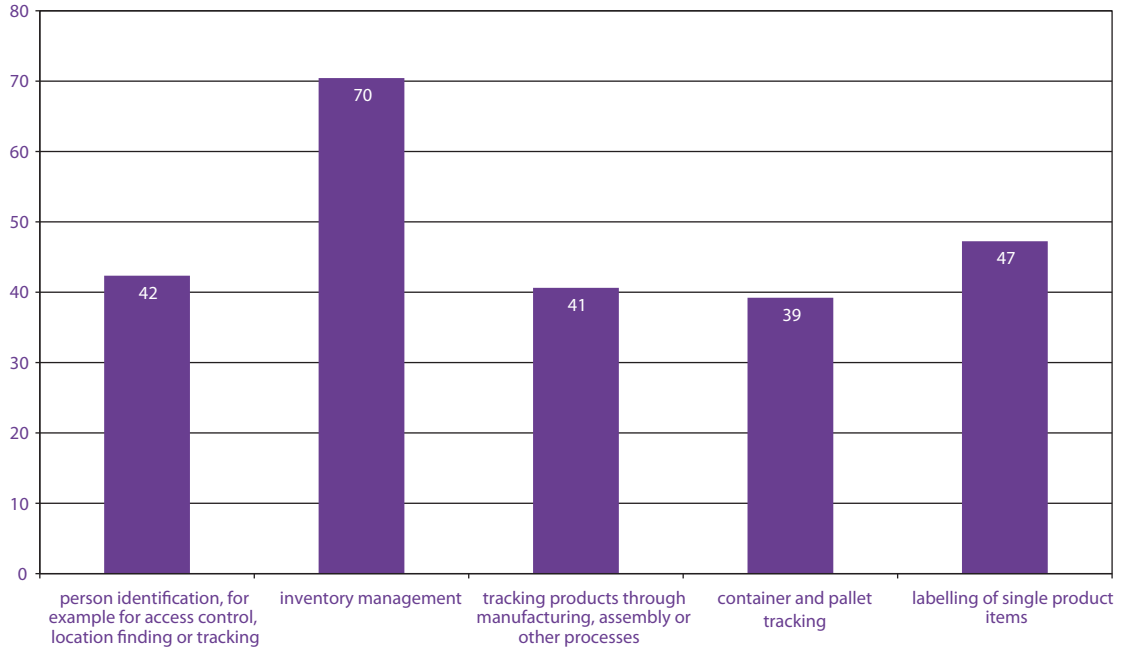
ICT is expected to provide further benefits to businesses through the diffusion of more recent technologies which are being increasingly deployed in the economy. In particular, RFID[64] applications are already used by a number of enterprises (Figure 5). This finding confirms RFID usage in logistics and freight transportation – from vehicle tracking to warehouse processes optimisation and reusable assets tracking – but also in passenger transportation, due to the increasing deployment of RFID in contact less smart cards for payments. Take-up is also high in retail trade (27%) and in manufacturing (25%). The reason behind these results is that process manufacturers are facing increased pressure from their retail customers, in tagging pallets or cases with RFID in order to improve supply chain processes. Finally take-up in hospitals is more limited (18%). In addition, the majority of respondents indicates that RFID is used for inventory management (enterprises comprising 70% of the workforce) while nearly half of the respondents showed usage or intended use of RFID for labelling single product items (47% of the workforce). Other key application areas include person identification, production tracking and container or pallet tracking (Figure 6). This evidence suggests that benefits from RFID can be expected in the area of the supply chain, including logistics, transportation and inventory optimization.

ICT benefits for businesses are normally expected to materialise through processes efficiency, innovation and market potential. Evidence shows that enterprises perceive ICT more as a tool for boosting productivity and reducing costs, rather than an instrument for increasing the number of reachable customers and the related turnover of the

Figure 5: **Use of RFID applications in 2007 in selected sectors and EU MS**
Enterprises comprising % of the workforce

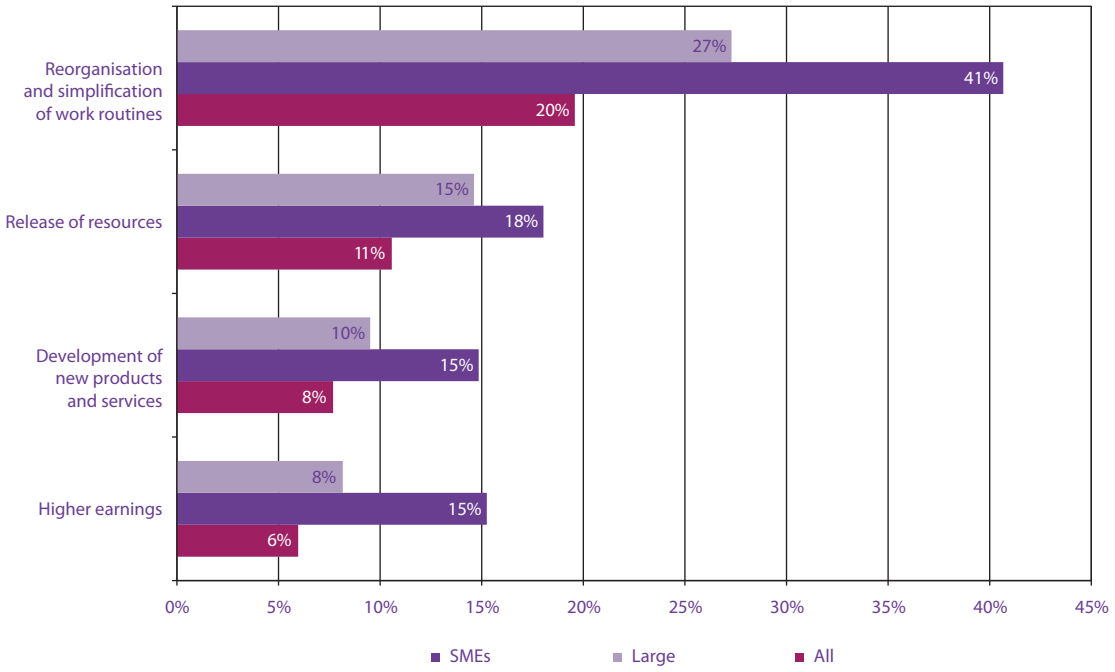
Source: eBusiness Watch 2007. The survey had a scope of 434 interviews conducted in 7 EU countries (France, Germany, Ireland, Italy, Poland, Spain and the UK) in September 2007.

Figure 6: **RFID application areas (in % of RFID using companies)**
Enterprises comprising % of the workforce



Source: eBusiness Watch 2007. The survey had a scope of 434 interviews ("total"), conducted in 7 EU countries (France, Germany, Ireland, Italy, Poland, Spain and the UK) in September 2007

Figure 7: **Perceived relevant benefits of ICT deployment (EU, in 2008)**
% of enterprises for which the listed benefits are relevant



Source: Eurostat, Survey on ICT in enterprises (10+ employees).

enterprises (Figure 7). This is consistent with findings on ICT take-up (Figure 3) which show that applications aiming at increasing the enterprise internal efficiency are more widespread with respect to those enabling eCommerce. Similarly, only a minority of businesses consider ICT an enabler for the rollout of new products/services. Finally, large enterprises tend to be more positive when assessing the impact of ICT with respect to SMEs.

Additional evidence on ICT impacts comes from the analysis based on empirical observation at enterprise level. A pilot Eurostat project covering some EU Member States[65] has come up with some initial evidence on the positive role of broadband connectivity on productivity, even if results are not fully consistent across countries and economic sectors. This seems also to confirm that the impact of ICT on productivity is not simply a matter of how much ICT a firm has, but also how ICT is used. In this respect, availability of ICT and eBusiness skills is a crucial factor.

6.3. The economic impact of ICT: theory and evidence

6.3.1. The impact of ICT on productivity and growth

In the context of the current economic and financial crisis, it is important to remember the central role played by the production and take up of ICT in driving innovation, productivity and growth[66]. Firstly, ICT-producing industries contribute directly to productivity and growth through their own rapid technological progress; secondly, ICT use improves the productivity of other factors of production (or inputs); and thirdly, there are 'spillover effects' on the rest of the economy as ICT diffusion leads to innovation and efficiency gains in other sectors.

65 DE, FR, IT UK, NL, SE, CZ, IE, AT

66 A detailed analysis of the issue was produced in the i2010 HLG note "The economic impact of ICT: evidence and questions" (2006), available at http://ec.europa.eu/information_society/eeurope/i2010/docs/high_level_group/note_on_economic_impact_of_ict.pdf

The development of the EUKLEMS database, supported by the 6th Framework Programme, has allowed a direct comparison of the divergent productivity experiences of the US and the EU and the identification of the contribution of ICT to such divergence. Labour productivity growth in the US accelerated from 1.2% in the period 1973-1995 to 2.3% in 1995-2006. Conversely, the 15 EU countries that constituted the Union until 2004 experienced a productivity growth slowdown between these two periods (from 2.4% to 1.5%). Most of the economic literature attributes these divergent trends to the slower emergence of the knowledge economy in Europe as opposed to the US.[67] The bulk of the EU productivity downturn is widely believed to stem from an outdated and inflexible industrial structure: with an excessive focus on low-medium technology industries, slow to adjust to the pressures of globalisation and of rapid technological change. This resistance to change contributed to the slow adoption of ICT and their integration into the business process in Europe.

In the mid-90s, the US experienced a productivity boost due to higher productivity originating from ICT-producing industries, as well as from a capital deepening effect due to investment in ICT assets throughout the economy. These changes were driven by the rapid pace of innovation in ICT, fuelled by the continuing fall in semiconductor prices. By contrast, the EU experienced lower productivity and growth contributions from investment in ICT and from ICT-producing industries (due to a smaller share of the ICT industry). However, the largest difference between the EU and the US, and for that matter between EU countries themselves, was due to the contribution of the overall efficiency of the production process. "Multifactor productivity growth" (which measures the joint influences on economic growth of technological change, efficiency improvements, returns to scale and other factors) accelerated from 0.5% to 1.4% in the US, while in the EU it fell from 0.9% to 0.3% . In particular, the US experienced more rapid productivity growth in market services, such as trade, finance and business services, than the EU.

Therefore, for Europe to increase its productivity potential, and benefit from ICT, it needs to find mechanisms to exploit service innovations for greater efficiency gains, and a new model of innovation and technological change, with greater emphasis on human capital, organisational change and other intangible investments, to make use of its own innovative capabilities. Further, a more flexible approach towards labour, product and capital markets would allow resources to flow to their most productive uses; structural reforms in the context of the renewed Lisbon agenda are already delivering on these aspects. Finally, the achievement of a truly single market is important in order to exploit competition benefits as well as economies of scale.

6.3.2. The impact of ICT on employment

There is wide consensus that ICT take-up, meaning business expenditure in hardware, software and electronic communications tends to translate into productivity growth both through a direct effect, due to the increase in the capital per worker ratio, and indirectly, thanks to efficiency improvements.

At the same time, in the political debate on the ICT impact on employment, one line of reasoning, which finds an echo in the general audience, stresses that technical progress allows firms to produce the same output with less input – and especially less labour – leading to "technological unemployment." This opinion, based on the assumption that the output of economies remains fixed over time, does not find support neither in economic history nor from a theoretical point of view and most of all it is contradicted by hundreds of years of economic history.

The recent Commission study (2008): "The Impact of ICT on employment"[68], clearly indicates that according to economic theory the long term impact of ICT diffusion on employment is likely to be negligible or even positive while a negative effect can be expected only in the very short run. In addition, the ICT effect on employment will depend on the specific features of the industry and the country considered, including the labour market legislation. Empirical evidence based on analysis of data at industry level in EU Member States, US and Japan[69] is

67 B. Van Ark, O'Mahony M. and Timmer M.P. (2008), "The productivity gap between Europe and the United States: Trends and causes", Journal of Economic Perspectives, vol. 22, No 1, pp 25-44.

68 Available at: http://preprod.europa.infso.cec.eu.int/information_society/eeurope/i2010/docs/benchmarking/impact_of_ict_on_employment.pdf

69 Data available within the EU KLEMS project.

in line with the theoretical considerations and does not support the hypothesis of a systematic positive or negative effect of ICT on employment in the long run. Econometric estimates of ICT impacts across countries and industries are highly dispersed around a small negative number and in most cases statistically not significant[70].

Hence, there is no evidence that ICT systematically influences the levels of overall employment across all countries and sectors. Rather, this impact will depend on the particularities of the country or sector, including the supply of labour.

6.4. Conclusions

ICT take-up by European businesses over the period 2005 and 2008 shows a mixed picture. Significant progress has been made in connectivity, e-banking and the uptake of online public services, reflecting efforts made by the public sector with regard to electronic public services. Less progress has been made in the area of eCommerce.

Evidence on the take-up of advanced solutions aimed at supporting enterprises' business processes shows that use of ICT for the automation of internal business processes through the automatic exchange of information and for the management of human resources is quite common, especially among large enterprises. But eBusiness applications enabling the automatic link with business partners, including those automating the supply chain and the transmission of invoices, are still used by a minority of EU enterprises.

A weak take-up of ICT solution which enhances efficiency standards, in particular by SMEs, raises concerns in terms of productivity impacts. Policy efforts in terms of awareness raising and facilitating access to ICT solutions should be intensified, while the spread of wireless solutions is a clear promise for future productivity gains.

70 ICT impact is measured as the ratio between ICT investments and output (ICT/Y). A coefficient of one means that, by increasing ICT by 1%, employment would increase by 1% too.

7 Developments in national ICT policies[71]

One of the major successes of i2010 is that it has lead to the mainstreaming of ICT policies. Member States have increasingly recognised the importance of ICT for productivity and growth throughout the economy and the potential it has for enabling the achievement of a broad variety of socio-economic objectives. As such they have integrated policies on ICT in to many other policies and more and more Member States have formulated integrated national ICT strategies in order to try to maximise the benefits of ICT in their economies.

7.1. Overview of main ICT policy priorities and developments across Member States

Member States with national ICT strategies include Bulgaria ('Programme for the Development of Information Technologies'), Cyprus ('National Strategy for the Information Society'), Estonia ('Estonian Information Society Strategy 2013'), Finland ('A renewing, human-centric and competitive Finland. The National Knowledge Society Strategy for 2007-2015'), France ('Plan Numerique'), Greece ('Digital Strategy'), Ireland (a 'National Knowledge Society Strategy' is in preparation), Malta ('Smart Island National ICT Strategy 2008-2010'), Poland ('Strategy for Information Society development till 2013'), Portugal ('Connecting Portugal'), Slovenia ('Strategy for the Development of the Information Society in the Republic of Slovenia (si2010)'), Spain (the 'AVANZA plan'), and the UK ('Digital Britain').

Many of these strategies follow or have similar goals to that of the i2010 initiative. Box 1 provides an overview of Member States' strategies.

BOX 1: AN OVERVIEW OF EU MEMBER STATES NATIONAL ICT STRATEGIES

A total of thirteen EU Member States currently have or are setting up integrated national ICT strategies. This box gives a brief overview of these strategies.

In **Bulgaria**, "in the third quarter of 2008 proposals for the adoption of two programmes with a three-year term of operation were elaborated: a national Programme for the Development of Information technologies and a national Programme for the Development of Broadband access. They are aimed at systematising the efforts

71 This chapter has been written on the basis of Member States own information derived primarily from their National Reform Programmes and/or ICT strategy documents.

and providing for adequate conditions for accelerated convergence with the advanced in this regard in the EU." (Republic of Bulgaria NRP 2008-2010)

Cyprus is developing an integrated National Strategy for the Information Society, the main target of which would be to exploit the opportunities provided by Information and Communication Technologies for improving competitiveness of all sectors of economic activity. For this objective the following measures will be promoted: appointment of a Commissioner for Information Society; creating an appropriate institutional and regulatory framework for executing various activities via internet; improving conditions of safe access and safe transactions via internet; changing the way of thinking and culture of the population and introducing both ICT and internet into everyday life; and expanding the coverage of broadband networks in rural areas to allow all citizens to have access from their homes to all services offered online. (NRP 2008)

The "**Estonian** Information Society Strategy 2013" covers the period from 2007-2013 the objectives are the following: that each member of society leads a full life, using the opportunities of the information society in every possible way and actively participating in public life ("nobody will stay or will be left behind"); Estonia's economic growth is based on the wide use of ICT solutions; and public sector is citizen-centred, transparent and efficient. (Estonian Information Society Strategy 2013 (2006))

France's national strategy has the goal of making it one of the best ICT countries by 2012, by providing 100% coverage of fixed and mobile broadband and introducing digital television. The plan rests on four priorities: (1) to provide access of the whole population to the internet and digital services, (2) to develop the production and supply of digital content, (3) to increase and diversify usage and digital services within enterprises, administrations and households, and (4) to modernise the governance of the digital economy.

"The aim of **Finland**'s information society policy is to increase the user-friendliness of services and the competitiveness and productivity of companies, and to promote regional and social equality. In terms of information society development, the key measures will be directed towards developing the following: information society infrastructure; the innovation environment and markets; content and services; expertise and preparedness. The public sector structures will be revamped and provision of electronic public services will be increased. In transport, the opportunities offered by telematics will continue to be exploited more widely and effectively." (NRP 2008, p63).

The **Greek** 'Digital Strategy 2006-2013' aims to perform a "Digital Leap to Productivity and Quality of life". The strategy comprises two main objectives: enhanced business productivity through the use of ICT and new skills; and improved quality of life through ICT. These two strategic objectives are further decomposed into six sub objectives: to boost ICT uptake by businesses; offer a large number of digital services to businesses; support the ICT sector as a pillar of the Greek economy; improve citizen welfare through ICT; and develop e-services for the citizen. (The Greek Digital Strategy, Ministry of Economy and Finance, Special Secretariat for Digital planning).

Ireland is developing a 'National Knowledge Society Strategy' focused on the development of its knowledge economy in order to help accelerate the development of knowledge-intense areas such as: digital traded services; eLearning products and services; and clinical trail infrastructure. More generally the Strategy will bring together the various actions and supports which will result in Ireland having the ability to develop, produce, licence and export products and services based on knowledge-intense ideas.

The 'Smart Island National ICT Strategy 2008-2010' aims to set a vision for **Malta** to become one of the top 10 information societies in the world. The main objectives of which are to: prepare Malta for the next generation of technology by laying the foundations for a world class infrastructure; overcoming the last mile of the digital divide and making ICT a social equaliser; developing a smart workforce by investing in people and nurturing

their skills and potential; using IST to improve quality of life; re-inventing government by transforming public service delivery and governance; enhancing the productivity of the private sector and its competitiveness through the adoption of eBusiness; and promoting Malta as an ICT hub for FDI whilst using ICT as a pillar for economic growth. (Malta NRP, p82).

Poland's current digital strategy is the 'Computerization Plan for Poland in 2007-2010'. A new strategy is also being formulated for the period up to 2013: 'Strategy for Information Society Development till 2013'. Together, these two strategies will be used to accomplish the following: Counteracting digital exclusion through financing access to the internet for people of low incomes; and widening access to the internet through supporting micro-, small and medium entrepreneurs intending to provide this service in the regions where this kind of business operation is not profitable.

In **Portugal**, the 'Connecting Portugal' programme, launched in 2005, will continue to be implemented giving special priority in the 2009-2010 period to R&D activities in the area of information and communication technologies and to eScience instruments; this includes the high performance network for research and education, digital scientific libraries, the opening access information and scientific data stores and the Grid computing super computing and the work platforms for distance research.

Slovenia has developed a 'Strategy for the Development of the Information Society in the Republic of Slovenia (si2010)', which constitutes a framework for the political direction to be taken towards developing an information society in Slovenia and, in terms of its structure, follows the European i2010 initiative. The purpose of this Strategy is, with the aid of efficient deployment of information and communications technologies, to promote competitiveness and productivity, ensure balanced social and regional development, and improve the quality of life of society as a whole and of each individual. The main objective of the Strategy is to promote further the development of the information society, which will have a considerable impact on increasing efficiency and innovation in the Slovenian economy and society. Furthermore, it will result in an increase in the number of jobs with a high added value, an improved quality of life and more balanced regional development. (Slovenia, NRP, 2008-2010)

In **Spain**, the 'Avanza Plan' has the objective of convergence with the European Union in the field of Information Society. The plan comprises a series of specific programmes focused on citizens, companies, the digital context, digital public services and eAdministration. Also since the end of 2008, the implementation of the 'AvanzaDos Plan' has begun with new strategic lines for developing the information society for the period up to 2012. In view of problems finding locations for mobile telephony antennas, one of the plan's proposals within the framework of boosting infrastructure is to reward local governments that do allow the antennas, thus contributing to improved coverage.

Finally, in the **United Kingdom**, the recent 'Digital Britain' report sets out the next steps of the British government to maximise the economic and social opportunities of ICT, with four action points: to assist the private sector in delivering an effective modern communications infrastructure, including a universal service commitment to ensure access to 2Mbit/s broadband services by 2012, and proposals to assist the development of next generation broadband to those areas that will not benefit from commercial deployments; to enable Britain to be a global centre for the creative industries in the digital age, including public service content, within a clear and fair legal framework; to ensure that people have the capabilities and skills to flourish in the digital economy, and that all can participate in digital society; and actions to modernise and improve its service to the taxpayer through digital procurement and the digital delivery of public services.

Table 1: **Ranking of policies and MS engaged in them**

1.	Infrastructure and Broadband diffusion:	AT, BE, BU, CY, CZ, DE, DK, EST, FI, FR, EL, ES, HG, IE, LT, LI, LU, MT, NL, PL, RO, SI, SK
2.	eGovernment:	AT, CY, CZ, DE, DK, EST, FI, FR, EL, ES, IT, LT, MT, NL, PL, RO, SI, SK, UK
3.	eLearning/ICT in Schools	BE, BU, CY, EST, FI, FR, IE, EL, ES, LT, MT, NL, SI,
4.	eSecurity	AT, CY, FI, FR, EL, ES, LT, LI, LU, SK
5.	eScience and ICT R&D and Innovation	BE, BU, CZ, DE, FR, ES, LU, PL
6.	eInclusion/digital literacy	BU, EL, ES, HU, MT, RO, SK
7.	eHealth	CY, CZ, EST, EL, ES, PL, SI
8.	Encouraging use of ICT	BE, FR, EL, RO, SI, MT
9.	eCommerce and eBusiness	BE, CY, EL, ES,
10.	eJustice:	CZ, ES, PL, SI
11.	Green ICT:	DK, IE and LU
12.	Harmful content/protection of minors	FI

Source: Screen Digest 2009

Whether Member States have an integrated national ICT strategy or not, the types of ICT initiatives employed are often similar across countries. Though, their depth and complexity differs, to some extent, depending upon their state of ICT advancement, both generally and within specific areas.

Priority areas include, in particular, the diffusion of Broadband infrastructure and ICT equipment, the encouragement and promotion of internet/ICT use, the development of digital skills (eLiteracy), the implementation of ICTs within government and for the provision of government services (eGovernment), the digitalisation of the legal system (eJustice) and of health services (eHealth), and the integration of ICT into the education system (eLearning and eScience). In addition to these generally prioritised areas, some Member States also put emphasis on areas such as encouragement of eCommerce and eBusiness, ICT R&D, eSecurity and Green ICT. Table 1 shows the ranking of these policies and the Member States involved in them.

7.2. Specific ICT policies

Countries' ICT policies can be broadly grouped into three main types of policies. The first covers policies devoted to infrastructure deployment, the second covers encouragement of use and digital literacy, and the third relates to policies in the area of ePublic services.

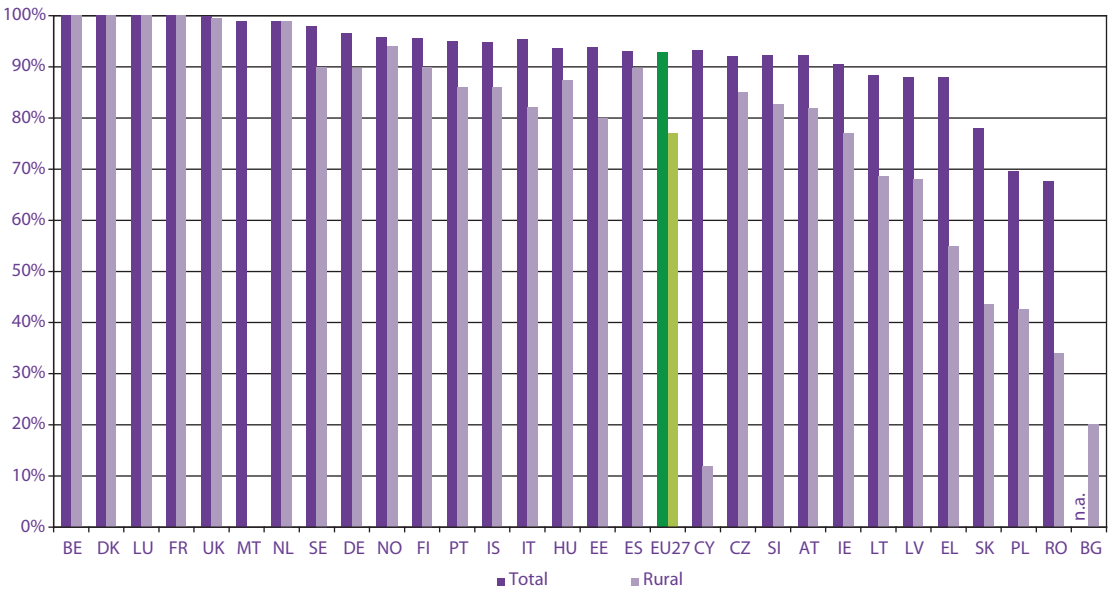
7.2.1. Infrastructure deployment: fixed and mobile broadband diffusion

All EU Member States put an emphasis on policies to increase the coverage of broadband throughout their economies. In particular, an increasing number of countries have now set targets for broadband coverage of the population; a large number of which are set at 100%.

Countries with *100% broadband targets* include Austria, Germany, France (fixed and mobile by 2012, already 98%), Hungary (end 2010) Ireland (2010), Latvia (2010) and Slovenia (2010). The United Kingdom proposed a commitment to universal service. In addition, coverage is approaching 100% in Belgium (100%), Denmark (100%), Luxemburg (100%), the United Kingdom (100%), Malta (99%), the Netherlands (99%, and investing in 100% fibre optic networks), France (99%) and Sweden (98%). In Greece a target has been set of 60% coverage by 2009 and in Latvia 98% by the end of 2010. Policies are increasingly focused on closing the gaps in rural areas, where provision of infrastructure by the market is not profitable.

With regard to increasing the availability of *broadband in schools* many Member States have dedicated policies.

Figure 1: **Coverage of DSL networks as % of population, December 2008**



Source: IDATE

In Belgium, a project called 'Cyberclasses' was initiated in 2008 to equip all schools in the French speaking community with computers, servers and broadband (ADSL) within two years.[72] Other Member States with policies to implement and/or upgrade ICT infrastructure in schools include Cyprus, Estonia, France, Greece, Spain, Ireland, Latvia, Malta, the Netherlands and the United Kingdom. Slovakia plans a policy in this area.

A number of Member States are also making efforts to increase the *coverage of wireless networks*, particularly in urban regions, for example with the implementation of wireless hotspots (RO and EL). Indeed in Finland, wireless broadband coverage is expected to be available to the whole population by the end of 2009. In Greece, special emphasis is being put on the development of WiMax and satellite internet combined with WiFi, in order for wireless technologies to cover as many areas as possible (and notably hard-to-access and remote areas) and ensure fully reliable connections; higher speeds and lower costs for users/consumers.

Policies are also being implemented to extend the coverage of *mobile services*. In this regard, some countries (FR, LU, EL, ES, IE, FI, SE, DK, UK and SI) have introduced or are introducing regulations/strategies designed at the reorganisation of their radio spectrum in order to increase the efficiency of its use, either to make the way for mobile digital television and/or to allow for the further development of broadband. Some countries, such as Spain, have actively encouraged the diffusion of mobile telephony antennas by rewarding local authorities which allow them in their areas. Some countries are also working on very high speed access via mobile (FR). In Sweden, 99% of the population was already covered by mobile networks in 2007.

A number of Member States are also investing in *fibre-optic networks* for very high speed access. While in some countries these network investments are limited to the scientific community, in others they are intended for more general use by the population. France has implemented a strategy in this regard with the goal of achieving 4 million users by 2012 and developing very high speed mobile. Lithuania has built networks in the main urban regions. The Netherlands has committed itself to 100% fibre optic networks. Finland has also set the goal of making high-speed broadband available to the whole population by 2015. Luxemburg is also investing in such networks. Slovenia states its intentions to develop fibre optic networks. In Greece, in September 2008, a project for developing Next Generation Networks based on fibre optic technologies for the establishment of an open access network providing high speed connections (100 Mbps

72 In 2004, 84 % of the Dutch speaking schools disposed of a broadband connection.

minimum) was presented, thus, allowing for the gradual interconnection of more than 1.5 million residences.

Other infrastructure projects include the setting up of *public access points* in some Member States (e.g. in HU (rural and socially disadvantaged), LV (rural areas), LT and RO) and projects designed to increase the ICT capacity of the scientific community (eScience), such as investments in the building of supercomputer centres in a number of Member States (BE, BU and DE).

7.2.2. Encouraging the use of ICT/broadband, eInclusion and digital literacy

In addition to the actual provision of infrastructure, Member States are implementing a range of policies designed at increasing the up-take and use of broadband and ICT more generally by various sections of society.

Member States believe that an important way to encourage a general increase in the take-up of broadband is through the encouragement of *competition* (BE, CZ, DE, EL, FR, PL, SI, SE and the UK).

Further to promoting competition in telecoms, a number of Member States have put policies in place focused on increasing the use of ICT by improving the *digital literacy* of the population. Many of these programmes are in the area of eLearning[73], focused on improving the ICT skills of students and teachers (BU, CY, EE, FI, EL, IE, LV, MT). However, some programmes are aimed at the general public, improving the skills of the workforce (BU, EE, ES, MT) and/or that of the scientific community.

With regard to the general public, in Belgium, the action 'Internet pour tous' (internet for everyone) was carried out over the period 2006-2007 to encourage the use of broadband. The action provided a packet including broadband access, a computer and attending a training course with subsequent VAT reimbursement. Hungary's 'Digital Literacy Action Plan (2008-2010)' has the objective of reducing the country's proportion of 'digitally illiterate' (measured by the proportion of the population that does not use the internet regularly) from 51% (2007) to 33% by 2010. In 2008, the rate was 44%. The plan is based on two pillars: reducing cognitive barriers and strengthening motivation; and developing skills. The plan will be evaluated and where necessary fine-tuned at the end of 2008 and 2009. Its implementation is intended as a response to the EU e-Inclusion and e-Skills initiatives.

Member States are also carrying out initiatives to *promote ICT awareness and use*. In Malta for example there are a number of initiatives specifically designed at promoting ICT use to disadvantaged groups, including the unemployed and inactive, the disabled and women. They include the 'Smart Start' initiative, designed to help the unemployed, those on social benefit, the disabled and non-profit organisations to purchase a PC in good working order. The 'Blue Skies Scheme' which provides households without an internet connection with a connection at a cheaper rate, 'Smart women' which provides ICT training to women. 'Star Office' provides office software cheaply to students and the disabled. There is also an ICT awareness campaign aimed at attracting students.

A number of countries are also encouraging the *use of ICT by SMEs* (BE, CZ, ES, and HU). In Belgium, l'Agence Wallone de Telécommunications (AWT) has developed an awareness raising strategy aimed at encouraging the use of ICT in SMEs.

In the Czech Republic, the 'Operational Programme Enterprise and Innovation' is designed to foster the development of SMEs which plan to invest in information and communication technologies; through making use of EU funds. The programme 'ICT in Enterprises' provides support to entities that are planning to upgrade their information systems to increase the effectiveness of their internal operations (e.g. production, ordering or stock control) and improve their external relations (with customers, suppliers or public administration bodies etc.). In addition, the programme 'ICT and Strategic Services' is designed for firms who decide to purchase or construct a building and employ developers and programmers with the aim to develop or upgrade ICT products and services.

In Spain, the government signed 39 agreements with the Autonomous Communities in 2006-2007 to encourage eCommerce, in particular electronic invoicing. These agreements mobilised 87.8 million euros in funding, half of which came from the Central Government.

Finally, as part of its e-Economy Action Plan, Hungary has set up an SME training and motivation programme. The programme includes a series of actions designed

73 Policies in the area of eLearning are discussed in more detail under the relevant section of the discussion on ePublic services.

to strengthen the digital maturity of SMEs and remove barriers to ICT introduction and use. On the one hand, the aim is to train SME owners and executives, increase their demand for ICT equipment and services and raise awareness of the importance of ICT. On the other hand, it aims at implementing organisational structural changes and management developments to promote the wider scope use of ICT equipment by SME owners and executives. Trainings to be held within the framework of the action aim to encourage company executives to invest in ICT equipment by demonstrating how company processes can be upgraded by using this type of equipment. The training will also provide information on available financial sources, since according to surveys (e.g. eBusiness W@tch), the lack of the latter largely constrains the development of the ICT-related physical infrastructure in enterprises.

7.2.3. Online public services

The area of ePublic services broadly includes policies in the areas of eGovernment, eHealth, eJustice and eLearning.

All Member States are active in the implementation of policies in the area of *eGovernment* and the i2010 eGovernment Action Plan, which was approved by the Council of Ministers in June 2006 and has already concrete impact throughout Europe. Within national governments, common policies include the expansion of office automation, the digitalisation of public administration, the networking of national governmental departments as well as between central and local authorities and the implementation of electronic public procurement (eProcurement). eProcurement was identified as a particularly important "high impact service". In this respect, Governments are following up the i2010 eGovernment Action Plan's objective to reach 100% availability and 50% effective use of eProcurement by 2010. Member States are currently working on large scale pan-European pilot projects on electronic public procurement and the authentication of electronic identities in order to combat risks of fragmentation of the internal market due lack of interoperability of information and communication technologies. This is the first step to better cooperation between administrations, also beyond national borders.

With regard to the provision of public services, and communication between government and the general public, many Member States have set up or are setting up 'one-stop-shops' for citizens and businesses and points of single contact for businesses, , in line with the requirements of the EU's Services Directive. Many Member States are also implementing electronic company registration and provisions for online submission of tax declarations. In some countries, they are introducing systems of data repositories for communication between individuals and companies and state bodies. Finally, the majority of Member States have policies for the implementation of eParticipation in place and are supporting disadvantaged groups to get online and making public websites more accessible and user friendly to this end.

Many of the above mentioned policies are being implemented as part of a package of measures designed at achieving efficiency gains, reducing administrative burden and cutting 'red tape'. In particular, the move to electronic registration of companies is, in many cases, seen as a way of encouraging entrepreneurship (by reducing the time it takes to set up a business), making company information available to citizens across the EU and, therefore, meeting commitments made in this regard.

At the same time as developing eGovernment, Member States have also been working on improving the conditions for electronic communications between governments and citizens, businesses and the government through the development and promotion of electronic identification (eID) and electronic signatures. Austria, one of the European leaders in eGovernment, emphasises in particular eSecurity (Box 2).

In their National Reform Plans (NRP's), a number of Member States report on the policies they are implementing in the area of *eHealth* (CY, CZ, EE, EL, ES, PL and SI). The range of activities includes equipping hospitals with new computers (ES), developing national health information systems (CY, EE, EL and PL), setting up web portals for public access to medical services such as managing hospital visits online (CY and PL), development of digital prescriptions (EE and ES), electronic health cards (EL) and setting up of electronic medical files (EL and ES). In addition, Greece is implementing an eHealth action plan also covering a number of initiatives related to tele-medicine.

A number of countries have also introduced policies in the area of *eJustice* (AT, CZ, ES, FR, PL, SI). These policies also include introduction of computers, digitalisation of records and the setting up of eCourts.

BOX 2: ESECURITY IN AUSTRIA

In Austria, since January 2008, the social security eCard can be registered over the internet as a 'Bürgerkarte' and authenticated for the purposes of electronic signature. This was made possible through a simplification of the 'Signaturgesetz' (the law governing signatures), which took place together with a number of other legal changes introduced to enable the development of eGovernment. These changes also made it possible to use the card for private transaction authentication with for example banks and insurance companies, providing customers with protection against 'Phishing'. In addition to electronic identification and signature, the card can also be used for encryption for the transmission of sensitive data.

Further to the 'Bürgerkarte' a new software programme has been developed for the creation of signature of PDF documents. The authentication of signatures on electronic documents can be verified via a dedicated website (www.buergerkarte.at/signature-verification/). It is hoped that these tools will encourage the electronic sending of invoices, an area in which is believed will deliver significant efficiency and cost savings.

Further developments in the area of eSecurity include the introduction of electronic proxies, development of recorded electronic delivery of documents and dual document delivery (electronic and paper), and the development of an eSecurity handbook.

Programmes in the area of *eLearning* include 'Cyberclasses' in Belgium (mentioned above). In Cyprus promotion of eLearning includes increasing the number of computers and their connection to the internet, interconnecting schools via Intranet, developing an electronic system providing parents with information on their child's performance and attendance etc. and providing continuous training to teachers in IT technologies and new analytical programmes. Estonia's eLearning programme focuses on developing learning software, updating study methods, complementing hardware and improving teacher qualifications in the use of eLearning. In Finland, a project started in 2008 on the 'Utilisation of Information and Communication Technology in Education and Study' will develop a new electronic learning environment by 2010. In addition to the goal of 100% coverage of educational institutions with broadband, the French eLearning policy is developing a services portal which will allow all members of the education community simple and secure access to all content and services adapted to their needs, as well as to digital resources, communication services and services for collective/collaborative work. From 2010, universities will be obliged to use electronic homework books and schools will have to move to paperless internal communication. Further, a number of projects will be introduced which require broadband access, for example the project targeted at learning of languages via video conference with native speakers.

In Greece, a number of projects continue to be run to increase the digital literacy and use of students. They include projects to encourage access to broadband ('DIODOS'), to subsidise the purchase of laptops for top ranking first year students ('See your life digitally'), a pilot project (starting in 2009) to provide specially designed laptops to school pupils aimed at getting them acquainted with new technologies early on ('A laptop per student'), and certified training courses for top student ('e-ducate') [Also 'Organic.Edunet' (eContent) and 'EDET' (research network: ICT R&D)].

In Spain, the Avanza Plan has provided IT equipment in almost 9,000 schools, benefiting 2.5 million students (around 45% of the student population). Also, the 'Networked Campus Programme' provides public universities with wireless internet. The 'Latvian Educational System Informatization Programme for 2007-2013' envisages the establishment of an educational information system, teacher training in the use of ICT, development of electronic education materials, establishment of an interactive portal for teachers and parents, computerization of schools and libraries and a number of other measures to improve the quality of education. Malta's eLearning Strategy also focuses on infrastructure in schools, teachers' and students' skills and resources, including actions to provide teachers with laptops, introduce high speed internet, setting up an eLearning platform, training teachers, and developing

web-based learning resources. The Netherlands and Slovenia are also implementing similar actions in the area of eLearning.

7.2.4. Other policies

Other ICT policy areas in which some Member States have been active include ICT R&D (ES, EL, BU and PT), Green ICT (DK, IE and LU), harmful content/protection of minors (FI) and Quality of life/flexible working arrangements/teleworking (EE).

7.3. Conclusions

The information provided by National authorities in their National Reform Programmes shows that Member States across the EU have recognised the important role played by ICTs in our modern Knowledge-based societies. ICT policies have come to the forefront of national policy making, being integrated into many different areas of policy and increasingly formulated as part of larger-scale national ICT strategies with similar objectives to that of the i2010 initiative. Policies have largely been focused in three main areas: infrastructure provision to achieve complete coverage of the population, in particular in relation to broadband; policies encouraging take-up and use of ICT and acquisition of digital skills; and provision of ePublic services.

Going forward national ICT policies need to build on the achievements of the past, both at a national level as well as by learning from best practices internationally. However, they also need to tackle ongoing problem areas as well as venture into new territory.

Information and communication technology is a key driver of economic growth and social change. A wealth of evidence shows that ICT is an important source of productivity, innovation and growth, increasing our competitiveness, creating jobs and driving globalisation, while at the same time presenting us with new instruments with which to tackle a number of our societal challenges such as climate change, energy efficiency and an ageing population. As such, ICT is at the very heart of the Lisbon strategy and essential to its success.

In times of economic and financial crisis, it is important that this key role of ICT is not forgotten. Investments in ICT are 'smart' investments; helping to create and maintain jobs and growth now, and emerge from the crisis stronger and more quickly, while at the same time creating the basis for sustainable growth and jobs in the future. In the short term, ICT investments support employment in ICT-related sectors. In the longer term, they increase efficiency, lead to innovation and make the whole economy more competitive.

In the current economic situation, pressure on national budgets and private financing may slow down the rate of planned ICT investment. Community funding can contribute to support public investment. Under Cohesion Policy programmes, €15.2 billions are foreseen for investment in ICT in the period 2007-13. These programmes should be accelerated to give a timely boost to public ICT investment at the national, regional and local level.

If we are serious about the Lisbon ambition for a "dynamic, knowledge-based society" , we must invest (at least) as much in the information highways of the future – a smart grid, broadband for all and better health care – as we do in more traditional infrastructure. The crucial role of ICT for economic recovery has been recognised in the European Economic Recovery package, which foresees up to 1.02 billion in EU funds for investment in broadband networks. In basing the recovery on ICT and innovation, we are also presented with the opportunity to restructure the economy towards a more sustainable future, by reducing our environmental impact, increasing our energy efficiency and creating a more inclusive society.

8 The impact of the economic **downturn** on the **ICT sector**

In the second half of 2008, the dramatic worsening of the financial crisis led to severe disruptions in credit intermediation and a significant fall in consumer and business confidence. As the financial crisis intensified last autumn, economic indicators deteriorated and global economic activity fell sharply during the last quarter of 2008, with historical drops in trade and production. The economic outlook remains uncertain as the world faces its worst crisis since the Second World War. The crisis has important repercussion on the European economy.

According to the Commission's Spring forecast (4 May 2009) GDP growth in the EU and the euro area dropped below 1% in 2008 (down from just under 3% in 2007). In 2009, real GDP is expected to fall by 4% (See Annex). The downturn is projected to be broad based, with almost all Member States expected to post negative growth rates this year. GDP growth should stabilise somewhat in 2010 but remain slightly negative, at -0.1% both in the EU and in the euro area. Inflation is expected to continue to fall rapidly this year, entering negative territory for a few months in the middle of the year. Unemployment in the EU will soar to 9.4% in 2009 and 10.9% in 2010; and in the euro area to 9.9% and 11.5%, respectively (see Annex). Budget deficits and debts will also rise sharply.

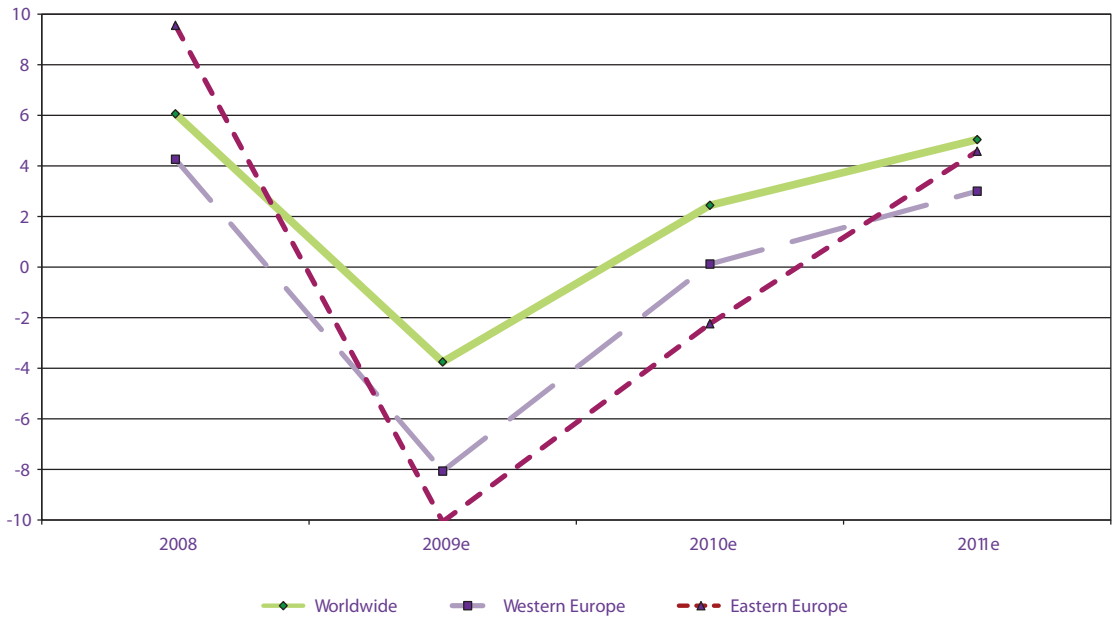
This chapter provides an overview of the impact the crisis is having on the ICT sector on the basis of recent updates of leading consulting analysts.[74]

8.1. The impact of the crisis on the ICT sector

Latest data on the ICT sector in Europe available from Gartner (March 2009) shows that the economic crisis is having a major impact on the ICT sector in Europe. While in December the sector seemed to be holding up quite well compared to other sectors, latest forecasts project a strong downturn. In Western Europe, total end-user spending on ICT is now expected to fall 8% in 2009 and to remain flat in 2010 before increasing to 3 percent in 2011. In Eastern Europe, the situation is expected to be worse, with a 10% decline in 2009 and a 2% decline in 2010. In 2011, spending is projected to increase by 4%. While the downturn is expected to have a significant impact on all segments, some sectors (manufacturing) will be more strongly hit than others (software).

74 As changes are taking place rapidly, current forecasts are being frequently updated and include a high element of uncertainty about the length and the severity of the economic downturn. Thus, estimates provided in what follows should be treated with caution.

Figure 1: **End-user spending on ICT by Region (% change on previous year)**



Source: Gartner (March 09)

8.1.1. Consumer goods and services

According to Gartner (March 2009), worldwide spending in computer hardware is expected to fall sharply in 2009 (-15%), revising its December 2008 forecast (-5%). A 1% rebound of the same market is expected in 2010. The forecast is however gloomier for Europe. While in Western Europe the computer hardware market is also expected to shrink by 15% in 2009, the recovery is expected to come later. The market is expected to continue contracting in 2010 before recovering modestly in 2010. In Eastern Europe, the outlook is substantially worse. Sales are expected to contract 27% this year and will only start to recover in 2011.

Problems in the personal computer business have increased the likelihood that 2009 will bring the first decline in PC sales[75], showing that corporate buyers in particular are cutting back, and low-priced machines could replace sales of traditional laptops. Negative expectations are also reflected in the sentiment of the European IT hardware producers. In November 2008, the confidence indicator[76] for the European computer industries[77] was at its worst level in more than 20 years and the situation was confirmed in December (latest available data), with likely layoffs to accommodate the impact of weaker demand on balance sheets.

The impact of the current economic downturn should be less severe on world demand for software. According to Gartner (March 2009), global software spending should stagnate in 2009 (0% growth). Never-the-less, this is a clear slowdown from the 7% that was still expected in December 2008. A return to growth of 5% is forecast already for 2010. In Europe, the software segment is expected to fare worse than at the global level, especially in Western Europe. Spending is expected to decline by 6% and 4% in Western and Eastern Europe, respectively, in 2009. In 2010, however, software sales are expected to show a marked recovery, recording growth rates of 4% and 6%, respectively.

75 FT, 9.2.2009: http://www.ft.com/cms/s/0/855ae2ce-f648-11dd-a9ed-0000779fd2ac.html

76 http://ec.europa.eu/economy_finance/db_indicators/db_indicators8650_en.htm. It includes: assessment of order-book levels, assessment of stocks of finished products (negative sign), production expectations for the months ahead.

77 NACE 30: Computer and office machines. Seasonally adjusted values.

Global spending on IT services is forecast to contract 2% in 2009, down from 10% growth in 2008, but to rebound in 2010 with around 4% growth. In comparison, IT services are projected to decline 8% in Western Europe and 3% Eastern Europe in 2009. However, here too, a recovery is expected in 2010 with growth of 3% and 7% projected, respectively, for the two regions.

The combined expectations for software and IT services markets suggests that businesses will keep on spending to keep their information systems running, but may tend to postpone new projects. Nevertheless, increased pressure on profitability might push businesses to invest in solutions leading to better process efficiency. Furthermore, regulation in the financial sector is expected to have a positive impact on demand for software.

In 2008, the European telecom service sector continued to grow (1.3% in real terms, 0.5% in nominal terms), and investment was still on the rise (about 52 billion euros). The telecom services sector is not as profitable as it was in previous years but is withstanding the deterioration in the economic climate better than other sectors thanks to the stability of its cash flow (due to the essential nature of basic telecom services, increasingly offered at flat rates) as well as to relatively low debt levels. Many consumers now consider communications services (fixed and mobile voice and broadband access) along with other utilities such as electricity, natural gas, water or sewage that cannot be easily dropped from consumption habits.

The economic deterioration in 2009 however is expected to put further downward pressure on investment and consumer spending with the risk of postponing the launch and the take-up of new and innovative services. A contraction in revenues in 2009 is however to be expected. According to Gartner (March 2008) growth in consumption of telecom services is forecast to decline in Western and Eastern Europe in 2009 (-6% in both regions) and to continue declining in 2010, though at a slower rate. A return to positive growth is projected in 2011.

The decline was already evident in 2007, driven by the maturity of some markets. In 2008, before the crisis unfolded, operators were looking for improvements in average revenue per user through deployment of new services, cuts in operational expenditure by means of next generation networks deployment, and investment in dynamic economies in Eastern Member States or in emerging economies like South America. In future, however, lower spending capacity by businesses and households may slow the adoption of new services (as consumers rationalize spending plans to focus on core telecom services) and make major operators focus on the less mature markets. The credit crunch and uncertainty in terms of take-up may delay investment in high-speed and mobile broadband. The evolution of the crisis in emerging economies is not helping the strengthening of the revenues generated outside Europe.

8.1.2. The internet segment

The economic crisis is also having an impact on firms in the internet sector, which is heavily US dominated. Growth in revenues of the major players declined continuously throughout 2008. However, the picture is somewhat fragmented – while some firms continue to post positive rates of growth others have moved into negative territory. In the retail segment, while Amazon still posted positive year-on-year growth in the first quarter of 2009 of 18% (nevertheless, down from 37% in Q1 2008), eBay had experienced a negative rate of -8% (down from 24% in the first quarter of 2008). Similarly, in the online advertising segment, Google reported 6% year-on-year growth in quarter 1 (down from 42% a year earlier), compared to negative growth of 13% for Yahoo (down from 9% in the first quarter of 2008).

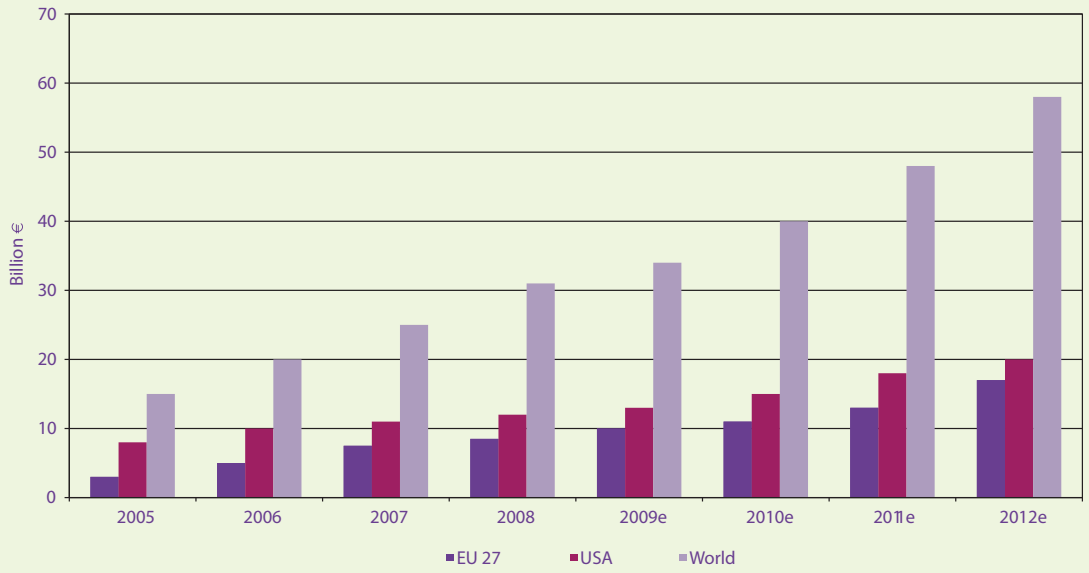
Business models in the internet sector are largely based on advertisement. Evidence is emerging that the online advertising market will actually benefit from the crisis, as it is acting as a catalyst for the transfer of advertising to the online market from more traditional forms of media (See Box 1).

BOX 1: THE IMPACT OF THE ECONOMIC CRISIS ON THE MARKET FOR ONLINE ADVERTISING

Online advertisement is the main source of revenues for internet companies. Thus the impact of the economic crisis on online advertising is of critical importance to the future of this sector. As marketing spending is one

of the first costs businesses cut when faced with a slowdown in sales, the crisis could be expected to have a particularly significant impact on the internet sector.

While advertising on traditional media has been severely hit by the global economic downturn, online advertising has kept growing, though at a slower pace than hitherto.



Source: Idate News 466 – 27 April 2009

According to IDATE, in 2009 the internet will likely be the medium to enjoy the greatest increase in ad spending, even if overall investments will be down, thanks to higher accountability and to innovative formats.

The global online advertising market had a net worth of €30.6 billion in 2008, and will climb to €58.8 billion in 2012 – accounting for 15% of advertisers' total spending.[1] The average growth rate increase between 2009 and 2012 would be 19.6%.

According to IAB Europe[2], online advertising in Europe was worth €11.2 billion in 2007 (a 40% increase from €7.2 billion in 2006). The European online advertising market is closing the gap with the US (€14.5 billion in the same period). The sectors spending the most in online advertising in 2007 were Entertainment & Leisure, Telecoms and Finance & Insurance.

Nevertheless, the decrease in the overall advertising market is not balanced by the increase in the online advertising market. According to recent forecasts[3], expenditure in general advertisement will decline by 6.9% in 2009.

The economic crisis could actually be beneficial for the web. As consumers are spending more time at home, consumption of the internet and media may increase. Moreover, search activities on the web are driving internet advertising growth as consumers are shifting from premium to value products and look for bargains.

1 IDATE News 466 – 27 April 2009

2 Interactive Advertising Bureau Europe, 2nd June 2008. Europe = AT, BE, DK, FI, FR, DE, EL, IT, NL, NO, PL, SL, ES, SE, TK, UK

3 ZenithOptimedia: 14 April 2009

Indeed, the reasons for the sustained growth of the online advertising market are: firstly, a growth in internet use (both in terms of time spent and total number of users); and secondly, the shift from advertisers from traditional media to the internet.

New forms of advertising such as viral marketing[4] in social networks or gamevertising[5] are taking full advantage of the interactive possibilities of the web and of digital content. Expenditure in advertising based on location through mobile devices is expected to increase with the development of mobile broadband.

Search and display are the most dynamic advertising segments. Most of the growth in internet advertising will come from search advertising (driven by companies like Google, Yahoo and Microsoft). Search marketing will represent half of the global online advertising market in 2009, or 17.2 billion EUR (53% of the market in 2012, generating an estimated 31.3 billion EUR).[6]

The display advertising internet category can be split into banner advertising and online video. While banner ads are getting increasingly commoditised, online video is growing through volume and premium rates. Revenues from display ads will go from 12.3 billion EUR in 2009 to 21.2 billion EUR in 2012 in the world. Display share of the global market will stabilise at around 36% thanks to the development of video advertising formats. Video ads are expected to be the online format with the strongest growth in the future.[7]

4 Marketing techniques applied to social networks and blogs that take full advantage of interactivity to increase to word-of-mouth with internet network effects.

5 Advertising in videogames.

6 IDATE News 466 – 27 April 2009

7 IDATE News 466 – 27 April 2009

Other success stories include Apple. Its year-on-year growth rate of revenues for Q1 2009 was 8.7%. However, this is down considerably from the 25% rate of growth recorded in Q4 2008. Apple is one of the companies monetising an open innovation model. As of April 2009, in the nine months since its launch, one billion applications were downloaded from "App Store", its internet based shop, half of them in the last quarter (with an estimated value of €149.5 million)[78]. App store sells five million applications through the web per day.

The reasons behind the success are the big supply coming from third-parties (Apple retains 30% of the revenues coming from these applications while the rest goes to the developer) and the simplicity of the interface. However, the company makes the bulk of its revenues from the sales of devices and not from the sale of content. It is interesting to note that the digital content (for instance videogames developed by third-parties) is being used as a tool to create value for the product. It is estimated that without the "App Store", Apple would have sold between 10% and 15% less iPhones.[79]

8.1.3. The ICT manufacturing sector

European manufacturers remain world leaders in the production of network equipment, with around 70% of the worldwide market, leveraging on their technological leadership and multinational presence. However, the rapid deterioration of the economic conditions since the last quarter of 2008 is reflected in estimates of expenditure in telecom equipment, both with regards to infrastructure equipment[80] and to mobile handsets. In March 2009

78 Needham & Co

79 Global Equities Research

80 Infrastructure equipment is divided into seven major segments: access, switching, routing, transport, business support systems, operations support systems and mobile infrastructure

Gartner estimated the year-on-year growth rate for the segment for 2009 at -6½% at the global level and at -9½% and -10% for Western and Eastern Europe respectively. This represents a significant downward revision from the still positive rates of growth forecast for 2009 at the end of last year. While a slowdown in global sales of mobile handsets (-7%) can be blamed for most of the decline, expenditure in infrastructure equipment (-3%) is also expected to decline.

Nonetheless, views on the impact of the current climate on growth are diverging. With the exception of Ericsson, both Alcatel-Lucent and Nokia Siemens Networks have seen negative annual growth rates in revenues in the last quarter of 2008 and first quarter of 2009. One manufacturer expects a lift in demand driven by data traffic growth, boosted by uptake of wireless datacards in laptops, while the two others are less optimistic, with one forecasting a reduction between 8% and 12% in revenues from telecommunications equipment and related deployment services.

- While the handset divisions of equipment manufacturers may expect a bad financial year in 2009, there are diverging views on how increasing traffic in mobile broadband and investment in next generation fixed broadband access will spur demand for communications infrastructure by telecom operators;

- Manufacturers expect an increase in demand for network equipment in emerging markets such as China and India. Global contract sales of Huawei jumped by 46% in 2008 to €18.3 billion; the company also forecasted sales of more than € 23.5 billion in 2009 and has proved the best performing company in the segment. Its low prices, in part related to the strength of the euro, may represent a further barrier to the recovery of European companies.

8.1.4. Semiconductors

Semiconductors are a key intermediate input into ICT equipment, as well as into other goods, such as cars. As such, they are considered as a crucial input into other sectors. Production is highly cyclical (dropping sharply during downturns and recovering quickly in upturns) and the current slowdown is no exception. According to Gartner (March 2009), 2009 will witness strong negative growth in worldwide chip sales (-24%), driven by a slowdown in PC purchases, digital appliances and mobile handsets. Semiconductor companies have already cut their production by closing some facilities or by lowering the utilisation rate and are tightening inventory control. This should have a positive impact on market prices. The uncertainties of the semiconductor industry ultimately reflect the overall economic and financial turmoil. 2010 and 2011 are however expected to be strong rebound years; with growth expected of 7.5% and 9.8% respectively (Gartner March 2009).

Not all the difficulties in the semiconductor industry can be attributed to the economic crisis. The crisis comes on top of chronic oversupply, for example in the dynamic random access memory market (DRAM), which has seen many conglomerates separate or sell their semiconductor business over the last two years in order to restore their own profitability. The beginning of this year already saw Qimonda (controlled by Infineon and the world's fifth-largest manufacturer of DRAM chips), file for bankruptcy as a result of the combined effect on its business of the slide in chip prices and decreased access to financing on the capital markets. Other important players are also suffering severely from the crisis.

8.2. Conclusions

This chapter has analysed the extent of the impact of the economic crisis on the ICT sector. The analysis, which is based on market data, shows that, while at the end of 2008 the sector seemed to be holding up quite well compared to other sectors, it is now being significantly affected and is expected to undergo a downturn. In Western Europe, total end-user spending on ICT is now expected to fall eight percent in 2009 and to remain flat in 2010 before increasing to three percent in 2011. In Eastern Europe, the situation is expected to be worse, with a 10 percent decline in 2009 and a two percent decline in 2010. In 2011, spending is projected to increase by four percent. While the downturn is expected to have a significant impact on all segments, some sectors (manufacturing) will be more strongly hit than others (software). The telecom equipment industry, which is Europe's traditional strength, and semiconductors are being hit by the crisis more than other ICT segments. The service segment (telecoms and software) is tempering the crisis thanks to sustained demand for traditional services. The internet industry, mainly US dominated, is weathering the storm better than any other part of the sector.

The ICT sector is the largest R&D investor in Europe and research activities are largely concentrated in its manufacturing segments. The economic slowdown, its

uncertain outlook and the expected brake on earnings suggest a slowdown in the growth of R&D expenditure. There is a risk that the current financial crisis may undermine the recent positive development in R&D investment rate by European businesses. As the private sector will tend to limit its R&D spending, it would become all the more important to ensure that the public sector sustains, and even increases, its support to R&D. The next chapter of the report looks at the impact of the crisis on R&D spending in more detail.

Annex

Table 1: **GDP at constant prices (annual % change)**

	2006	2007	Estimates 2008	Forecasts 2009	Forecasts 2010
BE	3.0	2.8	1.2	-3.5	-0.2
DE	3.0	2.5	1.3	-5.4	0.3
IE	5.7	6.0	-2.3	-9.0	-2.6
EL	4.5	4.0	2.9	-0.9	0.1
ES	3.9	3.7	1.2	-3.2	-1.0
FR	2.2	2.2	0.7	-3.0	-0.2
IT	1.8	1.5	-1.0	-4.4	0.1
CY	4.1	4.4	3.7	0.3	0.7
LU	6.4	5.2	-0.9	-3.0	0.1
MT	3.2	3.9	1.6	-0.9	0.2
NL	3.4	3.5	2.1	-3.5	-0.4
AT	3.4	3.1	1.8	-4.0	-0.1
PT	1.4	1.9	0.0	-3.7	-0.8
SI	5.9	6.8	3.5	-3.4	0.7
SK	8.5	10.4	6.4	-2.6	0.7
FI	4.9	4.5	0.9	-4.7	0.2
€ area	2.9	2.7	0.8	-4.0	-0.1
BG	6.3	6.2	6.0	-1.6	-0.1
CZ	6.8	6.0	3.2	-2.7	0.3
DK	3.3	1.6	-1.1	-3.3	0.3
EE	10.4	6.3	-3.6	-10.3	-0.8
LV	12.2	10.3	-4.6	-13.1	-3.2
LT	7.8	8.9	3.0	-11.0	-4.7
HU	4.1	1.1	0.5	-6.3	-0.3
PL	6.2	6.7	4.8	-1.4	0.8
RO	7.9	6.2	7.1	-4.0	0.0
SE	4.2	2.5	-0.2	-4.0	0.8
UK	2.8	3.0	0.7	-3.8	0.1
EU	**3.1**	**2.9**	**0.9**	**-4.0**	**-0.1**
US	2.8	2.0	1.1	-2.9	0.9
JP	2.0	2.4	-0.7	-5.3	0.1

Source: European Commission Spring Forecast, May 2009.

Table 2: **Number of unemployed (as % of the labour force)**

	2006	2007	Estimates 2008	Forecasts 2009	Forecasts 2010
BE	8.3	7.5	7.0	8.5	10.3
DE	9.8	8.4	7.3	8.6	10.4
IE	4.5	4.6	6.3	13.3	16.0
EL	8.9	8.3	7.7	9.1	9.7
ES	8.5	8.3	11.3	17.3	20.5
FR	9.2	8.3	7.8	9.6	10.7
IT	6.8	6.1	6.8	8.8	9.4
CY	4.6	4.0	3.8	4.7	6.0
LU	4.6	4.1	4.9	5.9	7.0
MT	7.1	6.4	5.9	7.1	7.6
NL	3.9	3.2	2.8	3.9	6.2
AT	4.8	4.4	3.8	6.0	7.1
PT	7.8	8.1	7.7	9.1	9.8
SI	6.0	4.9	4.4	6.6	7.4
SK	13.4	11.1	9.5	12.0	12.1
FI	7.7	6.9	6.4	8.9	9.3
€ area	8.3	7.5	7.5	9.9	11.5
BG	9.0	6.9	5.6	7.3	7.8
CZ	7.2	5.3	4.4	6.1	7.4
DK	3.9	3.8	3.3	5.2	6.6
EE	5.9	4.7	5.5	11.3	14.1
LV	6.8	6.0	7.5	15.7	16.0
LT	5.6	4.3	5.8	13.8	15.9
HU	7.5	7.4	7.8	9.5	11.2
PL	13.9	9.6	7.1	9.9	12.1
RO	7.3	6.4	5.8	8.0	7.7
SE	7.0	6.1	6.2	8.4	10.4
UK	5.4	5.3	5.6	8.2	9.4
EU	**8.2**	**7.1**	**7.0**	**9.4**	**10.9**

Source: European Commission Spring Forecast, May 2009.

9 R&D in ICT and the world economic crisis

R&D is the main driver of innovation and technological change, and as such, it is the main determinant of long-term productivity growth and living standards. This chapter addresses the evolution in ICT R&D expenditure over the last years. It starts off with a macro-economic analysis of the importance of ICT research in the EU27 Member States. A distinction is made between business spending and governmental funding, both in terms of absolute amounts and GDP percentages, revealing important differences within the Union, as well as a considerable gap with Europe's main international competitors. This gap, particularly the EU-US gap, is mainly explained by differences in the size and the composition of the ICT industry. Indeed, when looking at firm-level evidence, the R&D effort (R&D spending relative to total sales) in the two economic areas is very similar.

This is why in a second step the country-based analysis is complemented by a comprehensive firm-level analysis covering the period 2000-2009. The data is provided by companies' annual and quarterly financial reports. For all sectors, a fallback is observed following the dotcom bust in the beginning of the 21st century, with recovery taking place after 2005. First quarterly results indicate however that the world economic crisis is already impacting on R&D levels. Reduced cash flows and credit constraints (including a reduction in venture capital) are making R&D investment pro-cyclical.

Given the crucial contribution of innovation by the ICT sector to productivity growth, long-term strategic choices by governments in this area are of fundamental importance. The chapter therefore concludes by drawing attention to initiatives taken at EU level to deflect the actual crisis.

9.1. Country-level analysis

R&D intensity is more industry than country specific. Industry specificity may be due to the fact that each industry has a particular technological trajectory (roadmap) and cost structure, including what share of the revenues can be devoted to R&D, and the specific competitive conditions it faces.

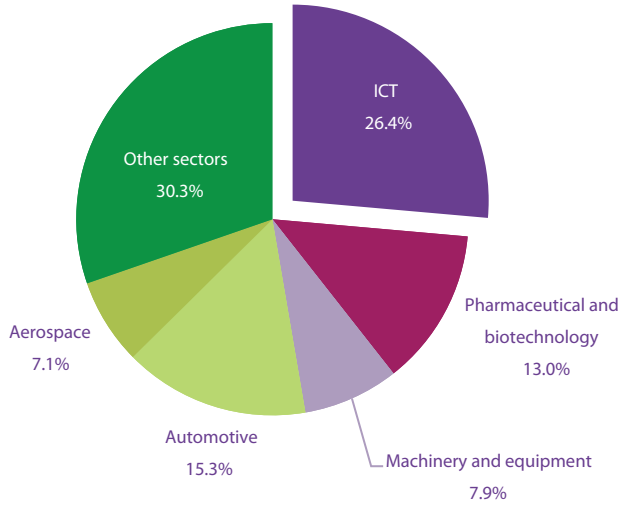
However, country-level analysis provides additional insights on the economic role that ICT R&D plays in the EU Member States. The latest available evidence[81] refers to 2005 and shows that the ICT sector is the largest R&D investing sector of EU, US and Japanese economies. Although the ICT sector in the EU contributes only about 3% of total employment and about 5% to total GDP, it drives 26% of overall business expenditure in R&D (BERD)[82] (Figure 1) and employs 32% of business sector researchers. The sector also provides other industries with productivity enhancing technologies, hence contributing directly and indirectly to increasing labour productivity and EU competitiveness.

R&D in ICT in the European Union is highly concentrated. The EU-15 accounts for 98% of the total while the new Member States are responsible for 2%.

81 JRC-IPTS Report: "The 2009 Report on R&D in ICT in the European Union" (Turlea et al.,2009). This report is part of the project: "Prospective Insights on R&D in ICT" (PREDICT) funded by the European Commission. Report available at: http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2259.

82 2005 figures, the latest available.

Figure 1: **Share of ICT in EU total BERD (2005)**



Source: PREDICT 2009 Report

Germany (26.2%), France (17.3%) and the UK (12.8%), the largest economies, are the biggest spenders. When relating R&D to the size of the different economies, a different picture emerges: it is in the Nordic countries (Finland, Sweden and Denmark) where the contribution of the ICT sector to the overall R&D intensity is the highest (Figure 2). Secondly, the majority of low R&D-intensive Member States (i.e. all new Member States) is catching up with the remainder of the Union[83], and structural and knowledge economy indicators in these countries are showing improvements, which in return could increase the attractiveness of foreign direct investment (FDI)[84].

The EU's main competitors (i.e. USA, Japan and Korea) are investing significantly more in ICT R&D (relative to GDP) than the EU. The EU and the US for example have similar GDP levels, but total R&D expenditure in the ICT sector is twice as high across the Atlantic, creating a gap of €33 billion[85]. This difference can be attributed to lower ICT R&D expenditures by both the business sector and the public sector (Figures 3 and 4).

Regarding business R&D, the lower expenditure rate is not necessarily a result of individual EU ICT companies spending less on R&D than their American counterparts. On the contrary, the company R&D effort (intensity) is similar for comparable EU and US firms in the different ICT sub-sectors[86]. The gap is primarily due to the smaller size of the EU ICT business sector relative to the US.

Recent estimated data on public R&D funding (government budget appropriations or outlays on R&D — GBAORD)[87] indicate that EU governments account for only a relatively small part of ICT R&D. In 2005, their support to ICT R&D was €4.45 billion, well below the US figure of €10.58 billion. Moreover, the intensity was higher in the latter country: in the US, public spending on ICT R&D stands at 0.10% of GDP, compared to 0.04% in Europe (Figure 4).

83 This is not the case for four new Member States (Bulgaria, Poland, Malta and Slovakia), for which the gap with the rest of Europe is actually increasing.

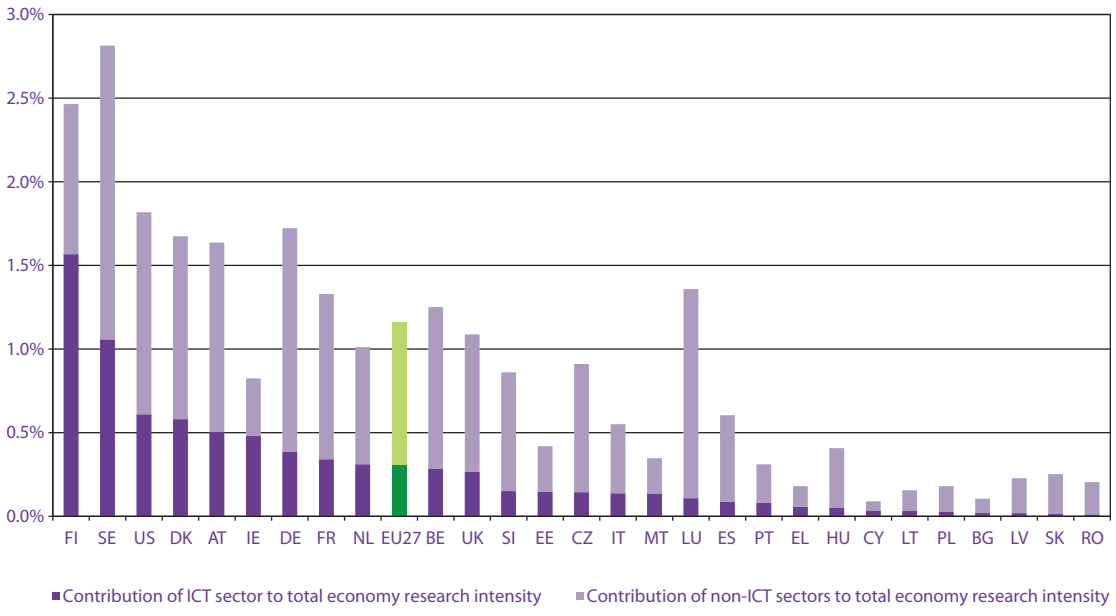
84 Report on a DG JRC-IPTS Workshop: "Raising Private Sector R&D in the New Member States: Does it help their economies catching up?" (Seville, 13.12.2007)

85 Total R&D expenditure in the USA stands at € 68.5 billion, compared to € 35.9 billion in the EU27 (at purchasing power parity, 2005 figures)

86 JRC-IPTS Reference Report "Mapping R&D Investment by the European ICT Business Sector" (Lindmark et al. 2008). Report available at http://ftp.jrc.es/EURdoc/JRC45723_RR.pdf

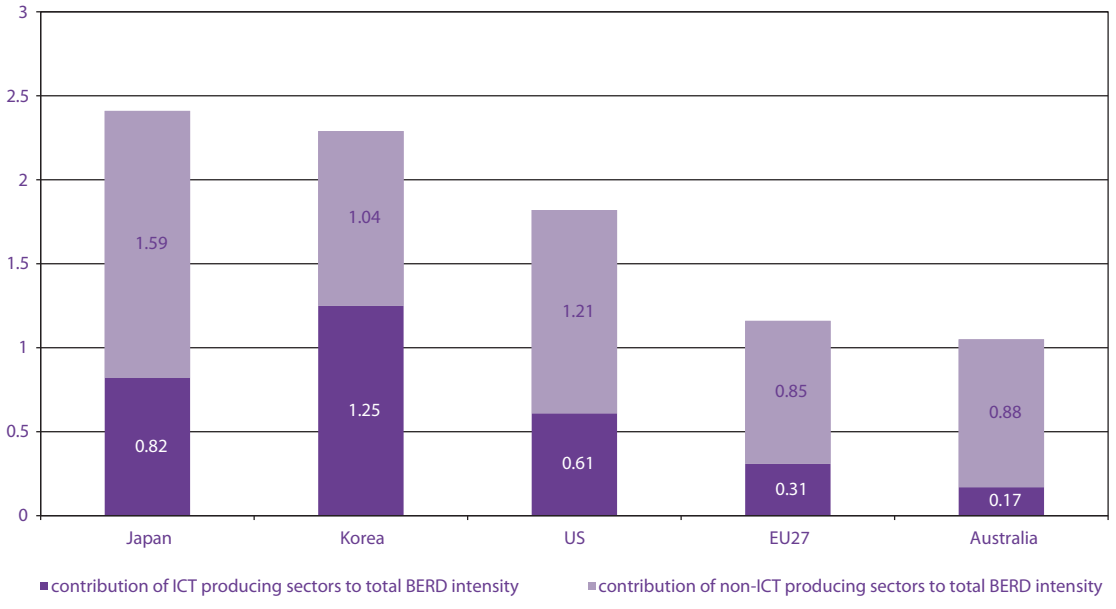
87 JRC-IPTS Report: "The 2009 Report on R&D in ICT in the European Union" (Turlea et al.,2009). http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=2259

Figure 2: **Contribution of the ICT sector to total intensity (BERD / Value Added) by Member State (2005)**



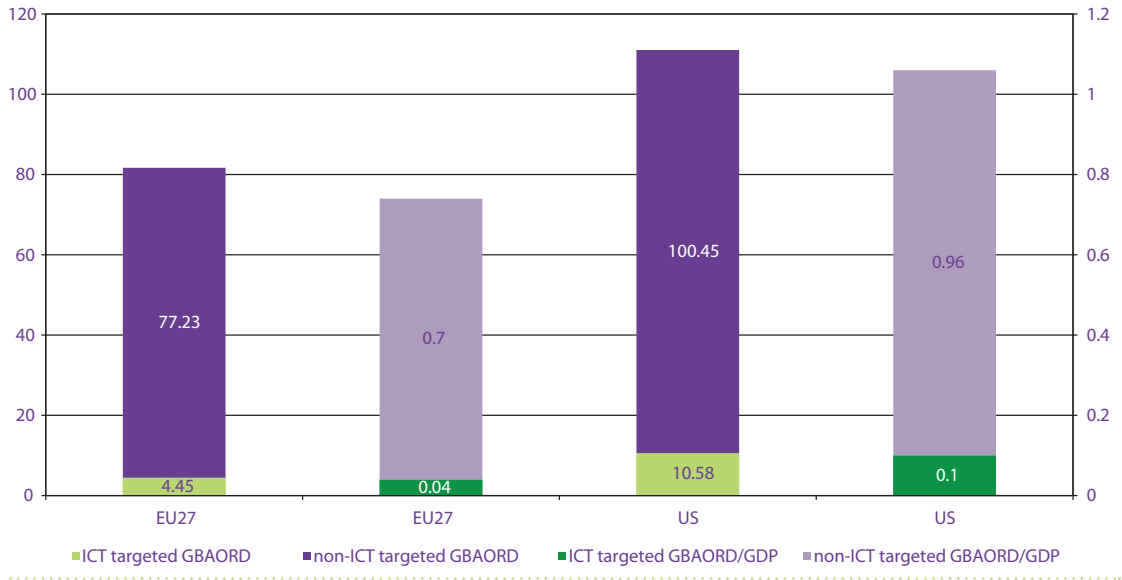
Source: PREDICT 2009 Report

Figure 3: **Contribution of the ICT sector to total BERD intensity (2005, %)**



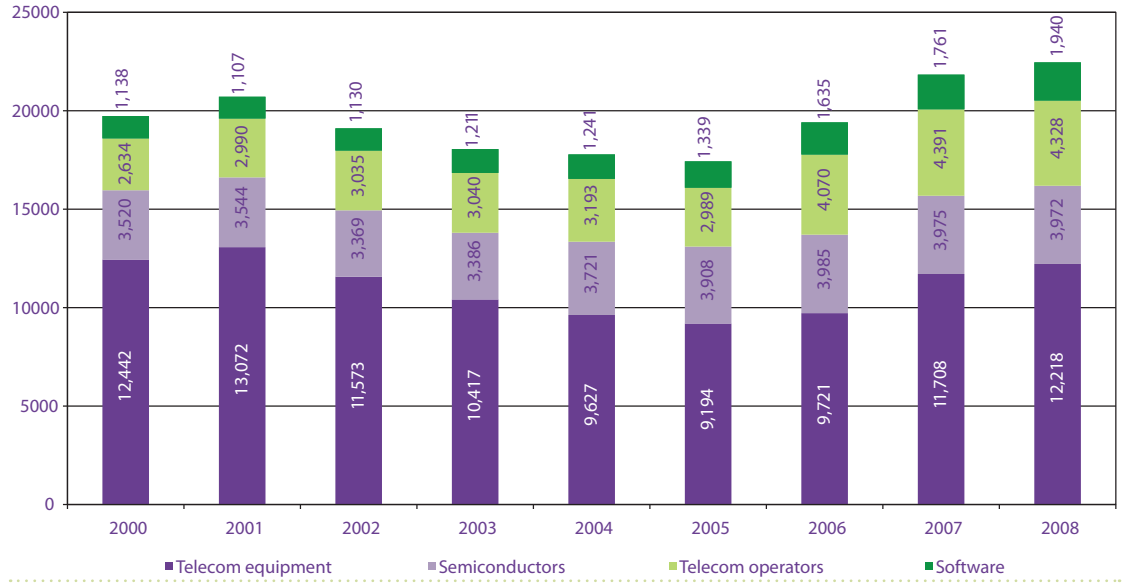
Source: PREDICT 2009 Report

Figure 4: **Public expenditure on R&D in billions of euro and as share of GDP (%) (2005)**



Source: Predict 2009 - The R&D expenditure is plotted on the left axis, the GDP contribution on the right axis.

Figure 5: **R&D spending in millions of euro**



Source: Annual reports of a sample of the EU top ICT companies in R&D spending representing 90% of total R&D spending recorded by the 2008 Scoreboard

Finally, according to Innovation Surveys, the ICT sector is one of the most collaborative sectors after energy and chemicals industries. Among innovative ICT firms in four EU countries, about 34% engage in some type of collaboration for innovation (versus 24% of all firms), and 13% of ICT firms cooperate with universities and public research organisations (versus 8.5% of all firms).[88]

9.2. ICT R&D investment trends by sectors

9.2.1. Methodology

This section develops an analysis of R&D based on spending data reported by companies in their annual reports. In general, this kind of data does not provide information about the place where R&D is actually performed.[89] The most recent available data are the 2008 annual reports and the first quarterly reports of 2009 (Q1 2009).

The database that is used is the EU Industrial Investment Scoreboard. This database presents information on 2000 companies from around the world on R&D investments. The set of companies it covers comprises the top 1000 R&D investors whose registered offices are in the EU and the top 1000 registered elsewhere.[90]

The 2008 EU Industrial Investment Scoreboard, covering fiscal year 2007, counts 187 EU ICT firms among the top-1000 R&D spending companies. They employ around 1 million persons in total and invest € 26,240 million in R&D. The most important ICT sub-sectors are: telecom equipment, telecom operators, semiconductors and software. Their R&D spending amounts to more than 90% of the ICT R&D total. The remaining ICT segments are computer services, internet, computer hardware and electronic office equipment, with significantly lower R&D rates.

These figures reflect the strengths and weaknesses of the European ICT industry. For example, there is little left of the computer hardware industry and Europe is nearly absent in the internet industry, in which companies like Google, Yahoo or MSN have acquired seemingly unchallengeable positions. The telecom equipment industry is Europe's traditional ICT strength. Europe has also world leaders in business and industrial software.

The following analysis considers R&D spending by the top spending firms in the list of the Scoreboard in the four main ICT sub-sectors. The cut off date for firms' annual reports was fiscal year 2008 and for their quarterly reports was 1Q/2009.

When interpreting these data, two important elements must be kept in mind: figures may be inflated by mergers and acquisitions and all amounts are expressed in euro, meaning that exchange rate variations are changing the evolution of the original data in the country's currency. Over the period 2000-2008, the euro constantly appreciated against the dollar, by 32% between January 2000 and December 2008.

In the four main ICT segments R&D investment has increased by 11.4% in 2006, 12.5% in 2007 and 2.9% in 2008 (Figure 5). Following the dotcom-bubble in 2001, total spending went down four consecutive years. The recovery started after 2005.

Because of the economic downturn, 2009 is expected to feature a slowdown in R&D investment. The next sections take a closer look at R&D spending in the first quarter of 2009 for each segment.

9.2.2. Telecom Equipment Industry

The telecom equipment industry is the largest segment of the ICT sector in terms of total R&D expenditure. It is also Europe's traditional ICT strength. In 2008, EU companies together had a 34% share of the fixed and IP infrastructure world-wide market and an 81% share in the mobile infrastructure world-wide market.

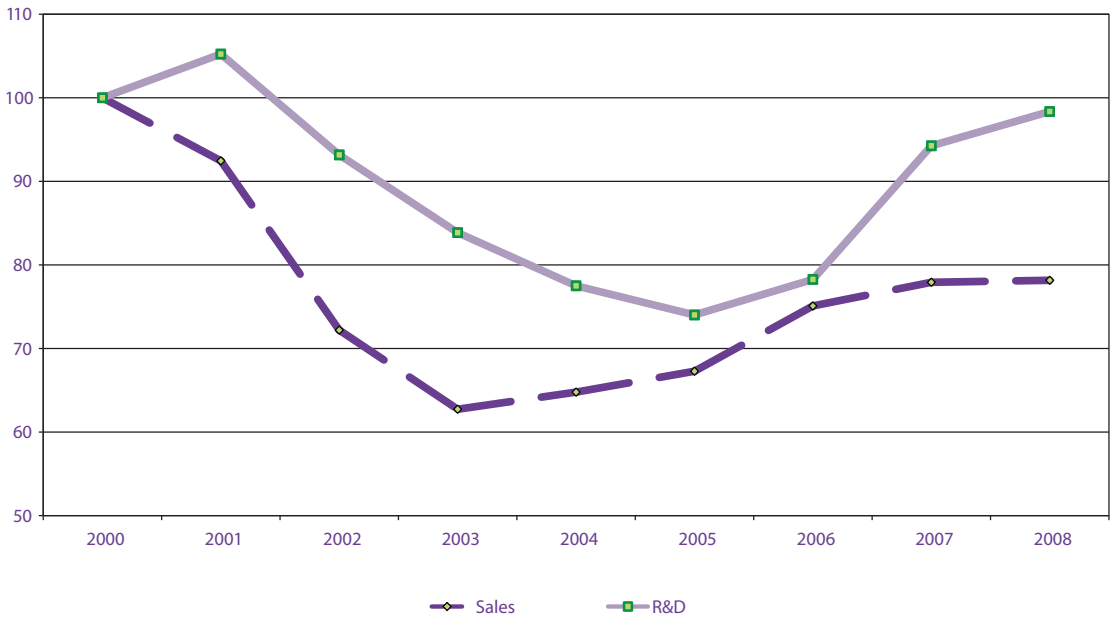
Between 2000 and 2004, the European telecom equipment industry, after reaching a peak in competitiveness due to the remarkable success of the GSM standard, saw a drop in sales and R&D following the crash of the dotcom bubble and less favourable economic growth (Figure 6).

88 OECD, using the 2007 European Community Innovation Survey

89 The company's whole R&D investment is attributed to the country in which it has its registered office.

90 http://iri.jrc.ec.europa.eu/research/scoreboard.htm

Figure 6: **Evolution of the telecom equipment sector's sales and R&D (Index 2000=100)**



Source: Annual Reports of the sample of Alcatel-Lucent, Ericsson, Nokia and Siemens COM, representing more than 90% of the EU Scoreboard sample for the telecom equipment sector

In the second half of the decade, the European telecom equipment industry went through important restructuring. In 2006, Ericsson acquired assets of Marconi telecommunications operations and Alcatel and Lucent entered into a definitive merger agreement. In 2007, Nokia Siemens Networks combined Nokia's networks business and Siemens' carrier related operations for fixed and mobile networks.

Between 2005 and mid-2008, world GDP expanded vigorously offering new market opportunities in emerging and developing countries, fostering an ever increasing globalisation of the industry that extended its business outside the maturing telecommunications markets in the advanced economies and started experiencing new competitive pressure from Asian players.

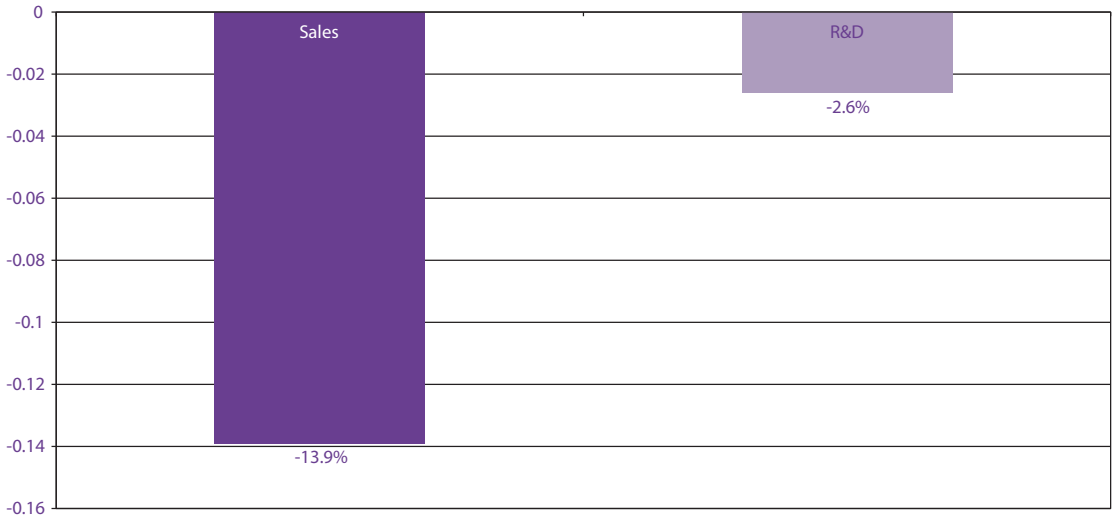
The restructuring of the telecom equipment R&D activities has been globalised together with other operations of this industry. Today, Alcatel Lucent R&D has approximately 23,000 R&D personnel (including Bell Labs), with a worldwide presence in 23 countries and around 50 major centres. The R&D workforce distribution is continental: European Mediterranean Area 39%; Americas 33%; Asia Pacific 28%. Nokia has R&D centres in 11 countries, employing 14,500 people which represent approximately 32% of Nokia's total workforce. Major R&D centres are located in various European countries, India and USA. Ericsson, with over 19,300 people employed in R&D, has set up a network of research facilities and Centres of Excellence in Europe (Sweden, Ireland, Italy, Greece and Hungary), the Americas, India and China.

R&D is increasingly devoted to improving users' experience. In its R&D orientations, Alcatel-Lucent is adopting a user-centric approach — putting the end user at the centre of all activities — a critical component in a service provider's ability to stay competitive, create services and generate profitable growth. Nokia's new user interface research, located in Europe and in the United States, with teams in China, India, and Africa also focuses on a user experience that meets cultural preferences.

The current economic deterioration is affecting the telecom equipment industry (Figure 7). The handset business saw a dramatic decline in consumer demand for handsets and a massive de-stocking starting in the fourth quarter of 2008 and extending into the first quarter of 2009. The turn in the inventory cycle is generally expected to be reached in the next quarter.

The effects of the global economic recession on investment in networks remain difficult to predict. Nokia and Nokia

Figure 7: **Cumulative Sales and R&D, at constant exchange rate, of Nokia, Alcatel-Lucent, Ericsson, Motorola, Cisco and Qualcomm**



Source: Financial Reports

Siemens Networks expect the mobile infrastructure and fixed infrastructures and related services market to decline approximately 10% in euro terms in 2009. Alcatel-Lucent expects the global telecommunications equipment and related services market to be down between 8% and 12% at constant currency in 2009. According to Ericsson, investment in wireless networks largely continues, and rollouts of new networks and new technologies accelerate in markets such as the US, China and India.

The combined R&D spending in fiscal year 2008 of Nokia, Alcatel-Lucent and Ericsson amounted to €12.2 billion, an increase of 4.3% compared to the previous year, but also an increase lower than the previous year. The first quarter of 2009 saw a significant drop in sales, mostly explained by the mobile handset business, and for most companies also in R&D. Among the European and US global telecom equipment companies, only Nokia and Qualcomm reported an increase in R&D.[91]

The R&D intensity in the telecom equipment industry is among the highest in the ICT sector, reaching 16% for Nokia Siemens Networks, Alcatel-Lucent and Ericsson in fiscal year 2008. R&D spending is decreasing less than sales: in 1Q/09, the R&D intensity increased to 19% for Nokia-Siemens and Alcatel-Lucent.

9.2.3. Telecom operators

The R&D intensity in the telecom service segment is very low, in general less than 2%, following a shift from R&D conducted by the previous public monopolies to R&D mostly conducted by equipment suppliers. Recently, the emergence of the Web 2.0 and Enterprise 2.0 services is the driving need for increasing and re-focusing R&D. The seven largest operators'[92] R&D spending reveals a significant increase in R&D between 2005 and 2008 (Figure 8).

91 The 50/50 joint venture between Ericsson and STMicroelectronics, merging STMicroelectronics' wireless business and Ericsson Mobile Platforms, started operations in February 2009 making it impossible to compare 1Q/09 with 1Q/08. Between 4Q/08 and 4Q/07, Ericsson's R&D increased by 3%.

92 Corresponding to 90% of total R&D spending as reported by the 2008 EU Scoreboard for this sector

Figure 8: **Evolution of the telecom operators sector's sales and R&D (Index 2000=100)**

Source: Annual Reports of a sample that consists of 7 largest telecom operators, representing more than 90% of R&D spending recorded by the EU Scoreboard for this industry

Figure 9: **Evolution of the semiconductor industry's sales and R&D (Index 2000=100)**

Source: Annual Reports STMicroelectronics, Infineon, Qimonda and NXP

The increase in R&D spending since 2005 is explained both by a significant increase in capitalised software development costs[93] and by the fact that before 2005 telecom operators did not mention capitalised software as part of their R&D spending. These investments are primarily related to the development and adaptation of internally developed software, as well as software platforms and architectures, with the aim of improving processes for the provision and operation of services and products. Development costs for software can be important in the total R&D budget. Not all telecom operators however distinguish between operational R&D and software R&D.

Operators are also following the same trend as equipment manufacturers and orienting their R&D to services and end-users centric goals and the overall R&D intensity will most probably increase in the coming years. Examples are: Deutsche Telekom Laboratories' was founded in 2005 and its major fields of focus include: intuitive usability, the integration of different media and devices, facilitating access, improving security and setting up high-performance networks. Telefónica I+D has become the largest private R&D centre in Spain. It has set up an international network connecting more than 150 universities and several hundreds of organisations in 42 countries worldwide. France Telecom set up in 2006 Orange Labs, with a staff of 3,800 researchers in 18 laboratories.

Too few telecom operators in the sample release their R&D spending in the quarterly reports and the impact of the crisis on their R&D during the first quarter of 2009 cannot be assessed.

9.2.4. Semiconductors Industry

Semiconductors were first developed in the United States (Bell Labs, Fairchild, Texas Instruments). The European semiconductor industry developed mainly under the protective umbrella of conglomerates that ultimately decided to spin-off their semiconductor business units. Semiconductors in mobile communications and embedded in final goods such as cars provided new market opportunities. At the beginning of the new millennium three European chip companies were in the global top ten.

The development of semiconductors relies on interactions and collaborative relationships between the manufacturer, the semiconductor equipment and materials industry and R&D research centres. Although its manufacturing world share declined, Europe has a world class, innovation eco-system in semiconductors, with a few dedicated regions with a critical mass and specific semiconductor competences such as Dresden, Dublin, Eindhoven, Leuven and Grenoble. These clusters are key assets for the competitiveness of the European industry and address all application fields. European public-private R&D partnerships are also considered the best in the world, although they would benefit from more efficient commercialisation of their R&D. The semiconductor industry has the highest R&D intensities of all ICT sectors. For fiscal year 2008, the R&D intensity of European semiconductors firms was about 22% for NXP, 21% for STMicroelectronics, 17.5% for Infineon and 18% for ASML (semiconductors equipment).

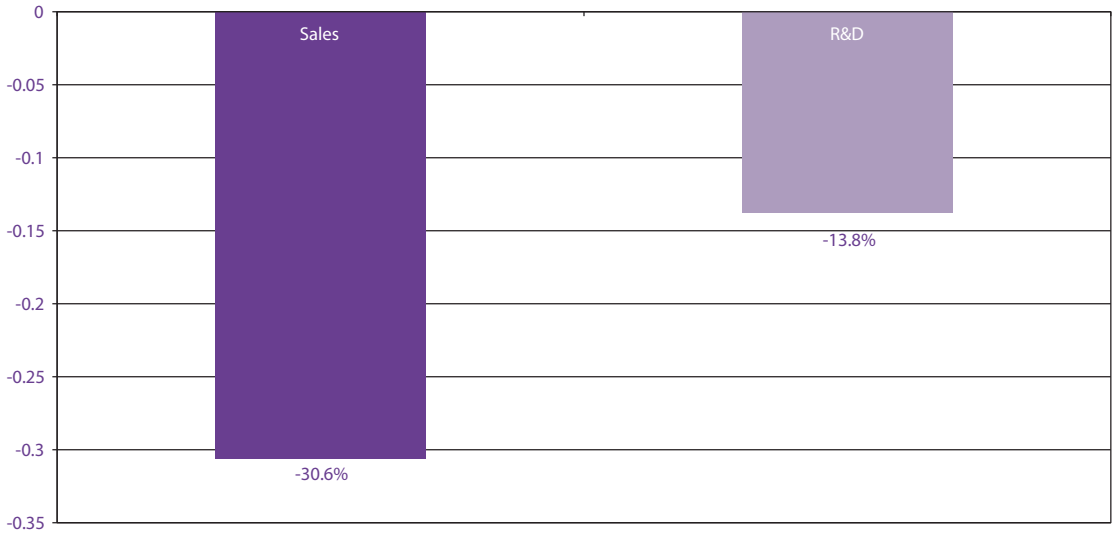
As semiconductors are intermediate goods, the industry is structurally highly cyclical and has been subject to significant economic downturns at various times. The industry is also characterised by continuous technological progress in the manufacturing of semiconductors (Moore's Law) which leads to transitional excess supplies.

The semiconductor industry has the highest R&D intensity of all ICT segments. R&D spending went down 5% after the dotcom bust in 2001, as a result of a major fallback in the demand by other industries. The sector however recovered quickly. During the last years, R&D amounts remained relatively stable, and there was no dramatic decline in 2008 despite a significant decline of its revenues (Figure 9).

Despite recent stability, when the financial crisis extended to the real economy in the fourth quarter on 2008, the semiconductor market collapsed in a way never experienced before as reflected by the negative results in Q1 2009 reports (Figure 10). During the fourth quarter of 2008 and the first quarter of 2009, the utilisation rate of

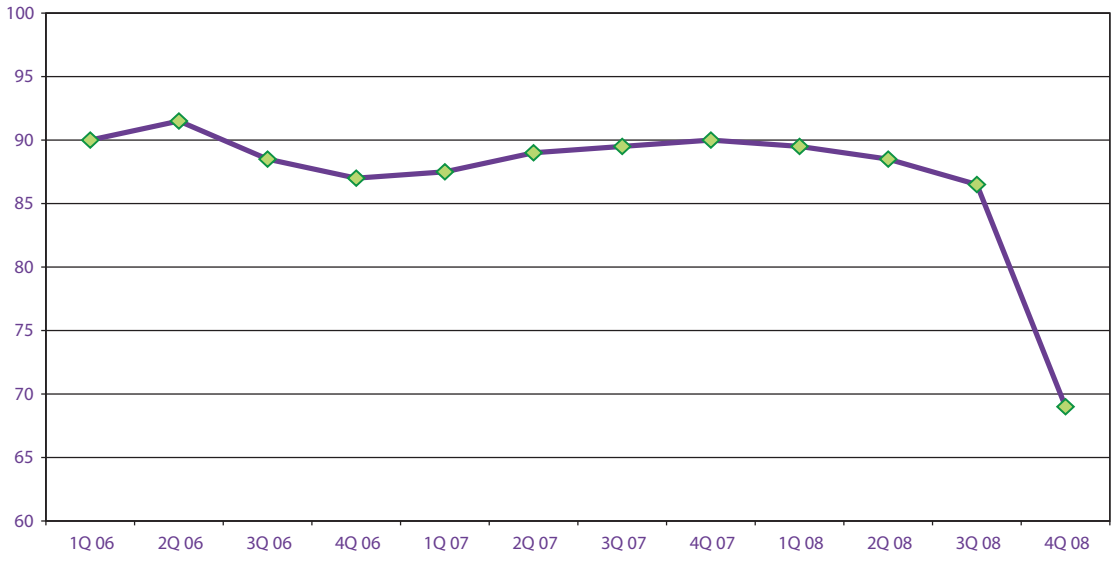
93 In accordance with the international accounting standard IAS 38 "Intangible Assets", R&D expenses are recorded as expenses in the year in which they occur, except for development costs which are capitalised when several criteria are met. Capitalised software developments are those incurred during the programming, codification and testing phases. Costs incurred during the design and planning, product definition and product specification stages are accounted for as expenses.

Figure 10: **Cumulative Sales and R&D, at constant exchange rate, of NXP, STM, Infineon, Intel, AMD and Texas Instruments**



Source: First Quarter 2009 Financial Reports

Figure 11: **Utilisation rate of semiconductor manufacturing facilities (%)**



Source: OECD, 2009

Table 1: **Software R&D in 2007**

	Changes in R&D investment 2007-2006 (%)		R&D CAGR* (2004-2207) (%)		R&D intensity 2007 (% R&D/Sales)	
	EU	Non-EU	EU	Non-EU	EU	Non-EU
Software	14.7	12.6	14.0	12.1	15.0	14.5

** Compound Annual Growth Rate*

Source: EU Industrial Investment Scoreboard

semiconductor facilities was at an historical low and led to important losses (Figure 11). Hopefully, as for mobile handsets, a turn in the inventory cycle seems to be in view, although the level of demand is still uncertain.

9.2.5. Software

This section is about the software industry defined as an activity producing a software original that is reproduced and sold, some are packaged, some are customised and some are linked to complementary services. Inevitably, the grouping is heteroclite, including games, manufacturing tools (computer aided design and manufacturing), business and internet software.[94]

This industry is highly fragmented. In 2005, there were an estimated 18,000 European packaged software companies.[95] Most of these had less than 15 employees and €1 million in revenue. This market fragmentation contrasts with the fact that R&D is highly concentrated.

The EU Scoreboard, which shows that total R&D expenditure in the software industry in Europe, rose 14% per year (Table 1). This is slightly higher than in other parts of the world. Moreover, R&D intensities in Europe and in the rest of the world are roughly similar, suggesting that the European software sector is growing at a faster pace than elsewhere.

According to the Scoreboard, total R&D expenditure by the European software industry in 2007 was around 4 billion. The 3 biggest companies (SAP, Dassault Systems and UbiSoft) are responsible for half of that amount, while the 11 biggest companies account for 71%. Within these 11 companies, 7 provide business solutions, while the others produce software for entertainment purposes (i.e. mainly games). Growth of their combined R&D expenditure over the period 2004-2007 is significant (Figure 12).

Although total R&D spending is lower for the entertainment companies, their R&D intensity is generally higher: with 33.6%, it largely exceeds the 14.1% for business software companies. The gaming industry is typically characterised by a constant need for innovation: as hardware becomes more powerful and cheaper, the demand for cutting-edge graphics and improved features booms, forcing the developers to constantly invest in R&D in order to insure competitiveness.

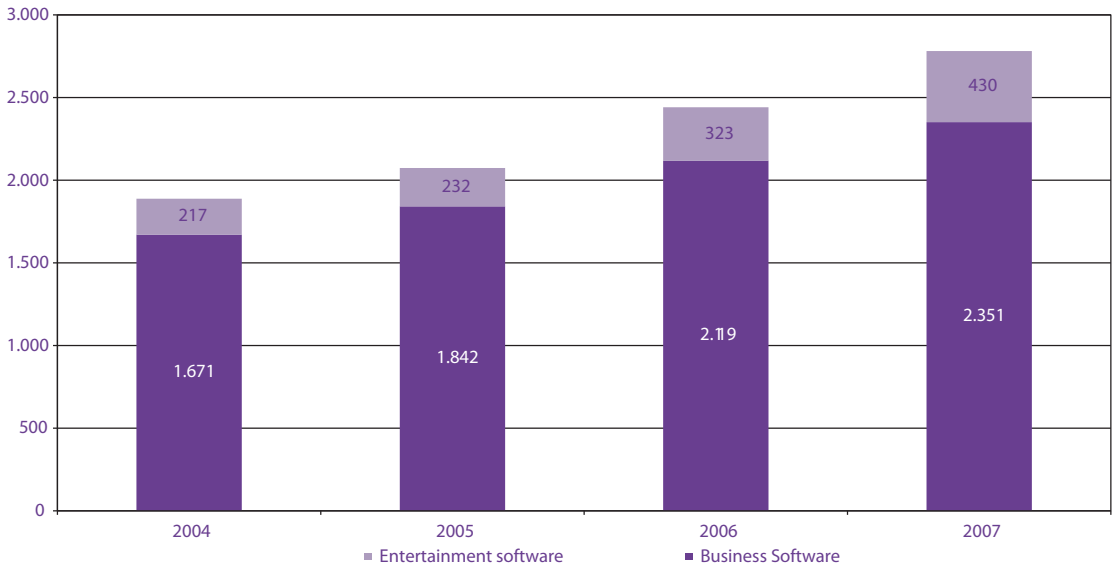
9.2.6. Internet companies

The search engines, social networks and web mail services that are shaping the internet are of US origin. The 2008 Scoreboard does not identify any single major EU firm providing internet related utilities (email, search engines, social networks). Two firms, Google and Yahoo, account for 88% of R&D carried out by internet companies. Their R&D spending is in line with revenue performance over the relevant period.

94 It should be reminded that an important part of R&D expenses are in fact own-account software developments. Indeed, in services as well as in manufacturing industries, much research relies on or results in new software. Eurostat and the OECD are currently and jointly implementing a new method for measuring R&D investment in software (SNA93 - Revision of the system of national accounts)

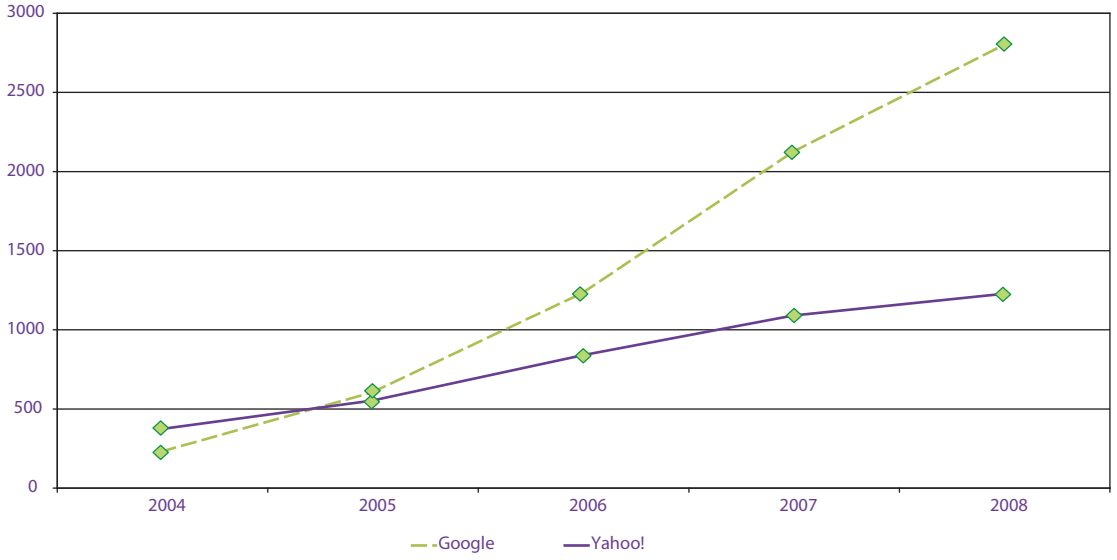
95 IDC figures

Figure 12: **The software industry's R&D spending (millions of euro)**



Source: Scoreboard 2008

Figure 13: **R&D expenditure by the two major internet companies (millions $)**



Source: Annual Reports

9.3. Conclusions

Technological innovation in the ICT sector is an important driver of productivity growth. The cyclicality of R&D investment and the preliminary evidence of its decline illustrated in this chapter may have important repercussions on the ability of the EU to sustain an acceleration in productivity growth and stimulate a durable recovery. Recovery strategies based on broad innovation strategies would help foster long-term growth. The EU stimulus packages do recognise the importance of ICT R&D and innovation for the competitiveness of the whole economy and for its ability to address the key societal challenges ahead.

The European Economic Recovery Plan proposed by the Commission on 26 November 2008 includes public-private partnerships for research and development in three initiatives aimed to develop new technologies for the manufacturing, construction and automotive sectors. ICT plays an important role in all three areas:

- In the Factories of the Future initiative, concerning innovation in modern manufacturing, ICT provides essential tools to face today's industrial challenges such as increasingly global networked operations, more agile manufacturing and customisation, lower carbon emissions and energy efficiency as well as optimised design of manufacturing systems and better process life cycle management.

- In the 'Energy-Efficient Buildings' initiative, ICT helps to improve energy efficiency in buildings through, for example, better monitoring and control of energy consumption, advanced lighting systems, and smarter and optimised interconnections with the power grids.

- In the 'Green Cars' initiative, ICT is essential for developing fully electrical vehicles, e.g. for battery management and power supply, for control mechanisms and for the interconnections with the transport and power infrastructures.

With ICT underlying innovations in all businesses, it is only through the development of a solid ICT-knowledge base and by shaping its development that Europe will be able to make the best of the technology throughout its economy.

i2010 — **List of actions**

Commission staff working document

volume **2**

SEC(2009)1060

http://ec.europa.eu/i2010

European Commission
Europe's Digital Competitiveness Report

i2010 — List of actions

June 2005 to May 2009[1]

o — horizontal i2010 actions	
Action and delivery date	**Overview**
Communication 'i2010 — A European Information Society for growth and employment', COM(2005) 229, 01.06.2005	The Communication sets a framework for addressing the main challenges and developments in the information society and media sectors up to 2010. The i2010 initiative promotes an open and competitive digital economy and emphasises ICTs as a driver of inclusion and quality of life. i2010 rests on three pillars: (1) Creating the single European Information Space, which promotes an open and competitive internal market for information society and media services; (2) Increasing investment in innovation and research in ICTs; and (3) Fostering inclusion, better public services and quality of life through the use of ICTs.
i2010 High Level Conference, London, 06.09.2005	The i2010 conference, hosted by the UK Presidency, provided a key opportunity for governments and business from across the EU to contribute to the definition of the i2010 strategy for the EU up to 2010.
Establishment of the i2010 High Level Group, Commission Decision (2006/215/EC), 15.03.2006	The High Level Group of Member State representatives advises the Commission on the implementation, review and development of the i2010 strategy.
New benchmarking framework for i2010, 20.04.2006	Benchmarking is central to monitoring progress in achieving the i2010 priorities. Results are reviewed in the i2010 Annual Reports. The indicators are closely aligned with the Lisbon integrated guidelines relevant to ICTs.
Communication 'i2010 — First Annual Report on the European Information Society', COM(2006) 215, 19.05.2006	The Annual Report took stock of the achievements of the first year of implementation of the i2010 initiative and updated the i2010 actions for the period 2006-2007. The associated Commission staff working paper reviewed the i2010 key actions against the background of ICT developments in the EU.
i2010 High Level Conference, Helsinki, 27-28.09.2006	The 2006 high-level conference on i2010, 'i2010 — Towards a Ubiquitous European Information Society', was hosted by the Finnish Presidency. It examined the opportunities and challenges associated with a 'ubiquitous' information society, in which people's ways of life and work will be based on having ICT services available everywhere, at all times.

1 This is a list of the actions launched, containing all items officially adopted before adoption of this Annual Report.

Fostering the competitiveness of Europe's ICT industry — EU ICT Task Force Report, 27.11.2006	The ICT Task Force recommends a focus on interoperability, developing digital and entrepreneurial skills, strengthening the internal market, reducing patent costs particularly for translations by application of the London Protocol, and promotion of lead markets through public procurement. The task force brought together experts from industry and civil society to identify major obstacles to the competitiveness of the ICT sector.
'The Challenges of Convergence' working paper of the i2010 High Level Group, 12.12.2006	The working paper, prepared together with the Member States in the i2010 High Level Group, highlights various technological, market and policy challenges posed by digital convergence. The paper concludes that the overall legal and regulatory framework is favourable for the further development of convergence, but there might be a need to look at emerging bottlenecks and new business models that change today's ways of delivering services and content to users.
Communication 'i2010 — Annual Information Society Report 2007', COM(2007) 146, 30.03.2007	The second Annual Report, published on 30 March 2007, reviews the Commission's and Member States' progress in implementing the i2010 agenda so far. It also updates the set of actions planned for 2007-2008. Finally, the report sets out the key policy issues for the future to be debated during the mid-term review of the i2010 strategy.
'User and consumer perspective in the context of convergence' working paper of the i2010 High Level Group, 20.04.2007	The issue paper identifies the gaps in the protection of users in the digital environment and reviews options for policy response.
'Content and Convergence' working paper of the i2010 High Level Group, 20.04.2007	The issue paper outlines the main economic and cultural challenges arising from digital convergence and points to ways of addressing them that bring benefit in term of European competitiveness, cultural diversity and users' interests.
Communication 'Preparing Europe's digital future. i2010 Mid-Term Review' (i2010 Annual Information Society Report 2008), COM(2008) 199, 17.04.2008	Two years after the launch of i2010, the Commission reflected on whether its general approach remained valid and best suited to today's policy priorities for growth and jobs. The report shows that the i2010 strategy, which triggered new EU initiatives on regulation, research and public-private partnerships, is delivering results. More than half of Europeans are now regular internet users, 80% of them have broadband connections and 60% of public services in the EU are fully available online. The strategy, has led to a firm commitment to promoting ICT at EU and national levels. In parallel, the EU institutions have encouraged the building of a single market for online services and increased research funding. A single market for telecoms, promoting cross-border communication services, is, however, still in the making. The mid-term review also identified new themes to consider for a longer term agenda for the EU – the digital single market, the role of the users, the need to continue investing in ICT R&D and innovation and the future of networks and the internet..
Information Society at the Crossroads (i2010 high level conference), Brdo, Slovenia, 13-14 May 2008	The conference, organised by the Slovenian Presidency, addressed the main topics raised by the mid-term review of i2010, including the themes identified for future reflection.
Building on i2010: Which services and networks for tomorrow? Paris, 9 September 2008	This French Presidency conference reflected on what needs to be done to promote and speed up the development of infrastructures and services of the future.
Communication 'Internet governance: the next steps', COM(2009) 277, 18.06.2009	The Communication analyses progress on internet governance and the changing role of governments in the process. It calls for more transparency and multilateral accountability in the governance of the internet and proposes an approach for the future.

1 — A Single European Information Space

1.1 — Delivering services anywhere, anytime over high-speed seamless networks

Action 1: Review of the regulatory framework for electronic communications

Communication on market reviews under the EU Regulatory Framework, COM(2006) 28, 06.02.2006	The report reviews the state of the electronic communications markets in 2005.
Communication 'European Electronic Communications Regulation and Markets 2005 (11th Report)' COM(2006) 68, 20.02.2006	The Commission publishes regular reports on the Member States' implementation of the EU framework for electronic communications. The 11th report looks at market developments in 2005, mainly in broadband, mobile and fixed services, the regulatory environment and the consumer interest.
Communication on the outcome of the review of the scope of universal service, COM(2006) 163, 07.04.2006	The Commission reviewed the scope of universal service in the Universal Service Directive and concluded that it would not extend the scope of universal service to mobile telephony and broadband. However, this theme continued to be discussed in the context of the general regulatory review of electronic communications in 2006.
Communication on the review of the EU Regulatory Framework for electronic communications networks and services, COM(2006) 334, 29.06.2006	Based on an analysis of the functioning of the regulatory framework and its impact, the Communication indicated possible changes and launched a public consultation on the proposals. At the same time, comments were invited on the draft second edition of the Commission Recommendation on Relevant Product and Service Markets. The two main proposals are to implement the Commission's policy approach to spectrum management and to reduce the burden of reviews of relevant markets by streamlining the procedures. Other changes proposed would strengthen the internal market, reinforce consumer interests, improve security and generally update the framework.
Proposal for a Regulation on roaming on public mobile networks within the Community, COM(2006) 382, 12.07.2006	The proposed Regulation does not fix an ideal price for roaming charges but applies a method that ensures, through price ceilings, that mobile roaming charges are not unjustifiably higher than those for domestic mobile phone use. The proposed regulation also enhances price transparency.
Communication 'European Electronic Communications Regulation and Markets 2006 (12th Report)' COM(2007) 155, 29.03.2007	The Commission report took a snapshot of Europe's telecom markets in 2006, worth almost €290 billion in revenues, just prior to the reform of the EU telecom rules. It included individual chapters covering the situation in each EU Member State.
Communication on market reviews under the EU Regulatory Framework (2nd report), COM(2007) 401, 11.07.2007	Although the EU's telecoms regulatory framework has led to significant benefits for citizens and enterprises alike, important challenges remain for national and European regulators, says the Commission report. It presents the results of 600 draft regulatory decisions sent to the Commission by National Regulatory Authorities. In a number of cases, the report found that the solutions imposed by national regulators to remedy a lack of competition varied considerably, leading to the risk of fragmenting the internal telecoms market to the detriment of consumers and pan-European operators.
Communication on Strengthening the Internal Market for Mobile TV. COM(2007) 409, 18.07.2007	The Commission has adopted a strategy favouring the take-up of mobile TV across the 27 EU Member States. The Commission urges Member States and industry to facilitate and accelerate the deployment of mobile TV across Europe and to encourage the use of DVB-H as the single European standard for mobile TV.

Proposals for a reform of the EU regulatory framework for electronic communications, 13.11.2007: Proposal for a Directive amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and services, and 2002/20/EC on the authorisation of electronic communications networks and services, COM(2007) 697; Proposal for a Directive amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on consumer protection cooperation, COM(2007) 698; Proposal for a Regulation establishing the European Electronic Communications Market Authority, COM(2007) 699; Communication — Reaping the full benefits of the digital dividend in Europe: A common approach to the use of the spectrum released by the digital switchover, COM(2007) 700; Commission recommendation on relevant product and service markets, C(2007) 5406 rev 1; Report on the outcome of the Review of the regulatory framework and summary of the 2007 reform proposals, COM(2007) 696	The 'Telecoms Reform Package', which was presented by the Commission on 13 November 2007, will change the EU telecoms rules adopted in 2002. It is expected to become law by the end of 2009 and includes the following main features: - New consumer rights such as the right to switch telecoms operators within 1 day; the right to transparent and comparable price information; the possibility to call freephone numbers from abroad; and a more effective single European emergency number 112. - More consumer choice through more competition, especially by giving national telecoms regulators the new remedy of functional separation for dominant telecom operators. - More security in using communication networks, especially through new instruments to fight spam, viruses and other cyber attacks. - A 'New Deal' for radio spectrum — the lifeblood of all wireless communication services — to spur investment in new infrastructures and to ensure 'broadband access for everyone'. In rural areas of the EU, only 72% of the population on average have broadband access. The Commission wants to overcome this 'digital divide' by better managing radio spectrum and by making spectrum available for wireless broadband services in regions where building a new fibre infrastructure is too costly. The switchover from analogue to digital TV will free a substantial amount of radio spectrum (the 'digital dividend') that can be used for this purpose. - Better regulation in telecoms by deregulating those markets where EU-driven market-opening has already led to competition; this will allow the Commission and national regulators to focus on the main bottlenecks, such as the broadband market. - More independent watchdogs to guarantee fair regulation in the interest of consumers. Too often, telecoms regulators are still close to the dominant operator, which continues to be partly owned by the national government in many countries. The EU Telecoms Reform is designed to strengthen the independence of national telecoms watchdogs from operators and governments alike. To quickly and effectively implement the reform, the Commission proposes establishing a European Telecom Market Authority that will help ensure that important communication services (such as internet broadband access, data roaming, mobile phone usage on planes and ships and cross-border business services) are regulated more consistently across the 27 EU Member States. The European Telecom Market Authority will more effectively combine the functions of the current European Regulators Group (ERG) and the current European Network and Information Security Agency (ENISA). To become law, the Commission proposals need to be approved by the European Parliament and the EU Council of Ministers.
Communication 'Progress report on the single European electronic communications market 2007 (13th Report)' COM(2008) 153, 19.03.2008	The progress report presented a snapshot of Europe's Single Telecoms Market as of December 2007, based on facts and figures from national telecoms regulators and market players.
Communication 'Advancing the internet - Action Plan for the deployment of internet Protocol version 6 (IPv6) in Europe', COM(2008) 313, 27.05.2008	Increasing demand for internet-based services means that there would not be enough addresses to support this expected growth, if no action is taken. Encouraging internet users and providers to adopt the latest internet Protocol (IP version 6 or IPv6) will provide a massive increase in address space, much in the same way as telephone numbers were lengthened in the 20th century. In this Communication, the Commission sets Europe a target of getting 25% of EU industry, public authorities and households to use IPv6 by 2010.

Proposal for a Regulation amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks and Directive 2002/21/EC on a common regulatory framework for electronic communications, COM(2008) 580, 23.09.2008 Communication on Roaming Regulation COM(2008) 579, 23.09.2008	Mobile phone users can expect the cost of sending text messages from abroad in the EU to be much cheaper: the Commission proposed to reduce the price of roaming text messages by 60% as of 1 July 2009. EU citizens travelling in other EU countries should pay no more than €0.11 per SMS compared to the current EU average of €0.29. The Commission also wants to improve transparency for surfing the web and downloading data on a mobile phone while abroad: consumers used to cheaper data services at home should be better protected against roaming "bill shocks" that can run to thousands of euro. The proposals have been submitted to the European Parliament and Council, who must agree before they become law. The EU already reduced charges for making and receiving calls abroad (voice roaming) by 60% in summer 2007.
Communication on the second periodic review of the scope of universal service in electronic communications networks and services, COM(2008) 572, 25.09.2008	The concept of universal service in telecoms is about a safety net guaranteeing a minimum level of services, such as connection to a phone network and basic internet access, that would fill the basic needs that the market fails to address. The Commission report shows that competitive markets for broadband internet are providing EU citizens widespread and affordable access; however, further efforts are needed to ensure broadband for all. The report asks whether a new universal service obligation should be considered.
Communication on future networks and the internet, COM(2008) 594, 29.09.2008	The Communication proposes a coherent policy for preparing Europe's information society for the next decade of internet. A public consultation has subsequently been carried out on best responses to the opportunities. The report also introduced a new Broadband Performance Index (BPI) that compares national performance on key measures such as broadband speed, price, competition and coverage.
Recommendation on notifications, time limits and consultations provided for in Article 7 of Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services, C(2008) 5925, 15.10.2008	The Recommendation reduces administrative demands on national telecoms regulators when submitting draft regulatory measures to the Commission under the so-called 'Article 7 procedure' . Since 2003, the Commission has reviewed more than 800 national regulators' decisions to break traditional telecoms monopolies and open up networks for competitors. The new Recommendation allows national regulators to use a simplified form to notify the Commission of certain decisions.
Communication on the legal framework for mobile TV networks and services: best practice for authorisation – the EU model, COM(2008) 845, 10.12.2009	Consumers are becoming increasingly interested in using mobile TV. However, before a commercial operator can launch such a service, they need an authorisation from the Member State. The new guidelines identify the main principles which regulators and governments in the EU should follow when authorising operators to provide Mobile TV services. The guidelines aim to accelerate the roll-out of these services across Europe.
Communication 'Investing today for tomorrow's Europe', COM(2009) 36, 28.01.2009 Proposal for a Council Regulation amending Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), COM(2009) 38 - 2009/0011 (CNS), 28.01.2009	The Commission aims to achieve 100 % high-speed internet coverage for all citizens by 2010 as part of the European Economic Recovery Plan. In January 2009 the Commission proposed to earmark € 1 billion to help rural areas get online, bring new jobs and help businesses grow. The funds, to come from unspent EU budget, were proposed to be targetted through the existing EU's Rural Development Fund to cover the "white spots" on Europe's broadband map (30% of the population in rural areas who do not have broadband access).
Communication 'Better access for rural areas to modern ICT', COM(2009) 103, 03.03.2009	Connecting the 30% of the EU's rural population that has no high speed internet access should be a priority for achieving 'broadband for all' by 2010. In a followup to its communication of January (see above), the Commission outlined how it would use its own support programmes to boost internet networks and services in rural areas, and called on EU Member States to do the same.

Communication 'Progress report on the single European electronic communications market 2008 (14th Report)' COM(2009) 140, 24.03.2008	The report gives a snapshot of the EU's telecoms market and the main regulatory developments that took place in 2008. It is based on facts and figures from national telecoms regulators and market players, verified by Commission experts. The report notes that Europe leads the world in mobile phone services. Despite the economic crisis, the EU's telecoms sector continued to grow in 2008, outperforming the rest of the economy. Average mobile phone bills have fallen. However, the report also warns that without better European coordination, the benefits of a single telecoms market could be jeopardised by inconsistent national regulation.
Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, C(2009) 3359, 07.05.2009	The Recommendation sets out guidance for EU telecoms regulators on the cost-based method to be used when calculating termination rates – the wholesale fees charged by operators to connect the call from another operator's network which are part of everyone's phone bill. The Recommendation indicates specifically that termination rates at national level should be based only on the real costs that an efficient operator incurs to establish the connection. Eliminating price distortions between phone operators across the EU will lower consumer prices for voice calls within and between Member States.
Communication 'Internet of Things — An action plan for Europe', COM(2009) 278, 18.6.2009	Today's internet links about 1.5 billion users worldwide through computers and mobile devices (about 300 million in the EU). In the coming years also machines and various physical objects will get connected, thus creating the 'internet of things'. Among the 14 actions proposed in the plan to promote the evolution of this 'internet of things' in the EU, are standardisation of the technologies involved across Europe and better funding of research, as well as measures to protect people's privacy, data and security as the new technology takes shape around them.
Commission regulation (EC) No 4521/2009 amending Regulation (EC) No 874/2004 laying down public policy rules concerning the implementation and functions of the .eu Top Level Domain and the principles governing registration, 26.06.2009	The new EU rules make it possible for internet users and businesses to register domain names under .eu using the characters of all the 23 official languages of the European Union, now including Cyrillic and Greek scripts. This means that later in 2009 .eu will also be available in the alphabets used by Bulgarians, Greeks and Cypriots and special characters used in other languages.

Action 2: Making spectrum management more efficient

Communication on a forward-looking radio spectrum policy for the European Union — Second annual report, COM(2005) 411, 06.09.2005	The Spectrum Policy Report identified policy priorities for more flexible spectrum management and an action plan for their implementation.
Communication on a market-based approach to spectrum management in the European Union, COM(2005) 400, 14.09.2005	The Communication paved the way for the coordinated introduction of secondary trading of radio frequencies in the Union by 2010.
Communication on EU spectrum policy priorities for the digital switchover, COM(2005) 461, 29.09.2005	The Communication provided guidance for international spectrum negotiations in the ITU Regional Radiocommunications Conference (RRC-06) with particular reference to the spectrum implications of the digital switchover.
Commission Decision 2005/513/EC on the harmonised use of radio spectrum in the 5 GHz frequency band for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs), 11.07.2005	This decision makes available in all Member States a substantial amount of radio spectrum for radio local area networks (RLANs) — commonly known as 'Wi-Fi' — to provide access on the move to the internet and private networks.

Commission Decision 2005/928/EC on the harmonisation of the 169.4-169.8125 MHz frequency band in the Community (frequency band originally designated for the ERMES paging system), 20.12.2005 (amended by Commission Decision 2008/673/EC, 13.08.2008).	Spectrum bands reserved for paging systems no longer in use were reallocated in the whole EU to special needs applications such as hearing aids and emergency alarms.
Commission Decisions: 2006/771/EC on the harmonisation of the radio spectrum for use by short-range devices, 09.11.2006 (;amended by Commission Decisions 2008/432/EC, 23.05.2008 and 2009/381/EC, 13.05.2009) and 2006/804/EC on the harmonisation of the radio spectrum for radio frequency identification (RFID) devices operating in the ultra high frequency (UHF) band, 23.11.2006	The two Decisions, applicable throughout the EU, specify harmonised conditions for the use of radio spectrum for a large range of low-power short-range radio transmitters. Thanks to these Decisions, consumers do not need to worry whether a wireless product bought in one Member State will work in another. One harmonisation measure covers RFIDs in the UHF band and the other addresses certain equipment categories of relevance today, but also has a built-in mechanism to extend it to new devices. This update mechanism was already used twice.
Communication on rapid access to spectrum for wireless electronic communications services through more flexibility, COM(2007) 50, 08.02.2007	The aim of this Communication is to set out the practical steps necessary from now until 2010 to pave the way towards more flexible spectrum management in bands used for electronic communications services with individual rights of use.
Commission Decision 2007/98/EC on the harmonised use of radio spectrum in the 2 GHz frequency bands for the implementation of systems providing mobile satellite services, 14.02.2007	This Decision is an important step in facilitating the introduction of new and innovative Mobile Satellite Service systems providing services such as satellite data casting or multimedia broadcasting (including mobile TV) via a coordinated EU approach.
Commission Decision 2007/131/EC on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community, 21.02.2007 (amended by 2009/343/EC, 21.04.09).	This harmonising decision outlines mandatory conditions for using ultra-wideband (UWB) technology in new-generation wireless devices (such as laptops, mobile phones, digital cameras) in the EU. It allows innovators to use this new technology throughout the EU without interference with other wireless users. With UWB, many electronic devices so far linked by cable will have a wireless alternative offering the same data rates.
Communication on Radio Frequency Identification (RFID) in Europe: Steps towards a policy framework, COM(2007) 96, 13.3.2007	From today's simple radio tags to tomorrow's intelligent and networked systems, RFID applications will create many opportunities for business and society. But the more intensive and extensive use of RFID also raises questions in the areas of privacy, security, technological reliability and international compatibility. The Communication on RFID identifies RFID-related issues of high importance for Europe, together with a plan for future action at European level.
Commission Decision 2007/344/EC on harmonised availability of information regarding spectrum use within the Community, 16.05.2007	Radio spectrum users can benefit from greater clarity on what spectrum is available and how this may be used across Europe, thanks to this Decision, which defines a common format and level of detail for information that Member States should provide. This common approach enables the establishment of a single information point containing comparable data.
Communication 'The ITU World Radio-communication Conference 2007 (WRC-07)', COM(2007) 371, 02.07.2007	The Communication outlines the EU's positions on what needs to be achieved at the 2007 World Radiocommunication Conference (WRC-07) of the International Telecommunication Union (ITU) in areas such as future terrestrial mobile systems, Earth exploration, digital radio broadcasting, and aviation applications.
Proposal for a Directive repealing Council Directive 87/372/EEC on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community COM(2007) 367, 25.07.2007	The Commission has proposed measures to make it easier and more lucrative for mobile operators in Europe to offer and develop innovative wireless technologies. By opening radio spectrum for advanced mobile data and multimedia services (such as 3G services that allow video streaming and fast downloads on a mobile handset), the Commission proposals aim to increase the number and choice of wireless services available, as well as to expand their geographic coverage to the benefit of all European citizens. The proposals also aim to reduce network deployment costs for Europe's wireless communications industry.

Decision 2008/626/EC of the European Parliament and of the Council on the selection and authorisation of systems providing mobile satellite services (MSS), 30.06.2008	The new selection mechanism aims to allow innovative services, such as mobile TV, broadband data and emergency communications, to develop smoothly throughout Europe from 2009.
Communication 'Reaping the full benefits of the digital dividend in Europe: A common approach to the use of the spectrum released by the digital switchover', COM(2007) 700, 13.11.2007	(See Action 1, Proposals for a reform of the EU regulatory framework for electronic communications)
Commission Decision 2008/286/EC amending Decision 2007/176/EC as regards the List of standards and/or specifications for electronic communications networks, services and associated facilities and services, 17.03.2008	The Commission has added the Digital Video Broadcasting Handheld standard (DVB-H) to the EU List of Standards, which serves as a basis for encouraging the harmonised provision of telecommunications across the EU. The addition of DVB-H is a new step towards establishing a Single Market for Mobile TV in Europe that will enable all EU citizens to watch TV on the move. Member States are required to encourage the use of DVB-H.
Commission Decision 2008/294/EC on harmonised conditions of spectrum use for the operation of mobile communication services on aircraft (MCA services), and Recommendation 2008/295/EC on authorisation of mobile communication services on aircraft (MCA services), 07.04.2008	The measures harmonise the technical and licensing requirements for the use of mobile phones on board aircrafts. As a result, businesspeople and consumers will be able to receive and make calls and messages safely with their own mobile phones while flying all over Europe. This means that the 90% of European air passengers that already carry mobile phones on-board aircraft, can remain contactable during flights.
Commission Decision 2008/411/EC on the harmonisation of the 3400 - 3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, 21.05.2008	The Decision harmonises 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications and ensures coherent technical conditions within the Community for the provision of services such as broadband wireless access.
Commission Decision 2008/477/EC on the harmonisation of the 2500-2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, 13.06.2008	The Decision harmonises the 2500-2690 MHz frequency band for terrestrial systems capable of providing electronic communications and ensures coherent technical conditions within the Community for the provision of services such as mobile internet access.
Commission Decision 2008/671/EC on the harmonised use of radio spectrum in the 5875 - 5905 MHz frequency band for safety related applications of Intelligent Transport Systems (ITS), 05.08.2008	The Decision earmarks the frequency band 5875-5905 MHz across Europe for smart vehicle communications systems (so called co-operative systems). They are based on wireless communication technology and allow cars to 'talk' to other cars and to the road infrastructure providers.
Commission Recommendation on the implementation of privacy and data protection principles in applications supported by radio-frequency identification, C(2009) 3200, 12.5.2009	The recommendation provides guidance to Member States on the design and operation of RFID applications in a lawful, ethical and socially and politically acceptable way, respecting the right to privacy and ensuring protection of personal data.
Action 3: A consistent internal market framework promoting the development of high quality and innovative information society and media services	
Commission Recommendation on collective cross-border management of copyright and related rights for legitimate online music services (2005/737/EC), 18.10.2005	The Recommendation puts forward measures for improving EU-wide licensing of copyright for online services. The development of EU-wide copyright licenses should allow new online music services to develop their full potential.

Proposal for a Directive on payment services in the internal market, COM(2005) 603, 01.12.2005	The proposed Directive brings down existing legal barriers in order to create a 'Single Payments Area' in the EU. The aim is to make cross-border payments — by credit card, debit card, electronic bank transfer, direct debit or any other means — as easy, cheap and secure as 'national' payments within one Member State.
Legislative proposal for an Audiovisual Media Services Directive (revision of the 'Television Without Frontiers' Directive), COM(2005) 646, 13.12.2005	The proposal aims to create a single framework for all types of audiovisual media services, irrespective of the technology used to transmit or receive them. The objective is to create a level playing field for the different providers of audiovisual content and provide operators of non-linear audiovisual media services with the legal certainty necessary to offer their services on a pan-European basis.
Commission Decision on re-use of Commission information (2006/291/EC), 07.04.2006	The Decision determines the conditions for the re-use of documents held by the Commission or on its behalf by the Office for Official Publications of the European Communities with the aim of facilitating wider re-use of this information.
European Charter for the Development and the Take-up of Film Online, 23.05.2006	The Charter identifies commendable practices for bringing film online via legitimate services and in a consumer-friendly way. It was initiated by the Commission and agreed by business leaders at the Cannes Film Festival in 2006. It aims to be the point of reference for the film and content industry, internet service providers and telecom operators.
Adoption of the MEDIA 2007 Programme, Decision 1718/2006/EC, 15.11.2006	Launched on 11.02.2007, the MEDIA 2007 programme will provide a €755 million boost to Europe's film industry over the next seven years. Almost 65% of the budget will help broaden the circulation of European works to other countries in Europe and worldwide. MEDIA 2007 provides easier access to finance and promotes increased use of digital technologies.
Adoption of the eContentplus 2006 Work Programme and call for proposals	The work programme set the following objectives for 2006: geographic information, educational content, digital libraries (cultural and scientific/scholarly content), and reinforcing cooperation between digital content stakeholders.
Commission staff working paper on media pluralism, SEC(2007) 32, 16.01.2007	Responding to political concerns about media concentration and its possible effects on pluralism and freedom of expression, the Commission presented a three-step approach to advancing the debate on media pluralism in the EU.
Green Paper on the Review of the Consumer Acquis, COM(2006) 744, 08.02.2007	The Green Paper launched a major new drive to adapt core EU consumer rules to the challenges of the fast-changing digital world. The paper identified a number of problems with the current legislation in the area of consumer protection, presented the main options for reform and initiated a public consultation.
Communication 'A single market for citizens — Interim Report to the 2007 Spring European Council', COM(2007) 60, 21.02.2007	The report sketched out a new vision for the single market of the future. It was followed later in 2007 by a full review of the single market (see below).
Single market review package: Communication on a single market for 21st century Europe, COM(2007) 724 and associated documents, 20.11.2007	The Communication concludes the review initiated in 2006 and transforms the 'vision paper' of February 2007 into an operational set of initiatives to re-position the single market. Proposals include a European e-invoicing framework, an action plan on e-authentication and e-signatures, a standardisation strategy, as well as an initiative on universal service in support of an information society for all, in line with the new reform proposals for EU telecom rules.
Communication on a European approach to media literacy in the digital environment, COM(2007) 833, 20.12.2007	The Communication is the first EU-level policy document on media literacy — the ability of people to critically analyse what they find in the media and to make more informed choices. The document focuses on: 1) media literacy for commercial communication, covering issues related to advertising, 2) media literacy for audiovisual works, which is in part about raising awareness of European film and enhancing creativity skills, 3) and online media literacy, which, for example, will give citizens a better understanding of how Google and other internet search engines work.

Communication on creative content online in the Single Market, COM(2007) 836, 03.01.2008	The Communication launched actions to support the development of innovative business models and the cross-border delivery of diverse online creative content services. The Commission has identified four main, horizontal challenges that merit further action at EU level: 1) availability of creative content, 2) multi-territory licensing for creative content, 3) interoperability and transparency of Digital Rights Management systems (DRMs) and 4) legal offers and piracy. The Communication opened a public consultation in order to prepare, by mid-2008, an EU Recommendation on Creative Content Online.
Proposal for a Decision establishing an audiovisual cooperation programme with professionals from third countries MEDIA Mundus, COM(2008) 892, 09.01.2009	The new MEDIA Mundus is an international cooperation programme for the audiovisual industry to strengthen cultural and commercial relations between Europe's film industry and film-makers of third countries. The EU will provide €15 million of funding from 2011-2013 for projects submitted by audiovisual professionals from the EU and third countries.
Communication concerning the State aid assessment criteria of the Commission communication on certain legal aspects relating to cinematographic and other audiovisual works (Cinema Communication) of 26 September 2001, (2009/C 31/01), 07.02.2009	The Communication extends the validity of the state aid assessment criteria for the production of films and audiovisual works until 31 December 2012. These criteria, laid down in a Commission Communication of 2001, are used by the Commission to approve Europe's national, regional and local film support schemes under the EU's state aid rules. The new Commission Communication also identifies a number of trends which are likely to have to be addressed by a future Cinema Communication.
eYouGuide to your rights online, launched 05/05/2009 http://ec.europa.eu/eyouguide	The Commission's eYouGuide is an online tool giving practical advice on the "digital rights" consumers have under EU law. The guide addresses consumer issues such as the rights towards your broadband provider, shopping on the web, downloading music and protecting your personal data online and on social networking sites. Giving consumers clear information about their rights will increase trust and help unlock the full economic potential of Europe's single online market.
Communication on re-use of Public Sector Information - review of Directive 2003/98/EC, COM(2009) 212, 07.05.2009	European citizens use products and services based on the vast amounts of information produced, collected and shared by public sector bodies, such as car navigation systems, weather forecasts and financial and insurance services, on a daily basis. Still, much of Europe's public sector information is not re-used. The Commission calls on EU Member States to make it easier to access and re-use public sector information.
1.2 — Increasing security of networks	
Action 4: Strategy for a secure European Information Society — increasing trust and confidence	
Report on the operation of the Directive on electronic signatures, COM(2006) 120, 15.03.2006	The report reviews the operation of the Directive on electronic signatures: most applications are found in the field of e-banking and eGovernment but the use of qualified electronic signatures has been much lower than expected.
Communication 'A strategy for a Secure Information Society — Dialogue, partnership and empowerment' COM(2006) 251, 31.05.2006	The strategy builds a framework and develops synergies among the various policy initiatives for network and information security. It calls for a structured process of consultation and dialogue with relevant stakeholders, including public administrations, the private sector, individual users and the European Network and Information Security Agency (ENISA).
Communication on fighting spam, spyware and malicious software, COM(2006) 688, 15.11.2006	Despite existing EU legislation outlawing spam, Europe continues to suffer from illegal online activities both from inside the EU and from third countries. The Commission stresses that national authorities must step up their prosecution of such activities. The Communication takes stock of the efforts made so far to fight these threats and identifies further action that can be taken.
Communication concerning the final evaluation of the Safer internet Action Plan (2003-2004), COM(2006) 663, 6.11.2006	The final evaluation of the first generation of Safer internet activities is a necessary step for further policy development, including the presentation of a new programme in 2008.

Communication on the implementation of the Safer internet plus programme (2005-2008) COM(2006) 661, 6.11.2006	Assessment of the first phase of operation of the programme provides the basis for defining the complete financial framework for the Programme.
Adoption of the Safer internet plus 2006 Work Programme and call for proposals	The 2006 call addressed all action lines under the Programme. For actions to fight illegal content and raise awareness, the call invited proposals from Member States where no hotline or awareness nodes had previously been established.
European Programme for Critical Infrastructure Protection (EPCIP), COM(2006) 786, 12.12.2006	Critical infrastructure can be damaged, destroyed or disrupted by deliberate acts of terrorism, natural disasters, negligence, accidents, as well as computer hacking, criminal activity and malicious behaviour. The Commission presented a package of new measures to improve the protection of critical infrastructure in Europe, including critical ICT infrastructure.
Decision C(2007) 249 on reserving the national numbering range beginning with '116' for harmonised numbers for harmonised services of social value, 12.02.2007	The Commission has adopted a Decision reserving the 116 000 telephone number in all Member States as a hotline for reporting missing children. Calling 116 000 is free of charge throughout Europe. It is up to the Member States to select an association or authority to manage this service. All other numbers beginning with 116 are also reserved for social services in Europe.
Communication 'Promoting Data Protection by Privacy Enhancing Technologies (PETs)' COM(2007) 228, 02.05.2007	The Communication identifies the benefits of Privacy Enhancing Technologies (PETs) and lays down the Commission's objectives in this field. Those objectives are to be achieved through a number of specific actions supporting the development of PETs and their use by data controllers and consumers.
Communication 'Towards a general policy on the fight against cyber crime', COM(2007) 267, 22.05.2007	The Communication outlines actions to improve cooperation between law enforcement authorities and between law enforcement and private sector operators in fighting cyber crime. The actions will complement other actions taken at national, European and international level.
Proposal for Decision establishing a multiannual Community programme on protecting children using the internet and other communication technologies, COM(2008) 106, 27.02.2008	Safer internet 2009-2013 builds upon the successful Safer internet plus programme and will have a budget of €55 million. Encompassing recent Web 2.0 communications services such as social networking, the new programme will fight not only illegal content but also harmful conduct such as grooming and bullying.
Communication 'On the protection of consumers, in particular minors, in respect of the use of video games', COM(2008) 207, 22.04.2008	There are public concerns that video games can cause aggressive behaviour, heightened by school shootings such as in Helsinki (Finland, November 2007). The Commission has surveyed existing measures protecting minors from harmful video games across the 27 EU Member States. 20 EU Member States now apply PEGI (Pan European Games Information), an age-rating system developed by industry, with EU support, since 2003. In the Commission's view, industry must invest more to strengthen and in particular to regularly update the PEGI system so that it becomes a truly effective pan-European tool.
Communication 'Protecting Europe from large scale cyber attacks and disruptions: enhancing preparedness, security and resilience', COM(2009) 149	Our life and economy have become increasingly dependent on information infrastructures such as computer networks and telephone lines, which therefore need to be safe. As we get more and more interconnected, failures of these infrastructures may cascade and spread beyond national borders. To address this risk, the Commission has launched a policy initiative on Critical Information Infrastructure Protection (CIIP), which focuses on prevention, preparedness and awareness and defines a plan for immediate actions to strengthen the security and resilience of CIIs. It complements the European Programme for Critical Infrastructure Protection (EPCIP).
Communication on the application of State aid rules to public service broadcasting as adopted by the Commission, COM(2009) …, 02.07.2009	The Communication provides a clear framework for the development of public broadcasting services and enhances legal certainty for investment by public and private media alike. The main changes include an increased focus on accountability and effective control at the national level, including a transparent evaluation of the overall impact of publicly-funded new media services.

2 — Innovation and investment in research

2.1 — Promoting research and innovation

Action 5: Strengthening European research through the Framework Programmes

Launch of the European Technology Platforms (ETPs), 2005-2006	European Technology Platforms help industrial and academic research communities in specific technology fields to coordinate their research and tailor it to a common 'strategic research agenda'. Nine Platforms have been established in ICT areas: nanoelectronics (ENIAC), embedded systems (ARTEMIS), mobile and wireless communications (eMobility), networked electronic media (NEM), networked software and services (NESSI), robotics (EUROP), photonics (PHOTONICS21), satellite communications (ISI) and smart systems integration (EPoSS).
Adoption of Decisions establishing the 7th Framework Programme for Research (2007-2013), Decision No 1982/2006/EC, 18.12.2006, and others (2006/971/EC, 19.12.2006 — Specific Programme 'Cooperation')	The Seventh Framework Programme (FP7) bundles all research-related EU initiatives together under a common roof and has a crucial role to play in reaching the goals of growth, competitiveness and employment. The broad objectives of FP7 are grouped into four categories: Cooperation, Ideas, People and Capacities. The ICT priority theme is addressed mainly in the 'Cooperation' Specific Programme.
Adoption of the ICT Work Programme 2007-2008 under the 7th Framework Programme for Research (FP7)	The Work Programme for the ICT theme of the FP7 Specific Programme 'Cooperation' defines the priorities and criteria for the calls for proposals launched in 2007. It addresses seven 'challenges' of strategic interest to European society (1. Pervasive and trusted network and service infrastructures; 2. Cognitive systems, interaction and robotics; 3. Components, systems and engineering; 4. Digital libraries and content; 5. Sustainable and personalised healthcare; 6. Mobility, environmental sustainability and energy efficiency; 7. Independent living and inclusion), along with research into 'future and emerging technologies' and support for horizontal actions, such as international cooperation. Furthermore, research e-Infrastructures is supported through the Research Infrastructures Work Programme for the 'Capacities' programme.
Proposal for a Council Regulation on the establishment of the 'ARTEMIS Joint Undertaking' to implement a Joint Technology Initiative in Embedded Computing Systems, COM(2007) 243, 15.05.2007	The Commission proposed a new kind of Europe-wide public-private R&D partnership — Joint Technology Initiatives (JTIs) — in embedded computing systems. JTIs pool industry, Member State and Commission resources to conduct targeted research programmes. They move away from the traditional case-by-case public research funding approach towards large-scale research programmes with common strategic research targets.
Proposal for a Council Regulation Setting up the 'ENIAC Joint Undertaking', COM(2007) 356, 22.06.2007	The second Commission proposal for a Joint Technology Initiative concerns nanoelectronics. This Europe-wide public-private research partnership, called ENIAC, is to have a €3bn budget from industry, the Member States and the Commission, and aims to create a strong nanoelectronics research and manufacturing sector in Europe. The ultimate aim is to generate innovative products with in-built intelligence in numerous areas such as the consumer electronics, automotive, healthcare and environmental management sectors.

Action 6: Making innovation and research policies more efficient

Action Plan for European Standardisation, April 2006	This four-year rolling action plan outlines the main actions to be implemented, including in the area of ICTs, and defines a timeframe for carrying out these actions, subject to a review after 2 years.
Communication 'Putting knowledge into practice: a broad-based innovation strategy for the EU', COM(2006) 502, 13.09.2006	This 10-point programme urges action at national and European levels to foster innovation in the EU economy. The Commission outlines the concept of lead markets where public authorities facilitate industry-led innovation by creating conditions for the successful market uptake of innovative products and services in key areas of societal demands.

Communication to the European Council informal meeting in Lahti: An innovation-friendly, modern Europe. COM(2006) 589, 12.10.2006	The document focuses on several specific measures that could boost Europe's innovative capacity in a relatively short period of time. The proposed measures concern the establishment of European leadership in future strategic technologies, forging stronger links between universities, research and business, as well as improving the framework conditions for R&D investment.
Launch of a European Network of Living Labs, 20.11.2006	The European Network of Living Labs creates a platform where firms, public authorities and citizens can work together on developing and testing new technologies, business models and services in real-life contexts. The ultimate aim is to set up a new European Innovation Infrastructure where users play an active role in innovation.
Preparation of the ICT PSP Work Programme 2007	The ICT Policy Support Programme (ICT PSP) in the Competitiveness and Innovation Programme (CIP) supports the aims of the i2010 strategy, building on the previous e-TEN, Modinis and e-Content programmes. In 2007 the programme focused on three main themes: efficient and interoperable eGovernment services; ICTs for accessibility, ageing and social integration; and ICTs for sustainable and interoperable health services.
Green Paper: The European Research Area-New Perspectives, COM(2007)161, 4.4.2007	The Green Paper launched a debate on how to create a unified and attractive European research area (ERA), a European internal market for research, where researchers, technology and knowledge freely circulate and where there is effective European-level coordination of national and regional research activities, programmes and policies. The Commission and Member States launched new iniatives to develop ERA, including enhanced political governance through the ´Ljubljana Process´ and five specific policy initiatives.
Communication on pre-commercial procurement: driving innovation to ensure sustainable high quality public services in Europe, COM(2007) 799, 14.12.2007	The Communication proposes a new strategy for harnessing the innovative potential of public spending in Europe in the field of Research and Development (R&D). Europe could do substantially more at the pre-commercial stage, where products and services are not yet ripe for the market, and where investment is particularly risk-prone but crucial for research breakthroughs. For the Commission, such pre-commercial procurement could tap unused potential especially in high-tech areas, such as research into information and communication technologies for health care and medicine. The strategy launches a debate with the 27 EU Member States on where and how to focus the pre-commercial procurement of R&D.
Communication 'A lead market initiative for Europe', COM(2007) 860 21.12.2007	Europe can develop innovation-friendly markets in a more targeted way, considerably facilitating the marketing of innovations. That is what the Lead Markets Initiative seeks to do. eHealth is one of the six markets identified for the initial stage of the initiative. The Commission presents ambitious action plans for these markets to rapidly secure tangible advantages for Europe's economy and consumers.
Council regulation on the Community legal framework for a European Research Infrastructure (ERI), COM (2008) 467	The legal framework assists Member States to develop and fund pan-European Research Infrastructures, including eInfrastructures, many of which have already been identified through ESFRI, the European Strategic Forum on Research Infrastructures.
Towards joint programming in research: Working together to tackle common challenges more effectively, COM(2008)468, 15.7.2008	The Commission proposed that Member States develop and implement common Strategic Research Agendas addressing major societal challenges, thereby eliminating unnecessary cross European duplication by pooling data, resources and expertise currently scattered across Europe.
Communication 'A strategic European framework for international science and technology cooperation', COM(2008) 588, 24.09.2008	The Commission proposes a strategy for strengthening science and technology cooperation with non-EU countries, notably in the field of ICT, where Europe is a strong exporter. The Commission invites Member States to define together, rather than in isolation, research areas where a coherent EU effort would have more impact.

Communication 'A strategy for ICT R&D and innovation in Europe: raising the game', COM(2009) 116, 13.03.2009	Both Europe's market and research efforts are fragmented; as a result, Europe is lagging behind its global competitors in ICT research and in production of innovative ICT-based products and services. The proposed strategy calls on Member States and industry to pool resources and work together more in ICT research and innovation. The strategy also proposes showcase ICT innovation projects to deliver modern services infrastructures in areas like healthcare and energy efficiency.
Communication 'Moving the ICT frontiers – a strategy for research on future and emerging technologies in Europe', COM(2009) 184, 20.04.2009	Unlimited computing power, computers mimicking the brain, mind-controlled wheelchairs and friendly robotic companions are part of this new European plan to boost visionary research. The Commission proposes to boost Europe's high-risk research into future technologies by doubling research investment at national and EU level in this area by 2015. The Commission pledges to lead by example, increasing the current funding of € 100 million per year by 70% by 2013.

2.2 — Promoting ICT innovation and adoption for competitiveness and employment

Action 7: Promoting eBusiness solutions

Establishment of the Enterprise Interoperability Centre (EIC), April 2006	The EIC provides a platform for companies to discuss interoperability issues in their business relationships, with the focus on business-to-business processes, taking into account the various messaging standards available in each industry.

3 — Inclusion, better public services and quality of life

3.1 — Facilitating wider inclusion, accessibility and digital literacy

Action 8: Further development of eAccessibility and a comprehensive eInclusion strategy

Communication on eAccessibility COM(2005) 425, 13.09.2005	The Communication calls upon the Member States to do more to promote eAccessibility and to encourage take-up by industry. While continuing to support measures such as standardisation, Design for All, web accessibility and research, the Commission also proposes: to improve the consistency of accessibility requirements in public procurement; to explore certification schemes for accessible products and services; and to make better use of the 'eAccessibility potential' of existing legislation.
Communication 'Bridging the broadband gap', COM(2006) 129, 20.03.2006	The Communication focuses on the lack of adequate broadband services in the less developed areas of the Union. It assesses the instruments available at EU level to address this issue and proposes two main strands of action: the strengthening of national broadband strategies to set clear targets and reflect regional needs; and better exchange of best practice.
Riga Ministerial Declaration on eInclusion, 11.06.2006	The ministerial conference in Riga launched preparations for the 2008 European Initiative on eInclusion. The concluding declaration set priorities and commitments for addressing the needs of older people, reducing geographical digital divides, enhancing eAccessibility, improving digital literacy and promoting cultural diversity as well as inclusive eGovernment.
Recommendation on key competences for lifelong learning, (2006/962/EC), 18.12.2006	Every citizen must be equipped with the skills needed to live and work in the new information society. The European Parliament and the Council adopted the Commission proposal for a Recommendation providing a European reference tool on key competences, including digital competence, and on access to these competences through lifelong learning.
Communication 'E-skills for the 21st century: fostering competitiveness, growth and jobs', COM(2007) 496, 07.09.2007	Recent surveys indicate that Europe may face severe e-skills shortages in the coming years. At the same time, e-skills are becoming central to productivity, employability and the response to global challenges. The Commission has therefore proposed a long-term e-skills agenda and a set of actions at EU level.

Communication 'European i2010 initiative on e-Inclusion — To be part of the information society', COM(2007) 694, 08.11.2007	Despite technological progress and enhanced competition, more than one in three Europeans are still excluded from the full benefits of the digital society. To address this, the Commission sets out a European initiative to: 1) enable everyone to take part in the information society by bridging the accessibility, broadband and competence gaps; 2) boost the effective participation of those at risk of exclusion, and improve their quality of life; and 3) integrate e-Inclusion actions in Europe, so as to maximise their lasting impact. Among other things, the Communication announced a 2008 awareness-raising campaign 'e-Inclusion, be part of it!' and a ministerial conference at the end of that year.
'Digital Literacy Report: a review for the i2010 eInclusion Initiative ', European Commission Working Paper, December 2008	As part of its the commitment made in the 2006 Ministerial Riga Declaration on eInclusion, the Commission has carried out a review of 470 digital literacy initiatives in Europe. It finds that Member States have invested heavily in digital literacy and much has been achieved with increasing internet use by all sections of the population. However it warns that much remains to be done, particularly for the elderly, and finds evidence of a possible secondary digital divide in terms of quality of use.

3.2 — Providing better public services

Action 9: Promoting ICT-enabled public services (eGovernment and eHealth)

Commission decision on e-Commission 2006-2010: enabling efficiency and transparency, C(2005) 4473, 23.11.2005	The Commission intends to lead by example by applying eGovernment to its own administration. The e-Commission initiative aims to deliver better-quality and more transparent services, guaranteeing security of information including the protection of personal data.
Action plan for the implementation of the legal framework for electronic public procurement (2004)841, 13.12.2004 and its implementing directives	'The application of new ICT technologies has the potential to transform public (and private) procurement. It can enhance and expedite communication between contracting authorities and bidders, reduce delays and transactions costs, and widen the pool of tenderers. Many of the technical solutions to support 'straight through' e-procurement are coming on stream. The Commission – through its e-procurement Action plan (2004) and support for the PEPPOL project – is working to ensure that interoperable solutions are rolled out on a pan-European basis.
Communication on interoperability for pan-European eGovernment services, COM(2006) 45, 13.02.2006	Interoperability in eGovernment requires that the multiple layers of government at national, regional and local levels are able to 'talk to each other'. The Communication calls upon the Member States and industry to collaborate to make such interoperability happen. More concrete steps follow in the eGovernment Action Plan.
Communication on i2010 eGovernment Action Plan: Accelerating eGovernment in Europe for the Benefit of All, COM(2006) 173, 25.04.2006	The eGovernment Action Plan addresses five priority areas, with ambitious objectives to be reached by 2010: 1) ensuring all citizens have access to a wide range of technologies; 2) raising administrative efficiency; 3) implementing e-Procurement; 4) ensuring secure access to services across the EU; and 5) strengthening participation and democratic decision-making.
Decision of the Commission on the EU Public Licence, C(2008) 891,9.1.2008	The EUPL is the first European Free/Open Source Software (F/OSS) Licence. The EUPL has been approved as a Licence to be used for the distribution of software developed in the framework of the IDA and IDABC programmes. Nevertheless, the text of the Licence is drafted in general terms, so the Licence may be used for other software applications, as the case may be, by other European Institutions, by national, regional or local administrations, other public entities as well as private entities and natural persons.
Commission decision on e-Commission 2006-2010: Mid-Term Review, C(2008)7961, 11.12.2008	Three years after the adoption of the e-Commission 2006-2010 strategy the overall picture is encouraging and most actions are on track. The Commission thus faces a new stage of eGovernment maturity where collaboration, common repositories, rationalisation and integration of the information systems portfolio will provide the framework to assemble processes in seamless operations so as to sustain the Commission's efforts in being a world-class, knowledge-based public administration.

Proposal for a decision of the European Parliament and of the Council on interoperability solutions for European public administrations (ISA), COM(2008)583 12.12.2008	This programme is the follow-on of IDABC which will come to an end on 31 December 2009. The ISA programme is focusing on interoperability solutions supporting the interaction between European public administrations and the implementation of Community policies and activities. The European Interoperability Framework (EIF) has been developed in the context of the IDA and IDABC programmes to support the European Union's strategy of providing user-centred eGovernment services by facilitating, at a pan-European level, the interoperability of services and systems between public administrations, as well as between administrations and the public (citizens, businesses). The EIF defines the general rules and principles for collaboration on interoperability between Member States and European Institutions. The first version of the EIF has been issued in 2004: the Commission is currently revising the European Interoperabilty Framework (EIF) to prepare a second version.
Communication on the final evaluation of the IDABC programme, COM(2009)247, 29.5.2009	The evaluation describes the IDABC programme as being in line with the eGovernment policy priorities of the European Commission, as expressed in the i2010 strategy and the related eGovernment action plan and identifies some future challenges in this area.
EU Health Portal 'Health-EU', launched 10.05.2006	Health-EU provides a single point of entry where citizens, administrations and specialists can find a wealth of health-related information and data from EU, national and sub-national levels. It is accessible at http://health.europa.eu.
Recommendation on cross-border interoperability of electronic health record (EHR) systems, (2008/594/EC), 02.07.2008	The Recommendation aims to provide Member States with basic principles and guidelines for ensuring that doctors can gain access to vital information on patients that they are trying to treat, wherever such information may be located in Europe. This will improve the safety and quality of care for people who require medical assistance while travelling or living abroad.
Communication on telemedicine for the benefit of patients, healthcare systems and society, COM(2008) 689, 4.11.2008	This Communication aims to support and improve access to telemedicine for EU citizens and healthcare professionals across Europe. In response to a call for action from Member States, this initiative aims to increase and broaden telemedicine services, including diagnosis, treatment and monitoring at a distance across Europe. Such services will allow, for example, a patient suffering from a rare retinal disease to be diagnosed in his hometown by a specialist working at a European Centre of Excellence for eye diseases located thousands of kilometres away. Patients with chronic heart failure will be able to have their disease more closely monitored and to enjoy better quality of life while staying at home.
Action 10: Ageing Well in the Information Society	
Communication 'Ageing well in the Information Society — An i2010 Initiative — Action Plan on Information and Communication Technologies and Ageing', COM(2007) 332, 14.06.2007 Proposal for a Decision on participation by the Community in a research and development programme aimed at enhancing the quality of life of older people through the use of new Information and Communication Technologies (ICT), COM(2007) 329, 14.06.2007	Responding to the needs of Europe's growing ageing population, the Commission adopted a European Action Plan for 'Ageing Well in the Information Society'. The action plan aims to help overcome technical and regulatory barriers to market development, to help raise awareness and share best practice, as well as to accelerate take-up through, for example, pilot projects and a European award scheme for smart homes and independent living applications. In particular, three areas of user needs are to be addressed: ageing well at work or 'active ageing at work', ageing well in the community, as well as ageing well at home. The action plan is accompanied by a new joint European research programme raising to over €1bn the investment on research into ICTs to improve the lives of older people.
Action 11: Intelligent Car	
Second eSafety Communication 'Bringing eCall to Citizens', COM(2005) 431, 14.09.2005	eCall is an in-vehicle safety system: when a car senses a major impact in an accident, its eCall device automatically calls the nearest emergency centre using 112. In response to the slow progress of eCall in the Member States, the Commission urges the national and regional governments to do more. The Communication provides a roadmap for full-scale roll-out of eCall.

Communication on the Intelligent Car Initiative 'Raising Awareness of ICT for Smarter, Safer and Cleaner Vehicles', COM(2006) 59, 15.02.2006	The Commission's Intelligent Car Initiative is a comprehensive initiative for smarter, safer and cleaner vehicles. The long-term objective is a situation where cars no longer crash and traffic congestion is reduced. The Communication presents a policy framework for action, comprising coordination of relevant stakeholders (eSafety Forum), ICT-based research and development, as well as awareness raising and stimulation of user demand.
Third eSafety Communication 'Bringing eCall back on track — Action Plan', COM(2006) 723, 23.11.2006	An urgent set of actions to roll out emergency call (eCall) technology for cars in Europe has been proposed by the Commission. Member States have been given clear tasks with deadlines for solving the remaining issues and proceeding with the necessary 112, E112 and eCall infrastructures. Industry is asked to renew its commitment to eCall.
Commission Recommendation on safe and efficient in-vehicle information and communication systems: update of the European Statement of Principles on human machine interface (2007/78/EC), 22.12.2006	The Commission has updated the Recommendation on human-machine interfaces in vehicles. This update responds to the increased presence of portable devices in cars such as mobile telephones, PDAs (Personal Digital Assistants) or laptops. The objective is to make the design and installation of these systems safer.
Communication 'Towards Europe-wide safer, cleaner and efficient mobility: the first Intelligent Car report', COM(2007) 541, 17.09.2007	The Commission has outlined new plans to accelerate the drive for safer, cleaner and smarter cars. The next step is negotiations with European and Asian automotive industry associations to reach an agreement on offering the pan-European in-vehicle emergency call system (eCall) as a standard option in all new cars from 2010. The Commission continues to promote the take-up of other life-saving technologies and investigate how technology can help make cars greener and smarter.
Commission Decision 2008/671/EC on the harmonised use of radio spectrum in the 5875 - 5905 MHz frequency band for safety-related applications of Intelligent Transport Systems (ITS), 05.08.2008	As part of its overall fight against road accidents and traffic jams, the Commission decided to reserve, across Europe, part of the radio spectrum for smart vehicle communications systems (so called co-operative systems). They are based on wireless communication technology and allow cars to 'talk' to other cars and to the road infrastructure providers. They can, for example, warn other drivers of slippery roads or of a crash which just happened. Smart vehicle communication systems have the potential to make safer and ease the lives of Europe's drivers.
Communication 'Action Plan for the Deployment of Intelligent Transport Systems in Europe', COM(2008) 886, 16.12.2008	With the objective to accelerate and coordinate the deployment and use of Intelligent Transport Systems (ITS) applications and services for road transport and their connections with other modes of transport, the ITS action plan proposes concrete measures in six priority areas to ensure seamless access and continuity of services throughout the EU. Such systems can help to make transport greener, reduce congestion and save lifes on Europe's roads. The ITS Action plan is a transport policy initiative which complements the Intelligent Car initiative and the work of the eSafety forum to make cars safer, cleaner and smarter.
Proposal for a Directive of the European Parliament and of the Council laying down the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other transport modes, COM(2008), 887, 16.12.2008	The proposed Directive accompanying the ITS Action Plan lays down the framework for the implementation of the measures identified in the Action Plan. It establishes a framework for the coordinated deployment and use of intelligent transport systems within the Community and the development of the specifications necessary. By ensuring the development and adoption of the necessary specifications and procedures, the proposed Directive will guarantee the required interoperability of systems and continuity of ITS services and applications. Both ITS Action Plan and Directive proposal will benefit from work carried out in the framework of the Intelligent Car Initiative.

Action 12: Digital Libraries

Communication on digital libraries, COM(2005) 465, 30.09.2005	The Commission is promoting and coordinating work to build a European Digital Library — a common multilingual access point to Europe's cultural heritage. The Communication proposes a first set of actions in the areas of: digitisation of content stored in traditional formats; online accessibility of this content; and digital preservation. The target as set to make two million books, films, photographs, manuscripts, and other cultural works accessible through the European Digital Library by 2008. This figure is planned to grow to at least six million by 2010.
Commission Decision setting up a High Level Expert Group on digital libraries, (2006/178/EC), 28.02.2006	This advisory group also provides a forum for discussion with stakeholders. Its first contribution on the management of copyright addresses the practical problems of dealing with orphan and out-of-print works and digital preservation.
Commission Recommendation on the digitisation and online accessibility of cultural material and digital preservation, (2006/585/EC), 24.08.2006	In the Recommendation, the Commission urges Member States to tackle three main areas: the digitisation of cultural material, its online accessibility and digital preservation. The institutions or Member States themselves are responsible for the selection of the material to be digitised.
Communication on scientific information in the digital age: access, dissemination and preservation, COM(2007) 56, 15.02.2007	The Communication examines how new digital technologies can be better used to increase access to research publications and data. The Commission thereby launches an EU framework to support new ways of promoting better access to scientific information online and to preserve research results digitally for future generations.
Commission Decision setting up the Member States' Expert Group on Digitisation and Digital Preservation (2007/320/EC), 22.03.2007	The group monitors progress and assess the implementation of the Recommendation on the digitisation and online accessibility of cultural material and digital preservation, and the Council Conclusions on this topic. It is also a forum for sharing strategies and best practice.
'Europeana' – Europe's Digital Library, launched at www.europeana.eu, 20.11.2008	At www.europeana.eu, internet users around the world can now access more than two million books, maps, recordings, photographs, archival documents, paintings and films from national libraries and cultural institutions of the EU's 27 Member States. Anyone interested in literature, art, science, politics, history, architecture, music or cinema will have free and fast access to Europe's greatest collections and masterpieces in a single virtual library through a web portal available in all EU languages. And this is just the beginning: Europeana will be expanded.

Action 13: ICTs for sustainable growth

Communication 'Addressing the challenge of energy efficiency through Information and Communication Technologies', COM(2008) 241, 13.05.2008	As part of its effort to combat climate change, the Commission is promoting the use of ICT to improve energy efficiency throughout the economy, starting with buildings, lighting and the power grid. ICT can enable 'greener' behaviour across the economy, which would massively cut Europe's carbon footprint if widely deployed. The Commission encourages the ICT sector, which accounts for 2% of global CO_2 emissions, to lead by example the drive towards carbon neutrality. This will be done by reinforcing research, development and deployment of components and systems, complemented by voluntary agreements, for example on green procurement. The real gains from green ICT will come from developing energy-efficient ICT solutions that impact the other 98% of global emissions. The Communication focuses on three energy-intensive areas: energy generation and distribution, buildings, and lighting.
Communication 'Mobilising information and communication technologies to facilitate the transition to an energy-efficient, low-carbon economy', COM(2009) 111, 12.03.2009	The Commission calls on Member States and industry to use ICT to improve energy efficiency, as this can reduce total carbon emissions in Europe by up to 15% by 2020 (Europe's overall target is 20%). ICT can help make people and companies more aware of how they use energy. It. With smart metering in their homes, for example, consumers have been found to reduce their energy consumption by as much as 10%. A public consultation was launched on what measures and commitments should follow.

ICT **Country Profiles**

Commission staff working document

volume **3**

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European Commission
Europe's Digital Competitiveness Report

http://ec.europa.eu/i2010

Introduction

This annex presents country-level results for 52 benchmarking indicators for which up-to-date data is available. Profiles are provided for each Member State plus Norway, Iceland and Croatia.[1]

The indicators were defined by the Commission in co-operation with Member States and were set out in the i2010 Benchmarking Framework[2] endorsed by the i2010 High Level Group in April 2006. The main sources of data are the Community Surveys of Households and Individuals and of Enterprises undertaken by the National Statistical Offices and Eurostat[3]. These data are complemented by other official statistics on electronic communications collected through the Communication Committee and by ad-hoc studies undertaken by independent contractors notably for broadband coverage, speeds and online availability of public services. A full list of the indicators used, sources and notes is given in the next section.

Data reported in the country profiles come from statistical sources harmonised at EU level[4]. Some indicators, in particular for those related to eCommerce, eBusiness take up by enterprises and eGovernment take up by citizens have to be interpreted with care because of slight changes in the definitions and/or changes in the structure of the questionnaire that could have affected comparability over time. The eCommerce indicator for 2008, in particular, is not available for a number of Member States.

1 Iceland and Norway are members of the European Economic Area and Croatia is a candidate country to the EU. They contribute to the funding of the Competitiveness and Innovation Programme and participate as such in the Eurostat surveys. However, they are not considered in the country rankings of all indicators except for the two broadband coverage indicators where Iceland and Norway are included. Because of the size of their population and of the advanced state of development of the market under consideration, however, the impact on the EU average can be considered negligible.

2 i2010 Benchmarking Framework: http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/060220_i2010_benchmarking_framework_nov_2006.doc

3 The data used in this version of the paper were extracted from the Eurostat database on 05.06.2009. Almost all Member States contributed to both surveys but there remain some outstanding returns.

4 See http://ec.europa.eu/eurostat/ict

Definitions and Sources

Broadband

Total DSL coverage (as % of total population) - Source: study for the European Commission, Broadband coverage in Europe (Preliminary data for December 2008)[5], Idate. Estimations for the EU average include IS and NO.

DSL coverage in rural areas (as % of total population) - Source: study for the European Commission, Broadband coverage in Europe (Preliminary data for December 2008), Idate. Estimations for the EU include IS and NO.

Broadband penetration: number of total subscriptions to fixed broadband connections (households, enterprises, public sector) by platform (DSL, all others) divided by the number of inhabitants. 3G subscriptions are not included in the total. Source: Communications Committee (COCOM) (1 January 2009). FR, NL, AT, EE, LT: data as at 1 October 2008. NO at 1st January 2009. For 2003 and 2005, data is at 31st December for all the countries except for NO (1st July). Note that COCOM data does not include mobile broadband connections.

Speed - % of broadband subscriptions above 2 Mbps– Source: study for the European Commission, Broadband coverage in Europe (Preliminary data for December 2008), Idate.

% of households with an internet connection – households with at least one member aged 16-74. Source: Eurostat survey on ICT use by households 2008.

% of households having a broadband connection – households with at least one member aged 16-74. Source: Eurostat survey on ICT use by households and individuals 2008.

% of enterprises having a broadband connection - 10+ employees, excluding the financial sector. Source: Eurostat survey on ICT use by enterprises 2008.

% of individuals using a mobile phone via UMTS (3G) to access the internet – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals 2008.

% of individuals using a laptop via wireless connection away from home/work to access the internet – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals 2008.

Internet usage

% of population who are regular internet users (using the internet at least once a week in the last 3 months) – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals.

% of population who are using the internet every day or almost every day (in the last 3 months) – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals.

5 "Broadband Coverage" refers to the coverage of DSL networks, the most widespread form of broadband access in Europe, and in particular to the percentage of population depending on a Local Exchange equipped with a DSLAM. Thus, figures do not account for those people that reside too far from these switches to be able to purchase a DSL connection even if they wanted to do so. Hence, coverage figures may overestimate actual eligibility.

% of population who have never used the internet – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals.

% of population using the internet for specific activities (in the last 3 months) - Activities: sending emails, looking for information about goods and services, reading online newspapers/magazines, ordering goods or services, over the internet, for private use (in the last year), selling goods and services (e.g. via auctions), internet banking, downloading computer or video games or their updates, downloading/listening to/watching music and/or films, paying for online audiovisual contents, listening to the web radio/watching web tv, uploading self-created content, seeking health information on injury, disease or nutrition, looking for a job or sending a job application, doing an online course, consultation with the purpose of learning. – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals.

eGovernment indicators

% of basic public services fully available online (for households and enterprises) - A public service is considered fully online when the publicly accessible website offers the possibility to completely treat the public service via the website, including decision and delivery. No other formal procedure is necessary for the applicant via "paperwork". Source: *The User Challenge. Benchmarking the Supply of Online Public Services*, European Commission. Data for September 2007.

% of population using eGovernment services (in the last three months) – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals.

% of population using eGovernment services for sending filled forms (in the last three months) – individuals aged 16-74. Source: Eurostat survey on ICT use by households and individuals.

% of enterprises using eGovernment services (in the last year) – 10+ employees, excluding the financial sector. Source: Eurostat survey on ICT use by enterprises.

% of enterprises using eGovernment services for sending filled forms (in the last year) – 10+ employees, excluding the financial sector. Source: Eurostat survey on ICT use by enterprises.

% of enterprises using eGovernment services to submit a proposal in a public electronic tender system (e-procurement) - 10+ employees, excluding the financial sector. Source: Eurostat survey on ICT use by enterprises.

eCommerce

eCommerce as % of total turnover of enterprises - Turnover on the internet or via other external computer mediated network as % of the total turnover of enterprises (in 2007). 10+ employees, excluding the financial sector. Source: Eurostat survey on ICT use by enterprises.

% of enterprises receiving orders/purchasing on the internet - Non financial enterprises. % of enterprises receiving orders/purchasing on the internet or via other external computer mediated network (in 2007). 10+ employees, excluding the financial sector. Source: Eurostat survey on ICT use by enterprises.

eBusiness

For all the indicators in this section the source is: Eurostat survey on ICT use by enterprises

% of enterprises using applications for integrating internal business processes – % of enterprises sharing electronically information on sales and/or purchases with the software used for any internal function (management of inventory levels, accounting, production/service management, distribution management), in January 2008. 10+ employees, excluding the financial sector.

% of enterprises using applications for integrating internal business processes (large enterprises) – as above but for enterprises with 250+ employees.

% of enterprises using applications for employees to access HR services – % of enterprises using, in January 2008, dedicated applications for employees to access human resources services (e.g. see open job positions, request annual leave, view or download payslips, or other services). 10+ employees, excluding the financial sector, excluding the financial sector.

% of enterprises exchanging automatically business documents with customers/suppliers - % of enterprises

sending/receiving automatically, in January 2008, orders, e-invoices, product information (catalogues, price lists, etc), transport documents. 10+ employees, excluding the financial sector.

% of enterprises sending/receiving e-invoices - % of enterprises, in January 2008, sending/receiving e-invoices in a digital format which allows its automatic processing.10+ employees, excluding the financial sector.

% of enterprises using analytical CRM - % of enterprises having used, in January 2008, any software application for making analysis of the information about clients for marketing purposes (this is commonly referred to as Customer Relationship Management, e.g. to set prices, make sales promotion, choose distribution channels, etc.).

Indicators on the growth of ICT sector and R&D

ICT sector share on total employment and value added – Source: Eurostat estimation based on SBS (structural business statistics) and National Accounts statistics.

Share of ICT R&D performed by the business sector as % of GDP and as % of total business expenditure in R&D. Source: IPTS (European Commission) – Prospective Insights on R&D in ICT Annual Report 2008.

% of ICT exports/imports on total exports/imports: data for Imports and Exports of goods are from the COMEXT database; data for services are from Balance of Payments statistics. Share of all Exports and Imports is calculated comparing the previously mentioned data with data from National Accounts Exports and Imports. Source: Eurostat.

% of persons employed with ICT user skills - Based on the OECD definition of ICT user (basic + advanced) skills. Source: Eurostat Labour Force Survey. The figure for 2008 refers to the first 3 quarters.

% of persons employed with ICT specialist skills - Based on the OECD definition of ICT specialist skills. Source: Eurostat Labour Force Survey. The figure for 2008 refers to the first 3 quarters.

ICT specialists: they have the ability to develop, operate and maintain ICT systems. ICTs constitute the main part of their job – they develop and put in place the ICT tools for others.

Advanced users: competent users of advanced, and often sector-specific, software tools. ICTs are not the main job but a tool.

Basic users: competent users of generic tools (e.g. Word, Excel, Outlook, PowerPoint) needed for the information society, eGovernment and working life. Here too, ICTs are a tool, not the main job.

1. Austria

The information society at large - connectivity, ICT usage by households, enterprises and government - is more developed than on average in the EU. Austria is a frontrunner in particular in the availability of eGovernment services, for which Austria has been leading developments in the EU consistently over the recent years. More recently particular emphasis has been given to the security of electronic transactions (eSecurity) through the deployment of the social security eCard which can be used for authentication in both public and private transactions.

Broadband

Fixed broadband access indicators do not feature significant progress, but indications are that wireless mobile is developing at a faster rate than in most EU countries. Austria's fixed broadband penetration now stands at 21.4%, close to the EU average, with households exhibiting higher rates of connectivity than enterprises do. For enterprise connectivity, Austria places near the bottom of the ranking. DSL coverage is at average levels, but progress is slow. Wireless mobile connectivity on the other hand is developing fast both for 3G and wireless laptop access and Austria is one of the most advanced country in the take up of these technologies.

Internet Usage

In the EU, Austria ranks 9th in terms of both regular (at least once a week) and frequent (almost every day) internet usage. 66% of the population were regular internet users in 2008 (above the EU average), up from 49% in 2005; 48% were frequent users, up from 32% in 2005. Nevertheless, a quarter of the population has never used the internet – somewhat better than the EU average of 33%. The picture in terms of use of advanced internet services is more mixed. While Austrian citizens are more intensive users of some services, such as sending e-mails, looking for information on goods and services, online shopping and seeking health information, they are less intensive users of others, such as watching web tv, seeking information with the purpose of learning, downloading video games or watching/downloading films and music.

Austria has reached full online availability of basic public services for citizens and enterprises. Take-up of eGovernment services by enterprises, at 80%, is relatively good and the country is one of the best performers in the area of e-procurement. Take-up by citizens, however, is significantly lower, though at 39% is higher than the EU average (28%).

ICTs in the Economy

Austria's performance on the eCommerce dimension is in line with the general situation in Europe. For eBusiness, Austria exhibits some top-ranking scores. This is primarily the case for in-house operations (integrating business processes, providing access to HR-services, using analytical CRM). For activities managing external relations (e.g. sending/receiving e-invoices or electronic information sharing with customers/suppliers), the figures are less impressive.

Austria also has a higher than average business expenditure on ICT R&D, ranking fourth, despite a less than average size of the ICT sector. It also has a rather good specialist eSkills base, but lags behind than expected in the percentage of persons employed with user skills.

Austria

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	86.0	86.0	91.3	92.0	92.2	92.7	17
DSL coverage in rural areas (as % of total population)		67.0	79.0	80.6	81.8	76.6	16
Broadband penetration (as % of population)	10.1	14.3	17.4	19.0	21.4	22.9	12
Speed - % of broadband subscriptions above 2 Mbps		22.9	29.7	42.9	57.3	63.3	16
% of households with an internet connection	44.6	46.7	52.3	59.6	68.9	60.4	8
% of households with a broadband connection	16	23	33	46	54	49	11
% of enterprises with a (fixed) broadband access	55	61	69	72	76	81	20
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	2	4	3	9
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				14	22	12	2
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	46	49	55	61	66	56	9
% pop. who are frequent internet users (using the internet every day or almost every day)	28	32	39	45	48	43	9
% population who have never used the internet		40	34	28	25	33	9
Take up of internet services (as % of population)							
sending emails	45	48	53	54	63	53	8
looking for information about goods and services	36	42	47	47	51	50	11
uploading self-created content					8	11	16
ordering goods or services, over the internet, for private use	19	25	32	36	37	32	9
reading online newspapers/magazines	16	21	26	24	30	25	14
selling goods and services (e.g. via auctions)	4	4	8	7	7	10	11
internet banking	18	22	27	30	34	29	12
downloading computer or video games or their updates					6	9	23
downloading/listening to/watching music and/or films					20	28	20
paying for online audiovisual contents					5	5	8
listening to the web radio/watching web tv	3	5	7	7	13	20	24
seeking health information on injury, disease or nutrition	6	16	24	27	32	28	7
looking for a job or sending a job application	4	6	9	8	9	13	18
doing an online course				1		3	
seeking information with the purpose of learning				9	12	26	24
eGovernment Indicators							
% basic public services for citizens fully available online	60		70	100		51	1
% basic public services for enterprises fully available online	88		100	100		72	
% of population using eGovernment services	21	29	33	27	39	28	7
% of population using eGovernment services for returning filled in forms					14	12	9
% of enterprises using eGovernment services	74	75	81	81	80	68	10
% of enterprises using eGovernment services for returning filled in forms	47	41	54	54	59	50	12
of which to submit a proposal in a public electronic tender system (e-procurement)		11	13	11	16	9	3
eCommerce							
eCommerce as % of total turnover of enterprises	7	7	10	11	13	12	7
% enterprises selling online	12	10	15	18	15	16	9
% enterprises purchasing online	22	22	37	42	34	28	7
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					59	41	3
using applications for integrating internal business processes (large enterprises)					92	70	1
using applications for employees to access Human Resources services					19	11	6
exchanging automatically business documents with customers/suppliers					29	25	11
sending/receiving e-invoices				18	17	21	17
sharing information electronically with customers/suppliers on Supply Chain Manag.					20	16	11
using analytical Customer Relation Manag.				29	30	17	1
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	4.5	4.5	4.4			5.0	11
ICT sector share of total employment	2.9	2.8	2.8			2.7	9
ICT R&D expenditure by the business sector, as % of GDP	0.5	0.5				0.3	4
= = = = =, as % of total R&D expenditure	31.16	31.96				26.43	10
% of ICT exports [illegible] exports	7.1	6.4	6.6	4.5			20
% of ICT imports of total imports	9.3	8.5	8.4	6.1			22
% of persons employed with ICT user skills.	19.7	18.2	18.3	17.6	17.5	18.4	20
% of persons employed with ICT specialist skills	2.9	3.1	3.1	2.9	3.1	3.0	12

2. Belgium

The information society is more developed in Belgium than on average in the EU. However, Belgium is not one of the frontrunners: although broadband markets are highly developed and performance is good in the fields of eCommerce and eBusiness, the country still lags behind in the use of advanced services and eGovernment (although some applications are very successful, for example the electronic tax return form "Tax-on-web") . A new national digital strategy is under preparation.

Broadband

With complete DSL coverage and 93.8% of internet connected households having access to broadband (mostly +2Mbps and even +4Mbps connections), Belgium has almost completed the transition from narrowband to broadband. With fixed broadband penetration at 27.5%, and a good balance of platform competition (DSL and cable modem), the country scores above average, even though in terms of ranking it lost two places since last year and no longer belongs to the leading group of countries. Enterprises' broadband access on the other hand has significantly progressed, with Belgium now ranking 4th in the EU (i.e. up 3 places since last year).

Despite good performance in fixed broadband access, there is room for improvement in terms of exploiting mobile opportunities: both for 3G mobile phone access and wireless laptop connections outside the office or home, Belgium scores below average.

Internet Usage

Belgium ranks among the top third in terms of both regular and frequent internet use. 66% of the population are regular internet users, accessing the internet at least once a week, and 51% are frequent users, accessing the internet almost every day. One quarter of the population has never used the internet. Belgians are above average users of the most common internet services, such as sending emails, looking for information on goods and services and internet banking. By contrast, they exhibit below average use of most other services.

In the area of eGovernment, while progress has been made in the provision of eGovernment services, especially for enterprises, uptake is lagging, particularly for citizens, with only 16% of the population making use of these services.

ICTs in the Economy

Progress in enterprises' connectivity has translated into a more intensive take-up of ICT. Belgium scores among the top 8 countries in every eCommerce indicator and shows solid performance in the eBusiness area. The Belgian ICT sector is comparable to the EU27 average, both in terms of contribution to GDP and employment.

Finally, the percentage of people employed with ICT user skills and ICT specialist skills are respectively at and below the European average, a surprising result given the average development of the information society in this country.

Belgium

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	100.0	100.0	100.0	100.0	99.9	92.7	4
DSL coverage in rural areas (as % of total population)		100.0	100.0	100.0	99.6	76.6	4
Broadband penetration (as % of population)	15.5	19.2	22.8	25.6	27.5	22.9	8
Speed - % of broadband subscriptions above 2 Mbps		91.7	91.2	90.8	93.9	63.3	2
% of households with an internet connection		50	54	60	64	60	9
% of households with a broadband connection		41	48	56	60	49	7
% of enterprises with a (fixed) broadband access	70	78	84	86	91	81	4
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	1	1	3	23
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				7	8	12	17
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)		53	58	63	66	56	8
% pop. who are frequent internet users (using the internet every day or almost every day)		38	45	49	51	43	7
% population who have never used the internet		39	34	29	26	33	12
Take up of internet services (as % of population)							
sending emails		49	54	60	62	53	9
looking for information about goods and services		43	51	55	58	50	8
uploading self-created content					5	11	21
ordering goods or services, over the internet, for private use		16	19	21	21	32	14
reading online newspapers/magazines		13	16	17	21	25	20
selling goods and services (e.g. via auctions)			7	8	10	10	10
internet banking		23	28	35	39	29	8
downloading computer or video games or their updates					6	9	21
downloading/listening to/watching music and/or films					23	28	17
paying for online audiovisual contents					3	5	17
listening to the web radio/watching web tv			11	13	15	20	20
seeking health information on injury, disease or nutrition		19	23	25	24	28	15
looking for a job or sending a job application		8	9	8	8	13	20
doing an online course				2	3	3	14
seeking information with the purpose of learning				17	20	26	19
eGovernment Indicators							
% basic public services for citizens fully available online	17		18	42		51	16
% basic public services for enterprises fully available online	63		88	88		72	
% of population using eGovernment services		18	30	23	16	28	20
% of population using eGovernment services for returning filled in forms					5	12	21
% of enterprises using eGovernment services	60	61	59	51	69	68	18
% of enterprises using eGovernment services for returning filled in forms	26	33	37	37	49	50	
of which to submit a proposal in a public electronic tender system (e-procurement)			6	3	7	9	20
eCommerce							
eCommerce as % of total turnover of enterprises	6	9	8	11		12	
% enterprises selling online	18	16	15	18	16	16	8
% enterprises purchasing online	9	18	16	43	34	28	6
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					58	41	4
using applications for integrating internal business processes (large enterprises)					89	70	2
using applications for employees to access Human Resources services					17	11	8
exchanging automatically business documents with customers/suppliers					39	25	1
sending/receiving e-invoices				31	36	21	3
sharing information electronically with customers/suppliers on Supply Chain Manag.					35	16	1
using analytical Customer Relation Manag.				17		17	
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	5.1	5.2	5.0			5.0	6
ICT sector share of total employment	3.0	3.0	2.9			2.7	8
ICT R&D expenditure by the business sector, as % of GDP	0.31	0.29				0.31	9
= = = = =, as % of total R&D expenditure	23.7	23.6				26.4	15
% of ICT exports on total exports	6.2	5.8	5.3	5.0			16
% of ICT imports on total imports	7.0	6.6	6.1	6.2			21
% of persons employed with ICT user skills.	18.0	19.0	18.8	19.0	18.8	18.4	16
% of persons employed with ICT specialist skills	2.7	2.5	2.6	2.8	2.3	3.0	25

3. Bulgaria

The information society in Bulgaria is at a relatively early stage of development. Although some visible progress has taken place since last year in the areas of broadband and internet usage, there is still significant room for improvement: very low rankings on broadband penetration, internet usage and eGovernment show the urgent need of further efforts to narrow the gap with the rest of Europe. To this end, in the 3rd quarter of 2008, a National Programme for Accelerated Information Society Development 2008-2010 was implemented, and proposals for the adoption of two complementary programmes with a three-year term of operation were elaborated: a National Programme for the Development of Information Technologies and a National Programme for the Development of Broadband Access. Both draft programmes are aimed at systematising the efforts and providing for adequate conditions to converge with the advanced EU countries in the area of broadband and ICTs in the economy.

Broadband

Fixed broadband penetration was 11.2% in 2008, less than half of the EU27 average. The percentage of households having access to the internet is among the lowest in Europe. But there is a more positive trend in terms of speed: 68.4% of those with internet access use a +2Mb/s connection, a number only exceeded by three other countries. This suggests that Bulgaria is leapfrogging the phases of narrowband and slow broadband internet connections.

Internet Usage

Rates of internet usage have been gradually improving over the last few years. Nevertheless, take-up of the internet in Bulgaria is still very low and a majority (57%) of the population has never used the internet. Usage of internet services is correspondingly low. The most popular services are also the most commonly used ones at EU level: sending emails and looking up information on goods and services. Another popular activity among internet users in Bulgaria is downloading/listening to/watching music and/or films.

In 2007 availability of eGovernment services was low. The rate of adoption of eGovernment services by both citizens and enterprises is also low, especially for citizens for which it is the lowest in the EU.

ICTs in the Economy

83% of Bulgarian enterprises are connected to the internet but only 75% of these connections are based on broadband. This explains why Bulgarian enterprises are still towards the bottom of the distribution for use of eCommerce, although some minor improvements have been made in terms of ranking. The situation is somewhat better for the take-up of eBusiness. In particular, Bulgaria scores well for the implementation of HR-applications, automatic documents exchange and the use of e-invoices.

Despite the below-average percentages of employees with ICT-skills, the ICT sector is relatively important: its contribution to GDP (6.3% in 2004) exceeds the EU27 average.

Bulgaria

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)					N/A	92.7	24
DSL coverage in rural areas (as % of total population)				0.0	20.0	76.6	25
Broadband penetration (as % of population)			4.5	7.6	11.2	22.9	26
Speed - % of broadband subscriptions above 2 Mbps				58.5	68.4	63.3	9
% of households with an internet connection	10		17	19	25	60	27
% of households with a broadband connection	4		10	15	21	49	26
% of enterprises with a (fixed) broadband access	28	32	57	61	62	81	24
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	0	1	3	22
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				1	2	12	26
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	13		22	28	33	56	25
% pop. who are frequent internet users (using the internet every day or almost every day)	7		14	20	23	43	26
% population who have never used the internet			71	65	57	33	26
Take up of internet services (as % of population)							
sending emails	14		19	25	28	53	25
looking for information about goods and services	8		13	17	22	50	26
uploading self-created content					3	11	26
ordering goods or services, over the internet, for private use	1		2	3	3	32	27
reading online newspapers/magazines	7		11	10	15	25	26
selling goods and services (e.g. via auctions)	0		1	1	1	10	21
internet banking	1		1	2	2	29	27
downloading computer or video games or their updates					6	9	20
downloading/listening to/watching music and/or films					21	28	19
paying for online audiovisual contents					2	5	24
listening to the web radio/watching web tv	6		11	10	13	20	23
seeking health information on injury, disease or nutrition	3		5	5	7	28	27
looking for a job or sending a job application	3		4	5	7	13	23
doing an online course				1	1	3	26
seeking information with the purpose of learning				2	5	26	27
eGovernment Indicators							
% basic public services for citizens fully available online				25		51	21
% basic public services for enterprises fully available online				0		72	
% of population using eGovernment services	5		8	6	8	28	27
% of population using eGovernment services for returning filled in forms					3	12	26
% of enterprises using eGovernment services	38	32	46	45	58	68	24
% of enterprises using eGovernment services for returning filled in forms	9	11	23	29	43	50	20
of which to submit a proposal in a public electronic tender system (e-procurement)		8	17	7	8	9	14
eCommerce							
eCommerce as % of total turnover of enterprises	4		0	1	1	12	19
% enterprises selling online	3		2	1	2	16	25
% enterprises purchasing online	4		3	3	3	28	25
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					35	41	21
using applications for integrating internal business processes (large enterprises)					54	70	25
using applications for employees to access Human Resources services					22	11	2
exchanging automatically business documents with customers/suppliers					31	25	10
sending/receiving e-invoices				9	26	21	8
sharing information electronically with customers/suppliers on Supply Chain Manag.					14	16	16
using analytical Customer Relation Manag.				9	9	17	20
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	6.3					5.0	
ICT sector share of total employment	1.9					2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.02	0.03				0.31	24
=====, as % of total R&D expenditure	17.7	24.9				26.4	14
% of ICT exports on total exports	2.0	2.4	2.4	2.7			24
% of ICT imports on total imports	5.7	5.9	5.8	5.7			25
% of persons employed with ICT user skills.	11.7	11.7	11.4	11.5	12.1	18.4	25
% of persons employed with ICT specialist skills	2.7	2.7	2.6	2.6	2.6	3.0	22

4. Cyprus

The information society in Cyprus is at early stages of development. Although efforts have been made to improve connectivity, the take-up of internet services by the public systematically remains below the European average. eBusiness scores are showing a brighter picture, while a good e-skills base can be a firm foundation for further development. To exploit the opportunities provided by ICTs, Cyprus is developing an integrated National Strategy for the Information Society, including the appointment of a Commissioner for Information Society, the creation of an appropriate institutional and regulatory framework for increased and safer internet usage, the promotion of ICT and the internet into everyday life and the expansion of broadband coverage in rural areas.

Broadband

In only four years time, fixed broadband penetration in Cyprus rose from 2.5% to 18.2%, narrowing the gap with the rest of Europe, with enterprise connectivity on the rise and widespread broadband coverage (although rural areas are not covered, only 3% of population resides in these areas). However, only a small fraction of broadband connections are fast (+2Mb/s) and mobile access is scarcely used.

Internet Usage

Cyprus exhibits low rates of both regular and frequent internet use, and little improvement has been made in recent years. The rates of regular internet use stagnated at 35% between 2007 and 2008 and only a 1pp. increase was observed in the rate of frequent use, to 24%, over this period. Furthermore, more than half of the population has never used the internet. Usage of internet services is less common than in the majority of other EU countries and the take up of internet services did not increase significantly for any of the indicators measured in 2007.

Some progress has been made with regard to the provision of public services for enterprises and take-up by enterprises has reached 65%. However, both provision and take-up for and by citizens is relatively low.

ICTs in the Economy

The percentage of employees with ICT user/specialist skills is in line with the EU average. The use of applications for integrating internal business processes is above average, but the take up of eBusiness and eCommerce services remains generally low.

Cyprus

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)		69.7	69.7	79.6	93.2	92.7	15
DSL coverage in rural areas (as % of total population)		0.0	0.0	0.0	12.0	76.6	26
Broadband penetration (as % of population)	2.5	6.3	8.9	13.8	18.2	22.9	17
Speed - % of broadband subscriptions above 2 Mbps		0.0	0.0	8.6	11.9	63.3	27
% of households with an internet connection	53	32	37	39	43	60	24
% of households with a broadband connection	2	4	12	20	33	49	23
% of enterprises with a (fixed) broadband access	35	40	55	69	79	81	19
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	1	1	3	26
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				7	3	12	22
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	28	26	29	35	35	56	24
% pop. who are frequent internet users (using the internet every day or almost every day)	18	16	19	23	24	43	24
% population who have never used the internet		64	62	56	54	33	23
Take up of internet services (as % of population)							
sending emails	24	23	25	30	30	53	24
looking for information about goods and services	21	24	27	32	32	50	23
uploading self-created content					6	11	20
ordering goods or services, over the internet, for private use	4	5	7	10	9	32	23
reading online newspapers/magazines	17	15	20	22	23	25	17
selling goods and services (e.g. via auctions)	0	0	1	1	1	10	22
internet banking	4	6	6	12	11	29	24
downloading computer or video games or their updates					7	9	19
downloading/listening to/watching music and/or films					16	28	25
paying for online audiovisual contents					1	5	25
listening to the web radio/watching web tv	12	9	9	13	12	20	25
seeking health information on injury, disease or nutrition	6	8	11	14	12	28	24
looking for a job or sending a job application	3	3	5	5	4	13	26
doing an online course				1	1	3	24
seeking information with the purpose of learning				21	17	26	20
eGovernment Indicators							
% basic public services for citizens fully available online	17		25	33		51	18
% basic public services for enterprises fully available online	38		50	63		72	
% of population using eGovernment services	11	11	13	20	16	28	21
% of population using eGovernment services for returning filled in forms					6	12	19
% of enterprises using eGovernment services	35	40	44	54	65	68	20
% of enterprises using eGovernment services for returning filled in forms	11	9	8	14	18	50	26
of which to submit a proposal in a public electronic tender system (e-procurement)		0	0	0	0	9	26
eCommerce							
eCommerce as % of total turnover of enterprises		0	2	1	1	12	18
% enterprises selling online	5	4	6	7	7	16	18
% enterprises purchasing online	14	15	10	12	14	28	16
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					46	41	15
using applications for integrating internal business processes (large enterprises)					81	70	10
using applications for employees to access Human Resources services					7	11	24
exchanging automatically business documents with customers/suppliers					8	25	27
sending/receiving e-invoices				10	7	21	26
sharing information electronically with customers/suppliers on Supply Chain Manag.					8	16	25
using analytical Customer Relation Manag.				14	14	17	14
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.03	0.04				0.31	21
= = = = =, as % of total R&D expenditure	42.2	39.4				26.4	3
% of ICT exports on total exports	5.3	7.9	5.6	4.7			18
% of ICT imports on total imports	6.9	9.8	7.5	6.1			23
% of persons employed with ICT user skills.	17.7	18.0	18.9	19.5	18.9	18.4	15
% of persons employed with ICT specialist skills	2.6	2.5	2.6	2.9	3.1	3.0	11

5. The Czech Republic

Progress in the development of the information society in the Czech Republic is visible although the country is still lagging behind in comparison to general developments in the EU. The country scores well in particular in the areas of eCommerce and in the use of applications for integrating internal business processes. To this end, the '*Operational Programme Enterprise and Innovation*' has been conceived to support companies which invest in ICT to increase effectiveness in their internal operations ('ICT in Enterprises' programme) or to support the creation/upgrading of ICT companies and services ('*ICT and Strategic Services*' programme).

Broadband

Progress in DSL coverage has been strong and is in line with the EU27 average. There has been a significant improvement in households' connectivity over the last years and the share of broadband subscriptions relative to total internet subscriptions has increased from 23% in 2004 to over 79% in 2008. Fixed broadband penetration and the percentage of households having access to broadband however remain low. Nevertheless, all broadband subscriptions now display +2Mb/s speeds, suggesting that the Czech Republic is benefiting from the development of platform competition and accelerating its transition to broadband. The percentage of users accessing the internet through UMTS is also above average.

Internet Usage

The Czech Republic has a somewhat lower proportion of regular and frequent internet users in the population than the EU average, although the proportion of those who have never used the internet is the same as for the EU as a whole. In addition, the number of users has risen substantially over the past few years: the number of regular users has doubled over the period since 2005 to reach 51% in 2008, and the number of frequent users has tripled, to reach 30%.

The most popular internet services used by Czech citizens are sending emails and looking for information on goods and services, as in the rest of EU. Other popular services include reading online newspapers and ordering goods and services online. In relation to the take up of other internet services, the Czech Republic still ranks quite low.

The take-up of eGovernment by citizens is amongst the lowest in the EU. This is possibly related to the fact that the availability of public services is also low. For enterprises, the picture is completely different: 100% of services are available online and take-up exceeds the EU average by 5 p.p.

ICTs in the Economy

The Czech Republic scores relatively well on the eCommerce dimension. With 15% of total turnover coming from eCommerce, the country ranks 4th. The share of enterprises buying and selling online lies around the European average, giving the Czech Republic a place in the top-10 for both aspects. For eBusiness, the picture is less positive: the popularity of business integration applications is important, but the other indicators yield low scores.

It is also clear that ICT is an important export product. Accordingly, the percentage of high-skilled ICT professionals lies above average. The presence of ICT user and ICT specialist skills in enterprises is increasing over time.

The Czech Republic

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)		74.7	81.3	85.0	92.0	92.7	19
DSL coverage in rural areas (as % of total population)				75.0	85.0	76.6	13
Broadband penetration (as % of population)	2.2	6.4	10.6	14.6	17.1	22.9	20
Speed - % of broadband subscriptions above 2 Mbps			9.0	43.4	100.0	63.3	1
% of households with an internet connection	19	19	29	35	46	60	23
% of households with a broadband connection	4	5	17	28	36	49	21
% of enterprises with a (fixed) broadband access	38	52	69	77	79	81	17
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	4	5	3	5
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				3	7	12	18
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	25	26	36	42	51	56	17
% pop. who are frequent internet users (using the internet every day or almost every day)	10	10	18	24	30	43	22
% population who have never used the internet		63	49	46	33	33	14
Take up of internet services (as % of population)							
sending emails	27	27	37	42	51	53	15
looking for information about goods and services	17	20	32	37	45	50	18
uploading self-created content					2	11	27
ordering goods or services, over the internet, for private use	5	5	13	17	23	32	12
reading online newspapers/magazines	10	12	19	22	33	25	12
selling goods and services (e.g. via auctions)			5			10	
internet banking	5	5	10	12	14	29	20
downloading computer or video games or their updates					5	9	26
downloading/listening to/watching music and/or films					19	28	22
paying for online audiovisual contents					4	5	12
listening to the web radio/watching web tv	3	3	6	8	13	20	21
seeking health information on injury, disease or nutrition		3	10	11	14	28	23
looking for a job or sending a job application	3	2	4	4	5	13	25
doing an online course				1	2	3	20
seeking information with the purpose of learning				17	10	26	26
eGovernment Indicators							
% basic public services for citizens fully available online	17		8	25		51	21
% basic public services for enterprises fully available online	50		63	100		72	
% of population using eGovernment services	7	5	17	16	14	28	24
% of population using eGovernment services for returning filled in forms					4	12	24
% of enterprises using eGovernment services	75	79	76	73	73	68	17
% of enterprises using eGovernment services for returning filled in forms	24	32	32	34	35	50	24
of which to submit a proposal in a public electronic tender system (e-procurement)		16	10	12	8	9	17
eCommerce							
eCommerce as % of total turnover of enterprises	6	8	7	9	15	12	4
% enterprises selling online	11	13	8	9	15	16	10
% enterprises purchasing online	19	21	17	22	26	28	8
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					49	41	9
using applications for integrating internal business processes (large enterprises)					85	70	4
using applications for employees to access Human Resources services					5	11	26
exchanging automatically business documents with customers/suppliers					15	25	24
sending/receiving e-invoices				33	17	21	19
sharing information electronically with customers/suppliers on Supply Chain Manag.					12	16	23
using analytical Customer Relation Manag.				15	14	17	15
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.11	0.14				0.31	13
= = = = =, as % of total R&D expenditure	13.9	15.8				26.4	20
% of ICT exports on total exports	12.2	12.1	13.5	14.9			5
% of ICT imports on total imports	13.2	12.4	14.3	15.3			4
% of persons employed with ICT user skills.	16.5	16.8	17.4	17.9	18.3	18.4	18
% of persons employed with ICT specialist skills	3.9	3.9	4.1	4.5	4.8	3.0	3

6. Denmark

Denmark is among the top nations for most i2010 indicators and is a clear frontrunner in the development of the information society. It is the leader in broadband penetration and has the highest share of frequent internet users in Europe. With an action plan on green ICT launched in 2008, Denmark is also at the forefront in terms of eco-friendly usage of ICT.

Broadband

Denmark ranks first in the EU in terms of broadband penetration rate (37.3%) and features complete coverage of fixed broadband networks. 90% of internet connected households subscribe to broadband. Mobile connectivity opportunities are used twice as much as the EU average. All this makes Denmark one of the top countries regarding broadband connectivity for citizens. Enterprises however are not capitalising on broadband connectivity at similar rates: broadband take-up has been stabilizing over the last years around 80%, in line with the EU27 average.

Internet Usage

Denmark is one of the frontrunners in terms of regular and frequent use of the internet, with 80% and 71% of the population accessing the internet at least once a week and almost every day, respectively. This is well above the EU averages for these indicators. In addition, the share of individuals never having used the internet, at 12%, is amongst the lowest in the EU.

Furthermore, all internet services are used by a larger percentage of the Danish population than is average for the EU, whether it be the most common ones, such as sending emails or looking for information about goods and services, or the less commonly used ones, such as paying for online content, downloading computer or video games or their updates, selling goods and services and uploading self-created content.

Denmark has around 50% availability of public services for citizens online and 86% for enterprises. As with the majority of Member States, Denmark has a larger uptake of online public services by enterprises than by citizens. However, as with other take-up indicators, take-up of online public services in Denmark has one of the highest rates.

ICTs in the Economy

Despite losing some places on the European ranking for some indicators, Denmark still performs well in the fields of eCommerce and eBusiness, with scores well above average.

For the ICT sector as a whole, figures are again very positive, both in absolute numbers and in terms of ranking. ICT is a significant contributor to the Danish GDP and employment. The R&D expenditure on ICT is relatively high and there is a strong presence of both user and specialist skills in employment.

Denmark

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	95.0	100.0	100.0	100.0	100.0	92.7	1
DSL coverage in rural areas (as % of total population)		100.0	100.0	100.0	100.0	76.6	1
Broadband penetration (as % of population)	19.2	24.7	31.9	35.6	37.3	22.9	1
Speed - % of broadband subscriptions above 2 Mbps		11.3	16.2	48.6	70.5	63.3	8
% of households with an internet connection	69	75	79	78	82	60	3
% of households with a broadband connection	36	51	63	70	74	49	1
% of enterprises with a (fixed) broadband access	80	82	83	80	80	81	16
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	1	6	3	3
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				25		12	
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	70	73	78	76	80	56	3
% pop. who are frequent internet users (using the internet every day or almost every day)	53	57	65	66	71	43	1
% population who have never used the internet		14	10	12	12	33	3
Take up of internet services (as % of population)							
sending emails	65	69	74	74	76	53	3
looking for information about goods and services	59	63	68	68	73	50	3
uploading self-created content					14	11	10
ordering goods or services, over the internet, for private use	42	48	55	56	59	32	1
reading online newspapers/magazines	36	38	46	47	52	25	3
selling goods and services (e.g. via auctions)	5	5	17	22	19	10	2
internet banking	45	49	57	57	61	29	4
downloading computer or video games or their updates					11	9	9
downloading/listening to/watching music and/or films					36	28	4
paying for online audiovisual contents					14	5	2
listening to the web radio/watching web tv	16	19	27	34	37	20	2
seeking health information on injury, disease or nutrition	27	24	28	38	36	28	6
looking for a job or sending a job application	16	19	20	26	23	13	2
doing an online course				4	3	3	10
seeking information with the purpose of learning				53	47	26	2
eGovernment Indicators							
% basic public services for citizens fully available online	33		42	50		51	14
% basic public services for enterprises fully available online	88		88	86		72	
% of population using eGovernment services	44		43	58	44	28	5
% of population using eGovernment services for returning filled in forms					27	12	2
% of enterprises using eGovernment services	85	87	87	88	90	68	3
% of enterprises using eGovernment services for returning filled in forms		56	55	61	65	50	8
of which to submit a proposal in a public electronic tender system (e-procurement)			5	7	8	9	15
eCommerce							
eCommerce as % of total turnover of enterprises	12		17	22		12	
% enterprises selling online	25	32	34	33	20	16	5
% enterprises purchasing online	28	32	34	36	38	28	5
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					57	41	6
using applications for integrating internal business processes (large enterprises)					85	70	5
using applications for employees to access Human Resources services					24	11	1
exchanging automatically business documents with customers/suppliers					38	25	3
sending/receiving e-invoices				37	43	21	1
sharing information electronically with customers/suppliers on Supply Chain Manag.					22	16	7
using analytical Customer Relation Manag.				17	19	17	7
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP		4.9	5.1			5.0	5
ICT sector share of total employment		3.6	3.7			2.7	4
ICT R&D expenditure by the business sector, as % of GDP	0.51	0.58				0.31	3
= = = = =, as % of total R&D expenditure	30.0	34.7				26.4	7
% of ICT exports on total exports	5.4	7.2	6.0	4.9			17
% of ICT imports on total imports	8.1	10.5	9.1	8.0			14
% of persons employed with ICT user skills.	22.6	24.0	23.5	23.2	22.8	18.4	4
% of persons employed with ICT specialist skills	4.0	3.5	3.9	4.0	4.4	3.0	4

7. Estonia

Estonia presents a mixed picture of information society developments. It is strong in the fields of eGovernment and in some of the eBusiness indicators, including enterprises' connectivity, but generally weak in eCommerce. The "*Estonian Information Society Strategy 2013*" which covers the period from 2007-2013, sets as main objective that each citizen should be able to benefit of the opportunities of the information society in every possible way and actively participate in public life ("*nobody will stay or will be left behind*"). It also states that Estonia's economic growth is based on the wide use of ICT solutions and supported by a public sector which is citizen-centred, transparent and efficient.

Broadband

Estonian households and enterprises have a higher level of broadband connectivity than the EU average – with a broadband penetration rate of 24.6%, Estonia is showing the best performance of the Member States that joined the EU since May 2004 – and growth is continuing. Moreover, 94% of the internet connected households use broadband connections. Despite widespread connectivity, few of these broadband subscriptions have speeds above 2Mb/s (only 38.9%, one of the lowest percentages in Europe). 88% of the enterprises have broadband access, giving Estonia a 7th place in the European ranking, up by 20 percentage points relative to four years ago.

Internet Usage

Estonia has a somewhat higher proportion of the population that are regular and frequent internet users than is average for the EU, and only about a quarter of the population has never used the internet, compared to around a third for the EU. With regard to the use of internet services, while Estonians are above average users of some services, for others they record low rates of use. On the one hand Estonia has the highest rate of internet use for the purpose of uploading self-created content, ranks second in terms of the proportion of the population that reads online newspapers and has more than the double the percentage of people using internet banking than is average for the EU. On the other hand only 1% of the population pay for online content and only 10% buy goods and services online. Use of other services is around average.

Both the provision and use of eGovernment services is more advanced in Estonia than the EU average. While 58% of public services for citizens are available online, for enterprises it is 88%. Rates of take up are 34% and 77%, respectively.

ICTs in the Economy

With only 11% and 18% of enterprises selling and purchasing online, Estonia is still lagging behind in the field of eCommerce. The situation is mixed for eBusiness: with the exception of the indicators on the automatic exchange of documents and sending and receiving e-invoices, Estoniais one of the weakest countries in Europe for the other indicators.

The latest figures reveal that the importance of the Estonian ICT sector in terms of GDP and employment is in line with the EU27 average. The same holds for the percentage of employees with ICT user or specialist skills.

ICT R&D represents one quarter of total R&D, but total R&D expenditure is low. The shares of ICT exports and imports have been falling over time.

Estonia

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)		90.0	90.0	85.0	93.9	92.7	13
DSL coverage in rural areas (as % of total population)				73.0	80.0	76.6	17
Broadband penetration (as % of population)	10.3	13.3	18.4	21.2	24.6	22.9	10
Speed - % of broadband subscriptions above 2 Mbps				3.7	38.9	63.3	21
% of households with an internet connection	31	39	46	53	58	60	15
% of households with a broadband connection	20	30	37	48	54	49	12
% of enterprises with a (fixed) broadband access	68	67	76	78	88	81	7
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	2	2	3	15
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				12	16	12	9
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	45	54	56	59	62	56	12
% pop. who are frequent internet users (using the internet every day or almost every day)	27	40	40	43	45	43	11
% population who have never used the internet		36	34	32	26	33	10
Take up of internet services (as % of population)							
sending emails	39	49	49	54	54	53	12
looking for information about goods and services	32	41	44	48	53	50	10
uploading self-created content					21	11	1
ordering goods or services, over the internet, for private use	6	7	7	9	10	32	21
reading online newspapers/magazines	38	46	50	50	54	25	2
selling goods and services (e.g. via auctions)	3	4	3	5	5	10	13
internet banking	35	45	48	53	55	29	5
downloading computer or video games or their updates					11	9	7
downloading/listening to/watching music and/or films					25	28	16
paying for online audiovisual contents					1	5	26
listening to the web radio/watching web tv	13	15	17	21	19	20	14
seeking health information on injury, disease or nutrition		16	18	26	25	28	12
looking for a job or sending a job application	12	18	17	13	15	13	9
doing an online course				7	5	3	4
seeking information with the purpose of learning					22	26	14
eGovernment Indicators							
% basic public services for citizens fully available online	36		64	58		51	9
% basic public services for enterprises fully available online	100		100	88		72	
% of population using eGovernment services	20	31	29	30	34	28	8
% of population using eGovernment services for returning filled in forms					24	12	5
% of enterprises using eGovernment services	84	70	69	76	77	68	13
% of enterprises using eGovernment services for returning filled in forms	54	50	54	58	62	50	10
of which to submit a proposal in a public electronic tender system (e-procurement)			13	13	12	9	6
eCommerce							
eCommerce as % of total turnover of enterprises	3	2				12	
% enterprises selling online	8	8	14	7	11	16	13
% enterprises purchasing online	32	13	17	13	18	28	14
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					42	41	18
using applications for integrating internal business processes (large enterprises)					72	70	18
using applications for employees to access Human Resources services					8	11	20
exchanging automatically business documents with customers/suppliers					34	25	7
sending/receiving e-invoices				25	39	21	2
sharing information electronically with customers/suppliers on Supply Chain Manag.					13	16	20
using analytical Customer Relation Manag.				10	9	17	23
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP		4.9	4.7			5.0	8
ICT sector share of total employment		2.9	2.9			2.7	7
ICT R&D expenditure by the business sector, as % of GDP	0.12	0.15				0.31	11
= = = = =, as % of total R&D expenditure	36.9	35.3				26.4	6
% of ICT exports on total exports	13.6	13.9	11.6	6.5			12
% of ICT imports on total imports	12.8	13.7	10.7	7.7			17
% of persons employed with ICT user skills.	17.2	19.9	17.8	19.3	18.9	184	14
% of persons employed with ICT specialist skills	2.4	2.7	2.5	2.6	2.9	3.0	13

8. Finland

Finland is amongst the best performing countries in Europe and is one of the frontrunners in information society developments in all respects. The ICT sector is very important for the Finnish economy The National information society policy is planning to further develop infrastructure, to innovate environment and markets, to develop content and services, expertise and preparedness. The public sector structures will be revamped and provision of electronic public services will be increased.

Broadband

In comparison to last year, the broadband penetration rate went down, lowering Finland's ranking from 2 to 4. However, just like for coverage, penetration still largely exceeds the EU27 average. The share of internet connected households (using broadband connections in 92% of the cases) is one of the highest in Europe too. The percentage of broadband subscriptions above 2 Mbps is one of the only indicators for which Finland scores below average. Given the presence of one of the leading mobile phone manufacturers, the adoption of mobile connectivity could be expected to be higher as well.

Finally, 92% of all enterprises have access to broadband internet. Nevertheless, Finland is no longer leading the European ranking in this respect, and scores third.

Internet Usage

With almost 4/5th of the population using the internet on a regular basis, mostly via high speed broadband connections, Finland ranks as one of the best countries for internet use in the EU. This high broadband take-up is clearly reflected in the use of internet services, for which Finland is placed among the highest ranking countries on almost all measured indicators. In particular, there is nowhere else in the EU where a larger proportion of the population uses the internet to look for health information, take courses, look for a job or read a newspaper.

In the field of eGovernment, Finland is also one of the leading countries. Its use by enterprises and citizens is the highest and second highest in Europe respectively. However, online availability of services for companies lies below the EU average and has decreased substantially in recent years.

ICTs in the Economy

In no other European country, the ICT sector contributes more to the GDP than in Finland, and its share in total employment is only higher in Sweden. Accordingly, the (relative) spending on R&D is unseen in any other country. ICT exports account for a relatively large share of total exports and imports, but this share is decreasing. The importance of ICTs for Finnish companies is reflected in the adoption of eBusiness applications, which all score above average. With the notable exception of customer relation management, the rankings and scores on this dimension do not fully match the overall development of the information society in Finland.

Finland

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	89.4	90.4	91.8	96.0	95.7	92.7	10
DSL coverage in rural areas (as % of total population)		78.0	82.0	91.0	90.0	76.6	7
Broadband penetration (as % of population)	14.9	22.4	27.1	34.6	30.7	22.9	4
Speed - % of broadband subscriptions above 2 Mbps		30.8	26.7	31.9	60.3	63.3	15
% of households with an internet connection	51	54	65	69	72	60	6
% of households with a broadband connection	21	36	53	63	66	49	4
% of enterprises with a (fixed) broadband access	71	81	89	91	92	81	3
% of individuals using a mobile phone via UMTS (3G) to access the internet			2	2	4	3	11
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				8	12	12	10
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	63	62	71	75	78	56	4
% pop. who are frequent internet users (using the internet every day or almost every day)	46	49	56	62	66	43	4
% population who have never used the internet		23	18	17	13	33	4
Take up of internet services (as % of population)							
sending emails	62	63	67	71	74	53	5
looking for information about goods and services	59	62	67	68	73	50	4
uploading self-created content					9	11	12
ordering goods or services, over the internet, for private use	33	38	44	48	51	32	6
reading online newspapers/magazines	37	41	46	50	57	25	1
selling goods and services (e.g. via auctions)	8	9	14	13	14	10	7
internet banking	50	56	63	66	72	29	1
downloading computer or video games or their updates					7	9	17
downloading/listening to/watching music and/or films					34	28	5
paying for online audiovisual contents					9	5	5
listening to the web radio/watching web tv	12	17	20	24	33	20	4
seeking health information on injury, disease or nutrition	33	39	44	47	51	28	1
looking for a job or sending a job application	22	24	26	26	26	13	1
doing an online course				13	14	3	1
seeking information with the purpose of learning				30	31	26	7
eGovernment Indicators							
% basic public services for citizens fully available online	60		60	80		51	6
% basic public services for enterprises fully available online	75		63	50		72	
% of population using eGovernment services	45	47	47	50	53	28	2
% of population using eGovernment services for returning filled in forms					18	12	7
% of enterprises using eGovernment services	91	91	93	94	95	68	1
% of enterprises using eGovernment services for returning filled in forms	61	71	78	78	81	50	1
of which to submit a proposal in a public electronic tender system (e-procurement)			0	0	0	9	26
eCommerce							
eCommerce as % of total turnover of enterprises	13	14	14	15	16	12	
% enterprises selling online	17	17	14	15	13	16	
% enterprises purchasing online	19	19	23	19		28	
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					49	41	10
using applications for integrating internal business processes (large enterprises)					74	70	15
using applications for employees to access Human Resources services					18	11	7
exchanging automatically business documents with customers/suppliers					28	25	13
sending/receiving e-invoices				27	25	21	9
sharing information electronically with customers/suppliers on Supply Chain Manag.					20	16	12
using analytical Customer Relation Manag.				26	25	17	3
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	7.9	8.0	8.2			5.0	1
ICT sector share of total employment	4.8	4.8	4.6			2.7	2
ICT R&D expenditure by the business sector, as % of GDP	1.53	1.57				0.31	1
=====, as % of total R&D expenditure	63.1	63.6				26.4	1
% of ICT exports on total exports	17.0	20.2	17.4	14.6			6
% of ICT imports on total imports	13.1	14.8	13.7	13.1			6
% of persons employed with ICT user skills.	19.9	20.0	20.6	20.6	20.0	18.4	9
% of persons employed with ICT specialist skills	4.0	4.3	4.3	4.2	4.1	3.0	5

9. France

France is fairly advanced in the information society, with many benchmarking indicators above the EU average, notably in the area of broadband, which have translated in advanced internet usage. However, ICT usage by businesses and eSkills are weaker than other areas. Further progress is expected from the France's national strategy "Digital France 2012", the country's action plan for the development of the Digital Economy by 2012. The plan has the goal of making it one of the best ICT countries by 2012, by providing 100% coverage of fixed and mobile broadband and introducing digital television. The plan rests on four priorities: (1) to provide access of the whole population to the internet and digital services, (2) to develop the production and supply of digital content, (3) to increase and diversify usage and digital services within enterprises, administrations and households, and (4) to modernise the governance of the digital economy.

Broadband

The broadband market has continued to grow, reaching a penetration rate of 27.7% in 2008, improving France's ranking by two places, and featuring high speeds. There is almost full DSL coverage in the whole country. 62% of households have an internet connection (92% are broadband), slightly exceeding the EU27 average. Mobile access to the internet is not yet developed. Enterprises on the other hand, do take advantage of the high DSL coverage. With 92% of the companies having broadband access, France ranks first on this indicator.

Internet Usage

In France, regular and frequent rates of internet use have been rising in recent years and they are currently somewhat higher than the average for the EU. Around a quarter of the population has never used the internet, compared to a third for the EU.

On average, use by French citizens of various internet services is also above the EU average. While the most popular activities are sending emails and looking up information about goods and services, as in most other countries, France is also one of the best countries for looking up information for the purpose of learning. The least popular activities include doing online courses, paying for online audiovisual content and downloading computer or video games and their updates. This is the case for most EU countries.

Both availability and take up of eGovernment services is above the EU average in France. As with most Member States, it is more developed for enterprises than it is for citizens.

ICTs in the Economy

France's performance on the eCommerce and eBusiness dimensions is not exceptional. For eCommerce, the share of e-turnover is equal to the EU27 average, but scores for the two other indicators are below average. For eBusiness, the rankings are relatively low, with the exception of the use of applications for integrating internal business processes by large enterprises. Despite high connectivity in Europe, French enterprises do not seem to take advantage of this opportunity to boost eBusiness and eCommerce.

The ICT sector's share in GDP and employment is in line with the European average, just like the ICT R&D expenditure. More could be expected however in terms of eSkills.

France

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	90.8	96.4	98.4	98.5	100.0	92.7	1
DSL coverage in rural areas (as % of total population)		87.9	96.5	96.7	100.0	76.6	1
Broadband penetration (as % of population)	11.2	16.4	20.4	23.3	27.7	22.9	7
Speed - % of broadband subscriptions above 2 Mbps		30.5	40.6	54.7	64.4	63.3	14
% of households with an internet connection	34		41	49	62	60	11
% of households with a broadband connection			30	43	57	49	8
% of enterprises with a (fixed) broadband access			86	89	92	81	1
% of individuals using a mobile phone via UMTS (3G) to access the internet				1	1	3	19
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				7	10	12	14
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)			39	57	63	56	10
% pop. who are frequent internet users (using the internet every day or almost every day)			26	41	47	43	10
% population who have never used the internet			46	32	26	33	11
Take up of internet services (as % of population)							
sending emails			34	48	57	53	11
looking for information about goods and services			36	55	57	50	9
uploading self-created content					17	11	5
ordering goods or services, over the internet, for private use			22	35	40	32	8
reading online newspapers/magazines			9	18	22	25	18
selling goods and services (e.g. via auctions)				7	10	10	9
internet banking			18	32	40	29	7
downloading computer or video games or their updates					6	9	22
downloading/listening to/watching music and/or films					38	28	3
paying for online audiovisual contents					5	5	9
listening to the web radio/watching web tv			10	17	24	20	8
seeking health information on injury, disease or nutrition			13	29	39	28	5
looking for a job or sending a job application			6	13	17	13	5
doing an online course				2	4	3	9
seeking information with the purpose of learning				43	47	26	3
eGovernment Indicators							
% basic public services for citizens fully available online	42		58	58		51	9
% basic public services for enterprises fully available online	63		75	88		72	
% of population using eGovernment services			26	41	43	28	6
% of population using eGovernment services for returning filled in forms					25	12	4
% of enterprises using eGovernment services			66	69	73	68	16
% of enterprises using eGovernment services for returning filled in forms			51	59	67	50	7
of which to submit a proposal in a public electronic tender system (e-procurement)			11	9	13	9	5
eCommerce							
eCommerce as % of total turnover of enterprises					12	12	9
% enterprises selling online					13	16	11
% enterprises purchasing online					18	28	13
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					46	41	14
using applications for integrating internal business processes (large enterprises)					81	70	9
using applications for employees to access Human Resources services					11	11	16
exchanging automatically business documents with customers/suppliers					29	25	12
sending/receiving e-invoices				10	20	21	15
sharing information electronically with customers/suppliers on Supply Chain Manag.					12	16	22
using analytical Customer Relation Manag.				9	14	17	17
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	4.5	4.5	4.4			5.0	10
ICT sector share of total employment	3.2	3.1	3.1			2.7	6
ICT R&D expenditure by the business sector, as % of GDP	0.36	0.34				0.31	7
= = = = =, as % of total R&D expenditure	26.6	25.5				26.4	12
% of ICT exports on total exports	7.5	7.1	7.2	5.2			15
% of ICT imports on total imports	9.4	8.9	8.9	7.6			18
% of persons employed with ICT user skills.	17.1	16.9	16.9	17.7	17.8	18.4	19
% of persons employed with ICT specialist skills	3.1	3.0	3.3	2.4	2.8	3.0	18

10. Germany

Germany is just outside the leading countries for information society development with most of benchmarking indicators having values around the EU average. However, there is room for improvement in the fields of eGovernment (especially for enterprises) and eBusiness.

Broadband

The broadband market has expanded further compared to the previous year. The latest figures reveal improvements on every indicator. DSL coverage has increased, particularly in rural areas. The broadband penetration rate exceeds the EU average, yielding a 9th rank. Three quarters of all households have internet access but only 73% of them use broadband connections and only half of all broadband subscribers access speeds above 2Mb/s. On the other hand, the use of wireless laptop connections is getting widespread. Significant progress has also been made in broadband connectivity by enterprises, exceeding the EU average rate for the first time.

Internet Usage

Germany performs relatively well in terms of rates of regular and frequent internet users in the population. However, it is not one of the most connected. Only 20% of German citizens have never used the internet, compared to 33% for the EU as a whole. Take up of most internet services is above the EU average, with the exception of reading online newspapers and doing online courses. Germany has the highest rate of population downloading computer or video games or their updates.

The online availability of public services exceeds the EU27 average, for both citizens and enterprises. However, take-up by enterprises is lagging in EU comparison. Despite this, use of e-procurement is average.

ICTs in the Economy

Germany shows a mixed picture in the area of eBusiness: for some indicators like the use of applications to access Human Resources services, Germany is among the leading countries, while for others relating to the integration of internal business processes and to supply chain management, it scores weakly.

The indicators on the ICT sector show that Germany is in line with the EU averages.

Germany

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	90.7	92.0	92.6	95.7	96.6	92.7	9
DSL coverage in rural areas (as % of total population)		55.0	58.5	87.5	89.7	76.6	9
Broadband penetration (as % of population)	8.4	12.8	18.1	23.8	27.5	22.9	9
Speed - % of broadband subscriptions above 2 Mbps		2.1	7.7	32.0	53.6	63.3	17
% of households with an internet connection	60	62	67	71	75	60	5
% of households with a broadband connection	18	23	34	50	55	49	10
% of enterprises with a (fixed) broadband access	54	62	73	80	84	81	12
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	2	2	3	18
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				14	18	12	4
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	50	54	59	64	68	56	7
% pop. who are frequent internet users (using the internet every day or almost every day)	30	34	40	46	51	43	8
% population who have never used the internet		29	26	23	20	33	7
Take up of internet services (as % of population)							
sending emails	51		60	64	67	53	6
looking for information about goods and services	52		60	63	66	50	6
uploading self-created content					14	11	9
ordering goods or services, over the internet, for private use	37	42	49	52	53	32	5
reading online newspapers/magazines	15		19	21	21	25	19
selling goods and services (e.g. via auctions)	14		20	21	18	10	3
internet banking	26		32	35	38	29	10
downloading computer or video games or their updates					18	9	1
downloading/listening to/watching music and/or films					29	28	12
paying for online audiovisual contents					5	5	7
listening to the web radio/watching web tv	8		12	15	21	20	12
seeking health information on injury, disease or nutrition			34	41	41	28	4
looking for a job or sending a job application	14		17	17	16	13	7
doing an online course				2	2	3	16
seeking information with the purpose of learning				27	28	26	8
eGovernment Indicators							
% basic public services for citizens fully available online	27		27	64		51	8
% basic public services for enterprises fully available online	75		75	88		72	
% of population using eGovernment services	33		32	43	33	28	9
% of population using eGovernment services for returning filled in forms					10	12	15
% of enterprises using eGovernment services	36	44	49	56	56	68	25
% of enterprises using eGovernment services for returning filled in forms	17	24	37	43	45	50	19
of which to submit a proposal in a public electronic tender system (e-procurement)		13	11	12	10	9	10
eCommerce							
eCommerce as % of total turnover of enterprises	11	13	14	11		12	
% enterprises selling online	18	16	18	24		16	
% enterprises purchasing online	47	41	48	52		28	
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					33	41	22
using applications for integrating internal business processes (large enterprises)					68	70	20
using applications for employees to access Human Resources services					16	11	11
exchanging automatically business documents with customers/suppliers					35	25	5
sending/receiving e-invoices				19	27	21	7
sharing information electronically with customers/suppliers on Supply Chain Manag.					12	16	21
using analytical Customer Relation Manag.				30	26	17	2
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	4.8	4.6	4.7			5.0	9
ICT sector share of total employment	2.5	2.6	2.6			2.7	12
ICT R&D expenditure by the business sector, as % of GDP	0.39	0.38				0.31	6
= = = = =, as % of total R&D expenditure	22.3	22.3				26.4	17
% of ICT exports on total exports	10.1	9.6	9.2	7.3			10
% of ICT imports on total imports	11.6	11.3	11.1	9.7			10
% of persons employed with ICT user skills.	19.7	20.2	20.3	19.8	18.3	18.4	17
% of persons employed with ICT specialist skills	3.0	3.2	3.3	3.2	3.1	3.0	9

11. Greece

Greece has experienced good progress in the area of broadband over recent years. However, the information society in Greece is still lagging behind in comparison to general developments in the EU. Scores for the eBusiness dimension are around the European average, but for all other indicators, there is a serious gap between Greece and the large majority of other countries. To fill the gap, Greece has been implementing an ambitious '*Digital Strategy 2006-2013*' plan, aiming to perform a "Digital Leap to Productivity and Quality of life", by leveraging EU Structural Funds. The Digital Strategy comprises two main objectives: enhanced business productivity through the use of ICT; and improved quality of life through ICT. Particular emphasis has been given to increase digital literacy among students and the younger generation through projects to encourage access to broadband ('*Diodos*'), to subsidise the purchase of laptops of top ranking first year students ('See your life digitally'), an education-focused initiative (starting in 2009) to provide laptops to school pupils aimed at getting them acquainted with new technologies early on ('Digital Classroom'), and certified training courses for all students ('*e-ducate*').

Broadband

In comparison to the situation five years ago, Greece's performance in broadband has improved significantly thanks to the implementation of the electronic communications regulatory framework and of the "Broadband Action Plan" that used Structural Funds to stimulate broadband investments and extend coverage in Greek regions. Total DSL coverage increased from 9% (in 2004) to 88% in 2008, DSL coverage in rural areas rose from 0% to 55%, and take up reaches 13.4% of the population, up from 0.5%. Despite good progress over 2007, households' connectivity remains low and stands at only half of the European average. Connectivity of enterprises is somewhat better, but still significantly lower than for most EU Member States. Mobile broadband is emerging.

Internet Usage

In Greece, a third of the population uses the internet regularly, 23% are frequent users and 56% have never used the internet. The country also consistently ranks as one of those with the lowest use of various internet services. Most internet users are active in sending emails and looking for information on goods and services. Looking up information for the purpose of learning, reading online news papers and downloading/listening to/watching music and/or films are also popular activities among Greek internet users.

The availability of eGovernment services, for citizens and enterprises, in Greece is below the EU average, though it has grown substantially in recent years. Take up of eGovernment services by citizens is very low and has not shown much improvement. By contrast, at 78%, take up by enterprises is high, 10 p.p. above the EU average.

ICTs in the Economy

No significant progress has been made over the years in terms of eCommerce. The situation is far more positive for eBusiness, where scores are in line with the European average. Only the use of e-invoices is significantly behind.

Information on the impact of ICTs on the Greek economy is limited with no information available on size and growth of the ICT sector. Indicators on ICT exports and eSkills have stabilised over time and remain among the lowest in Europe.

Greece

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	9.0	12.0	18.0	86.3	88.0	92.7	22
DSL coverage in rural areas (as % of total population)		0.0	10.0	50.0	55.0	76.6	21
Broadband penetration (as % of population)	0.5	1.4	4.4	9.1	13.4	22.9	23
Speed - % of broadband subscriptions above 2 Mbps		0.0	9.7	30.0	43.7	63.3	20
% of households with an internet connection	17	22	23	25	31	60	25
% of households with a broadband connection	0	1	4	7	22	49	25
% of enterprises with a (fixed) broadband access	21	44	58	72	71	81	22
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	1	1	3	24
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				1	3	12	24
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	17	18	23	28	33	56	26
% pop. who are frequent internet users (using the internet every day or almost every day)	9	11	13	19	23	43	25
% population who have never used the internet		73	65	62	56	33	25
Take up of internet services (as % of population)							
sending emails	15	14	17	21	26	53	26
looking for information about goods and services	14	17	23	28	31	50	24
uploading self-created content					4	11	25
ordering goods or services, over the internet, for private use	1	2	5	8	9	32	24
reading online newspapers/magazines	11	9	14	16	19	25	22
selling goods and services (e.g. via auctions)	0	1	0			10	
internet banking	1	1	2	4	5	29	25
downloading computer or video games or their updates					6	9	24
downloading/listening to/watching music and/or films					19	28	23
paying for online audiovisual contents					2	5	23
listening to the web radio/watching web tv	4	4	5	8	16	20	19
seeking health information on injury, disease or nutrition	6	2	6	8	10	28	26
looking for a job or sending a job application	2	2	4	5	5	13	24
doing an online course				2	2	3	21
seeking information with the purpose of learning				5	22	26	15
eGovernment Indicators							
% basic public services for citizens fully available online	18		17	33		51	18
% basic public services for enterprises fully available online	50		50	63		72	
% of population using eGovernment services	8	7	9	12	10	28	25
% of population using eGovernment services for returning filled in forms					4	12	25
% of enterprises using eGovernment services	77	81	84	82	78	68	11
% of enterprises using eGovernment services for returning filled in forms	45	56	76	77	62	50	9
of which to submit a proposal in a public electronic tender system (e-procurement)		21	11	10	7	9	18
eCommerce							
eCommerce as % of total turnover of enterprises	2	2	3	2	3	12	16
% enterprises selling online	6	7	7	6	6	16	19
% enterprises purchasing online	14	14	11	8	9	28	20
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					42	41	17
using applications for integrating internal business processes (large enterprises)					71	70	19
using applications for employees to access Human Resources services					14	11	12
exchanging automatically business documents with customers/suppliers					20	25	20
sending/receiving e-invoices				10	13	21	20
sharing information electronically with customers/suppliers on Supply Chain Manag.					20	16	13
using analytical Customer Relation Manag.				15	15	17	12
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	3.1					5.0	
ICT sector share of total employment	1.5					2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.09	0.07				0.31	19
= = = = =, as % of total R&D expenditure	54.5	36.1				26.4	5
% of ICT exports on total exports	1.2	1.0	2.1	1.0			27
% of ICT imports on total imports	4.7	4.2	5.1	4.9			27
% of persons employed with ICT user skills.	12.1	12.3	13.0	12.7	12.9	18.4	24
% of persons employed with ICT specialist skills	2.4	2.2	2.1	2.2	2.0	3.0	26

12. Hungary

The share of internet users in Hungary is increasing and has caught up with EU average levels. The information society in Hungary however is still lagging behind in comparison with the general developments in Europe, with most of the other benchmarking indicators below the EU average. Broadband is widely available, and the strength of the ICT sector with the good eSkills base are strategic assets for in this country. Furthermore, Hungary has launched specific programmes and action plans in the areas of eInclusion and eBusiness, notably the set up of public access points for rural and socially disadvantaged, the 'Digital Literacy Action Plan', and the "e-Economy Action Plan" designed to strengthen the digital maturity of SMEs and remove barriers to ICT introduction and use.

Broadband

DSL coverage in Hungary is above EU average. Households are increasingly connected to the internet. The share of households in the population using broadband connections has increased significantly during 2007 and nowadays 87.5% of connected households have broadband, indicating that Hungary has managed to leapfrog slower access technologies. Enterprises' connectivity remains below EU average and broadband penetration remains among the lowest in the EU.

Internet Usage

Internet use has expanded in Hungary in recent years and the percentages of regular and frequent internet users are equal to those for the EU average. Use of a number of internet services is also similar to the EU average. However, for some services, there are larger differences. On the one hand, Hungary exhibits an above average percentage of the population downloading computer or video games or their updates and uploading self-created content. On the other hand, it has a below average proportion of the population buying goods and services online and doing their banking over the internet.

Both the availability and use of eGovernment services for the citizens is at the same level as the EU average. For enterprises, however, the rates are lower, especially for availability.

ICTs in the Economy

Of all turnover, 12% is generated by eCommerce, a figure equal to the EU average. Nevertheless, the share of enterprises selling or purchasing online is among the lowest in Europe. For the eBusiness dimension, Hungary persistently shows low rankings, with all indicators giving below average scores.

Despite these difficulties, Hungary has a relatively large ICT sector that represents approximately a fifth of its exports, the third highest in the EU, and the percentage of persons employed with ICT user skills exceeds the EU average. The ICT sector contributes significantly to the GDP and employment as well, ranking 4th and 3rd for these indicators respectively. ICT-related R&D drives more than a quarter of total R&D but R&D expenditure as a percentage of GDP remains generally low.

Hungary

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	70.0	85.0	89.0	91.0	93.7	92.7	14
DSL coverage in rural areas (as % of total population)		76.0	77.0	80.0	87.4	76.6	11
Broadband penetration (as % of population)	3.6	6.1	9.9	14.2	16.3	22.9	22
Speed - % of broadband subscriptions above 2 Mbps		2.0	13.4	44.8	33.4	63.3	23
% of households with an internet connection	14	22	32	38	48	60	19
% of households with a broadband connection	6	11	22	33	42	49	17
% of enterprises with a (fixed) broadband access		48	61	70	72	81	21
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	1	2	3	16
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				2	4	12	21
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	21	34	42	49	56	56	15
% pop. who are frequent internet users (using the internet every day or almost every day)	18	20	29	37	43	43	13
% population who have never used the internet		60	52	46	37	33	16
Take up of internet services (as % of population)							
sending emails	20	31	37	47	53	53	13
looking for information about goods and services	19	25	35	43	49	50	13
uploading self-created content					17	11	6
ordering goods or services, over the internet, for private use	4	8	7	11	14	32	19
reading online newspapers/magazines	14	18	25	28	33	25	11
selling goods and services (e.g. via auctions)	1	1	3	4	5	10	15
internet banking	3	6	8	12	13	29	22
downloading computer or video games or their updates					13	9	3
downloading/listening to/watching music and/or films					30	28	11
paying for online audiovisual contents					2	5	21
listening to the web radio/watching web tv	3	7	12	16	18	20	16
seeking health information on injury, disease or nutrition	8	10	17	23	29	28	9
looking for a job or sending a job application	6	10	12	13	14	13	10
doing an online course				2	2	3	15
seeking information with the purpose of learning				19	22	26	16
eGovernment Indicators							
% basic public services for citizens fully available online	8		50	50		51	14
% basic public services for enterprises fully available online	25		50	50		72	
% of population using eGovernment services	16	18	17	25	25	28	15
% of population using eGovernment services for returning filled in forms					11	12	14
% of enterprises using eGovernment services	35		45	55	60	68	23
% of enterprises using eGovernment services for returning filled in forms	23		28	44	50	50	16
of which to submit a proposal in a public electronic tender system (e-procurement)			8	8	9	9	13
eCommerce							
eCommerce as % of total turnover of enterprises		3	7	6	12	12	8
% enterprises selling online	6	4	9	4	4	16	22
% enterprises purchasing online	14	5	11	7	7	28	23
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					27	41	25
using applications for integrating internal business processes (large enterprises)					67	70	21
using applications for employees to access Human Resources services					9	11	19
exchanging automatically business documents with customers/suppliers					19	25	21
sending/receiving e-invoices				4	5	21	27
sharing information electronically with customers/suppliers on Supply Chain Manag.					14	16	18
using analytical Customer Relation Manag.				5	5	17	25
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	6.7	7.0	6.4			5.0	4
ICT sector share of total employment	3.9	3.9	3.9			2.7	3
ICT R&D expenditure by the business sector, as % of GDP	0.05	0.05				0.31	20
= = = = =, as % of total R&D expenditure	12.7	13.1				26.4	23
% of ICT exports on total exports	23.1	23.4	23.3	21.5			3
% of ICT imports on total imports	20.6	19.1	18.5	18.6			3
% of persons employed with ICT user skills.	20.5	20.5	20.6	20.3	20.9	18.4	7
% of persons employed with ICT specialist skills	2.9	2.7	2.9	2.7	2.9	3.0	14

13. Ireland

Ireland provides a mixed image of information society developments, with good scores for eCommerce and eGovernment services for enterprises, but also levels of connectivity and usage of ICTs by citizens and businesses very close to the EU average. Ireland is developing a 'National Knowledge Society Strategy' focused on the development of its knowledge economy in order to help accelerate the development of knowledge-intensive areas such as: digitally traded services; eLearning products and services; and clinical trial infrastructure. More generally the Strategy will bring together the various actions and supports which will result in Ireland having the ability to develop, produce, licence and export products and services based on knowledge-intensive ideas.

Broadband

In 2007, fixed broadband penetration reached 20.2% of the population, slightly below the EU27 average of 22.9%. 49% of broadband subscriptions exceed the 2Mb/s threshold, giving Ireland only the 19th place on the speed ranking.

The take-up of broadband internet by households has been increasing swiftly, but narrowband is still relatively widespread (one third of all connections). Ireland's rankings for fixed connections are average, but the countries ranks high (5th) for wireless laptop connections.

83% of the enterprises have broadband internet access, in line with the EU27 average.

Internet Usage

Internet usage by Irish citizens is similar to that for the EU average: 57% of the population uses the internet on a regular basis and 46% are frequent users. The proportion of those who have never used the internet is also around a third. Take up of services, on the other hand, is generally lower than for the EU as a whole, except for ordering goods online, which at 36% is somewhat larger, and sending emails, which is equal to, the EU average.

In the area of eGovernment, Ireland records below average availability of online public services. Despite this, take up by citizens is similar to the EU average and take up by enterprises is one of the best in Europe, with 91% of enterprises using eGovernment services. Ireland is even the most advanced country for the take up of e-procurement in the EU.

ICTs in the Economy

More than 27% of all Irish exports come from the ICT sector, the highest share in Europe. Moreover, Ireland is one of the leading countries for the share of R&D devoted to ICT. Surprisingly, on the other hand, the country ranks only 24th for specialist eSkills and the share has been slowly declining. This could indicate that there is an important concentration of e-knowledge in few, R&D intensive companies.

The business side of the information society is better developed. Ireland shows some very good ranking for the eBusiness dimension, and it is one of the frontrunners in Europe in eCommerce .

Ireland

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	71.0	82.3	85.6	89.2	90.5	92.7	20
DSL coverage in rural areas (as % of total population)		56.5	64.0	73.3	77.0	76.6	18
Broadband penetration (as % of population)	3.4	6.7	12.3	17.4	20.2	22.9	14
Speed - % of broadband subscriptions above 2 Mbps		6.9	17.1	18.4	49.4	63.3	19
% of households with an internet connection	40	47	50	57	63	60	10
% of households with a broadband connection	3	7	13	31	43	49	15
% of enterprises with a (fixed) broadband access	32	48	61	68	83	81	13
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	3	2	3	17
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				11	18	12	5
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	27	31	44	51	57	56	13
% pop. who are frequent internet users (using the internet every day or almost every day)	12	17	25	32	39	43	16
% population who have never used the internet		55	42	35	32	33	13
Take up of internet services (as % of population)							
sending emails	27	31	45	48	53	53	14
looking for information about goods and services	22	29	42	44	46	50	17
uploading self-created content					8	11	14
ordering goods or services, over the internet, for private use	14	19	28	33	36	32	10
reading online newspapers/magazines	5	4	8	10	17	25	25
selling goods and services (e.g. via auctions)	1	1	4	3	3	10	19
internet banking	10	13	21	24	28	29	13
downloading computer or video games or their updates					5	9	25
downloading/listening to/watching music and/or films					19	28	21
paying for online audiovisual contents					2	5	20
listening to the web radio/watching web tv	3	4	9	10	13	20	22
seeking health information on injury, disease or nutrition	6	10	8	12	19	28	20
looking for a job or sending a job application	3	2	6	7	9	13	17
doing an online course				3	3	3	11
seeking information with the purpose of learning				16	21	26	17
eGovernment Indicators							
% basic public services for citizens fully available online	30		30	40		51	17
% basic public services for enterprises fully available online	75		75	63		72	
% of population using eGovernment services	14	18	26	32	27	28	14
% of population using eGovernment services for returning filled in forms					18	12	6
% of enterprises using eGovernment services	69	76	84	89	91	68	2
% of enterprises using eGovernment services for returning filled in forms	32	42	56	69	68	50	5
of which to submit a proposal in a public electronic tender system (e-procurement)		14	21	22	26	9	1
eCommerce							
eCommerce as % of total turnover of enterprises	18	20	17	19	18	12	3
% enterprises selling online	19	21	23	27	25	16	3
% enterprises purchasing online	33	41	53	55	54	28	1
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					62	41	2
using applications for integrating internal business processes (large enterprises)					86	70	3
using applications for employees to access Human Resources services					16	11	10
exchanging automatically business documents with customers/suppliers					23	25	19
sending/receiving e-invoices				26	21	21	14
sharing information electronically with customers/suppliers on Supply Chain Manag.					10	16	24
using analytical Customer Relation Manag.				23	24	17	4
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.44	0.48				0.31	5
= = = = =, as % of total R&D expenditure	53.8	58.1				26.4	2
% of ICT exports on total exports	27.6	27.2	27.0	27.6			1
% of ICT imports on total imports	12.3	12.3	12.1	10.4			9
% of persons employed with ICT user skills.	19.4	18.8	18.9	18.9	19.2	18.4	13
% of persons employed with ICT specialist skills	2.8	2.6	2.5	2.4	2.3	3.0	24

14. Italy

Italy presents a mixed picture of information society developments. It shows good scores in terms of availability of eGovernment services and eBusiness adoption but still lags behind for fixed connectivity, eCommerce and the use of the internet by households. An important framework initiative has been launched in 2008 to enhance public services (the '*new Strategic Plan for Innovation of the Italian Government*'). The '*Linea Amica*' (friendly line) has been launched at the beginning of 2009 to enhance citizens' accessibility to public on-line services. Those who are not familiar with internet can contact Linea Amica by calling a toll free number either from a fixed line or from a mobile phone. A 'Programme for infrastructural broadband coverage', was activated by the Government in coordination with Italian Regions, to reach 99% of population with a broadband connection with speeds between 2 and 20 Mb/s by 2012. The programme will increase the capacity of access networks, both through fixed and wireless technologies.

Broadband

Fixed broadband penetration increased in 2008, but is still roughly 4 p.p. below the EU27 average. Total DSL coverage is high, and the latest figures reveal that this is now the case in rural areas too, thanks to significant progress in the past two years. Almost 70% of broadband subscribers access speeds above 2Mb/s but the percentage of internet-connected households remains one of the lowest in Europe. Although the figure has doubled in two years, less than one in three households has a broadband connection. Enterprises' broadband connectivity on the other hand is comparable to the EU average. Mobile broadband appears well established.

Internet Usage

Only a minority of Italians use the internet on a regular and/or frequent basis and half of the population has still never used the internet at all. Progress in getting more people online has also been rather gradual. As such, Italy ranks as one of the least internet active countries in Europe. Correspondingly, the take-up of internet services is also weak. The most popular activities are also the most common ones undertaken at EU level; namely, sending emails and looking up information about goods and services. Italian citizens are also approaching the European average in terms of looking up information for the purposes of learning.

Italy scores relatively well in the provision of eGovernment services, with 58% of public services for citizens and 88% for enterprises available online. While take up of these services is relatively good for enterprises, as with general connectivity, take up by citizens is low.

ICTs in the Economy

The importance of eCommerce in the Italian economy is negligible. For eBusiness, the situation is far more positive. For most indicators, the EU27 average is exceeded. Only applications for employees to access HR services are much rarer than in other countries. Most enterprises thus seem to acknowledge the importance of the internet as a business tool. The ICT sector is comparable to the European average in terms of GDP and employment contribution. The ICT R&D share to total R&D is at EU average, but R&D spending as a whole in Italy is particularly low. Finally, the percentage of employees with ICT specialist skills is below average; while ICT user skills are at EU average.

Italy

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	85.0	87.0	89.0	94.0	95.3	92.7	11
DSL coverage in rural areas (as % of total population)		44.6	50.5	81.7	82.0	76.6	15
Broadband penetration (as % of population)	8.0	11.8	14.5	17.1	19.0	22.9	16
Speed - % of broadband subscriptions above 2 Mbps		4.2	4.3	45.2	68.3	63.3	10
% of households with an internet connection	34	39	40	43	47	60	21
% of households with a broadband connection		13	16	25	31	49	24
% of enterprises with a (fixed) broadband access	23	57	70	76	81	81	14
% of individuals using a mobile phone via UMTS (3G) to access the internet			2	3	3	3	13
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				7	10	12	13
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	26	28	31	34	37	56	23
% pop. who are frequent internet users (using the internet every day or almost every day)	24	27	29	31	35	43	19
% population who have never used the internet		62	59	54	50	33	22
Take up of internet services (as % of population)							
sending emails		26	29	31	34	53	23
looking for information about goods and services		21	23	27	30	50	25
uploading self-created content					7	11	19
ordering goods or services, over the internet, for private use		6	9	10	11	32	20
reading online newspapers/magazines		13	13	17	17	25	24
selling goods and services (e.g. via auctions)		2	3	4	4	10	18
internet banking		8	9	12	13	29	23
downloading computer or video games or their updates					4	9	27
downloading/listening to/watching music and/or films					15	28	27
paying for online audiovisual contents					0	5	27
listening to the web radio/watching web tv		5	5	8	9	20	26
seeking health information on injury, disease or nutrition		9	12	16	16	28	22
looking for a job or sending a job application		5	6	7	7	13	22
doing an online course				2	2	3	17
seeking information with the purpose of learning				21	24	26	12
eGovernment Indicators							
% basic public services for citizens fully available online	27		36	58		51	9
% basic public services for enterprises fully available online	88		88	88		72	
% of population using eGovernment services		14	16	17	15	28	23
% of population using eGovernment services for returning filled in forms					5	12	22
% of enterprises using eGovernment services	65	73	87	84	82	68	9
% of enterprises using eGovernment services for returning filled in forms	35	29	49	35	42	50	21
of which to submit a proposal in a public electronic tender system (e-procurement)		10	7	7	9	9	12
eCommerce							
eCommerce as % of total turnover of enterprises	3	2	2	2		12	
% enterprises selling online	7	3	3	2	3	16	24
% enterprises purchasing online	6	4	10	10	12	28	18
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					49	41	8
using applications for integrating internal business processes (large enterprises)					82	70	7
using applications for employees to access Human Resources services					6	11	25
exchanging automatically business documents with customers/suppliers					27	25	15
sending/receiving e-invoices				34	29	21	5
sharing information electronically with customers/suppliers on Supply Chain Manag.					21	16	8
using analytical Customer Relation Manag.				15	14	17	13
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	3.9	3.9	4.0			5.0	12
ICT sector share of total employment	2.7	2.7	2.6			2.7	11
ICT R&D expenditure by the business sector, as % of GDP	0.13	0.14				0.31	14
= = = = =, as % of total R&D expenditure	25.2	25.1				26.4	13
% of ICT exports on total exports	3.9	3.9	3.8	2.6			25
% of ICT imports on total imports	8.0	7.5	6.9	6.1			24
% of persons employed with ICT user skills.	17.6	17.5	18.9	19.4	19.4	18.4	12
% of persons employed with ICT specialist skills	2.8	2.8	2.9	2.8	2.7	3.0	19

15. Latvia

The information society in Latvia is still lagging behind in comparison with the general developments in the EU, although internet users are actively taking up advanced services. The wide dissemination of internet usage in the population and a good skills base are laying the foundations for further developments. Several important initiatives have been taken in 2008 to boost information society. In particular, the approval by the Government of a list of high-priority projects related to information society and eServices (education, culture, health care, employment, social security etc.) submitted by the ministries and other institutions subordinated to them. Furthermore, the '*Latvian Educational System Informatization Programme for 2007-2013*' envisages the establishment of an educational information system, teacher training in the use of ICT, development of electronic education materials, establishment of an interactive portal for teachers and parents, computerisation of schools and libraries and a number of other measures to improve the quality of education.

Broadband

Total DSL coverage in Latvia grew further to reach 88% of the population, exceeding the EU average. However, broadband coverage in rural areas remains an issue and broadband penetration is still lower than average, as is the connectivity of households. With only 62% of enterprises having broadband internet access, Latvia is placed at the bottom of the European ranking as well (23rd). No significant progress can be observed in the area of broadband over the last year.

Internet Usage

The presence of regular and frequent internet users in Latvia is comparable to that for the EU as a whole. Take-up of internet services is also generally good. Rates of participation for the more popular activities such as sending emails and looking up information about goods and services are similar to the EU average and for a number of other services rates of use are higher. In particular, Latvia records particularly large above average rates of the population using the internet for reading online newspapers (+18 p.p.), internet banking (+10pp.), uploading self-created content (+8 p.p.), doing online courses (+5 p.p.) and downloading video games (+5 p.p.). For a small number of services (seeking information for learning purposes, ordering goods), it records relatively low rates of use by its citizens. The take-up of all services, for which there is comparable data, has increased since last year.

The availability of online public services is very low, both for citizens and for enterprises. Subsequently, the use of eGovernment also lies far below the European average.

ICTs in the Economy

eCommerce and eBusiness are not particularly developed yet in Latvia. Despite improvements in terms of rankings and absolute figures, the three indicators of eCommerce remain below the EU27 average. In eBusiness dimension, indicators are at or below EU average.

Data on the size of the ICT sector are not available and other indicators suggest that ICTs do not yet play an important part in the Latvian economy. The percentage of persons employed with ICT user skills is above average, but ICT specialists score less well.

Latvia

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)			72.0	87.0	88.0	92.7	23
DSL coverage in rural areas (as % of total population)			37.0	65.0	68.0	76.6	20
Broadband penetration (as % of population)	2.4	5.7	10.5	15.0	17.4	22.9	19
Speed - % of broadband subscriptions above 2 Mbps		0.3	7.6	32.6	73.0	63.3	6
% of households with an internet connection	15	31	42	51	53	60	16
% of households with a broadband connection	5	14	23	32	40	49	18
% of enterprises with a (fixed) broadband access	45	48	59	57	62	81	23
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	1	1	3	20
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				3	10	12	12
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	27	36	46	52	57	56	14
% pop. who are frequent internet users (using the internet every day or almost every day)	16	23	31	37	42	43	14
% population who have never used the internet		51	45	39	34	33	15
Take up of internet services (as % of population)							
sending emails	25	33	41	46	49	53	16
looking for information about goods and services	19	27	36	39	49	50	14
uploading self-created content					19	11	2
ordering goods or services, over the internet, for private use	3	5	8	11	16	32	18
reading online newspapers/magazines	19	24	27	18	33	25	13
selling goods and services (e.g. via auctions)	1	1	2	2		10	
internet banking	12	16	22	28	39	29	9
downloading computer or video games or their updates					13	9	4
downloading/listening to/watching music and/or films					33	28	8
paying for online audiovisual contents					4	5	10
listening to the web radio/watching web tv	9	11	17	20	24	20	9
seeking health information on injury, disease or nutrition	8	7	12	11	24	28	16
looking for a job or sending a job application	9	10	11	9	16	13	8
doing an online course				6	8	3	2
seeking information with the purpose of learning				5	13	26	23
eGovernment Indicators							
% basic public services for citizens fully available online	8		8	25		51	21
% basic public services for enterprises fully available online	0		13	38		72	
% of population using eGovernment services	13	13	25	18	16	28	22
% of population using eGovernment services for returning filled in forms					6	12	20
% of enterprises using eGovernment services	40	35	40	45	55	68	26
% of enterprises using eGovernment services for returning filled in forms	15	15	21	26	39	50	23
of which to submit a proposal in a public electronic tender system (e-procurement)		0	0	6	8	9	16
eCommerce							
eCommerce as % of total turnover of enterprises		1	1	2	7	12	15
% enterprises selling online		1	2	2	6	16	20
% enterprises purchasing online		1	3	5	9	28	21
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					36	41	20
using applications for integrating internal business processes (large enterprises)					60	70	22
using applications for employees to access Human Resources services					11	11	17
exchanging automatically business documents with customers/suppliers					19	25	22
sending/receiving e-invoices				25	20	21	16
sharing information electronically with customers/suppliers on Supply Chain Manag.					20	16	14
using analytical Customer Relation Manag.				10	9	17	21
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment	1.6	1.7	1.6			2.7	14
ICT R&D expenditure by the business sector, as % of GDP	0.02	0.02				0.31	25
= = = = =, as % of total R&D expenditure	12.1	8.4				26.4	24
% of ICT exports on total exports	3.1	3.4	4.1	4.1			22
% of ICT imports on total imports	6.5	6.7	7.0	7.1			19
% of persons employed with ICT user skills.	17.0	16.6	19.3	21.0	21.3	18.4	6
% of persons employed with ICT specialist skills	3.3	3.5	3.3	3.3	2.7	3.0	20

16. Lithuania

Fast progress in internet usage by individuals and growth in eCommerce activities are laying the foundations for further information. The Strategy for Information Society Development in Lithuania has given priority to the creation of ICT competence in the population (e-skills) and social cohesion (e-Inclusion). The modernization of the public administration through the use of ICTs and the protection of the Lithuanian culture (e-content) are also main objectives of the ICT strategy.

Broadband

Broadband coverage in rural areas has experienced significant progress in recent years. In 2008, fixed broadband penetration increased to 17.5%, moving 4 places up since last year, but still lags behind the EU27 average of 23%. Despite progress, the connectivity of households remains below average and the situation is even weaker for enterprises, as Lithuania ranks at the bottom of the list. New mobile connectivity usages are not yet developed.

Internet Usage

Corresponding to its low level of connectivity, internet use by Lithuanian households also remains below average. At 43% Lithuania also has an above average proportion of the population that has never used the internet. Nevertheless, the share of regular and frequent users has increased substantially over the past four years; from 26 to 50% and from 13 to 38%, respectively.

The take-up of internet services too shows a sharp increase in comparison to four years ago. For some services, Lithuania ranks among the top ten users e.g. reading online newspapers, downloading games, music of films and doing online courses. For other indicators, however, use is lower than the average.

The online availability of public services for citizens is only half of the EU average, and has not increased since 2004. Take up by citizens is below the EU average but is increasing. Availability is higher for services for enterprises, though but still below average, and take up by enterprises exceeds the EU average by 18pp.

ICTs in the Economy

In only 3 other countries more enterprises sell online than they do in Lithuania, and the country ranks 9th for the share of firms purchasing online. In general, 8% of total turnover in Lithuania comes from eCommerce.

In terms of eBusiness, applications for integrating internal business processes, for HR services or for Customer Relation Management are still rare. On the other hand, ICTs are often used to exchange documents, to share information on Supply Chain Management and for e-invoices.

ICTs have a minimal impact on the Lithuanian economy. R&D investment is very small, as are exports of ICT products. User skills are widespread among Lithuanian employees, but nowhere else in Europe specialist skills are lacking more.

Lithuania

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)		82.0	83.0	87.9	88.4	92.7	21
DSL coverage in rural areas (as % of total population)		54.6	58.0	67.5	68.5	76.6	19
Broadband penetration (as % of population)	3.8	6.8	10.6	13.7	17.5	22.9	18
Speed - % of broadband subscriptions above 2 Mbps		0.7	4.0	14.0	33.3	63.3	24
% of households with an internet connection	12	16	35	44	51	60	18
% of households with a broadband connection	4	12	19	34	43	49	16
% of enterprises with a (fixed) broadband access	50	57	57	53	56	81	26
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	0	1	3	25
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				2	3	12	23
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	26	30	38	45	50	56	18
% pop. who are frequent internet users (using the internet every day or almost every day)	13	16	23	30	38	43	17
% population who have never used the internet		61	54	49	43	33	19
Take up of internet services (as % of population)							
sending emails	23	26	32	39	42	53	20
looking for information about goods and services	15	22	30	36	37	50	20
uploading self-created content					8	11	15
ordering goods or services, over the internet, for private use	1	2	4	6	6	32	25
reading online newspapers/magazines	21	24	30	32	43	25	5
selling goods and services (e.g. via auctions)	0	1	2	1	1	10	20
internet banking	7	10	15	21	27	29	14
downloading computer or video games or their updates					12	9	6
downloading/listening to/watching music and/or films					32	28	9
paying for online audiovisual contents					3	5	18
listening to the web radio/watching web tv	8	11	17	20	19	20	13
seeking health information on injury, disease or nutrition		9	15	19	21	28	19
looking for a job or sending a job application	4	7	9	10	10	13	14
doing an online course				5	4	3	7
seeking information with the purpose of learning				20	20	26	18
eGovernment Indicators							
% basic public services for citizens fully available online	25		25	25		51	21
% basic public services for enterprises fully available online	63		63	50		72	
% of population using eGovernment services	10	12	13	18	20	28	16
% of population using eGovernment services for returning filled in forms					13	12	10
% of enterprises using eGovernment services	65	72	76	76	86	68	7
% of enterprises using eGovernment services for returning filled in forms	30	52	56	60	75	50	3
of which to submit a proposal in a public electronic tender system (e-procurement)		8	13	16	20	9	2
eCommerce							
eCommerce as % of total turnover of enterprises	2	2	5	5	8	12	13
% enterprises selling online	5	6	13	14	22	16	4
% enterprises purchasing online	13	7	17	18	25	28	9
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					23	41	27
using applications for integrating internal business processes (large enterprises)					55	70	24
using applications for employees to access Human Resources services					10	11	18
exchanging automatically business documents with customers/suppliers					33	25	9
sending/receiving e-invoices				15	35	21	4
sharing information electronically with customers/suppliers on Supply Chain Manag.					29	16	3
using analytical Customer Relation Manag.				9	8	17	24
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	3.2	2.8				5.0	
ICT sector share of total employment	1.8	1.8				2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.03	0.03				0.31	22
= = = = =, as % of total R&D expenditure	17.8	20.5				26.4	18
% of ICT exports on total exports	5.3	4.8	4.4	4.3			21
% of ICT imports on total imports	6.9	6.8	6.4	6.4			20
% of persons employed with ICT user skills.	17.5	18.8	19.4	21.2	23.4	18.4	3
% of persons employed with ICT specialist skills	2.0	1.4	1.4	1.5	1.9	3.0	27

17. Luxembourg

Luxembourg is well advanced in the information society, with many benchmarking indicators significantly above the EU average, in particular in the area of broadband connectivity, households' internet usage and eSkills endowments. The country is also very active in Green IT: all the companies have accepted the challenge and a variety of concrete solutions have been deployed to significantly reduce energy use in other sectors of the economy and in the society as a whole.

Broadband

Luxembourg has further improved its broadband penetration since last year, reaching 28.8% and rising 2 places in the EU ranking. There is full DSL coverage and the use of wireless laptop connections is the highest in Europe. The good infrastructure is reflected in the percentage of households connected to (broadband) internet (80%).

Speeds are the only downside in the connectivity dimension: only one in two broadband connections is faster than 2Mb/s.

Internet Usage

Luxembourg performs well in terms of the proportion of its population that are using the internet. 77% of citizens are regular internet users, most accessing the internet almost every day, and only 16% have never used the internet. Use of various internet services is also high in comparison to other EU Member States; with Luxemburg exhibiting above average use by its citizens of all but two activities: looking for a job and downloading computer or video games or their updates. Luxemburg has the highest proportion of its population using the internet to look for information for the purpose of learning.

Despite below average availability, the use of eGovernment services by citizens and enterprises is one of the highest in Europe.

ICTs in the Economy

There are fewer enterprises in Luxembourg selling and purchasing online relative to EU averages. eBusiness on the other hand is well developed, with rankings ranging from 6th to 14th place.

No information is available on the size of the ICT sector in Luxembourg, but exports are significant despite a decline since 2006. The workforce displays the highest user eSkills and second highest specialist eSkills in Europe (an improvement of two places since last year). Together with the high connectivity rate and widespread take up of internet services in the general population, this forms a very good starting point for further information society developments.

Luxembourg

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	100.0	100.0	100.0	100.0	100.0	92.7	1
DSL coverage in rural areas (as % of total population)		100.0	100.0	100.0	100.0	76.6	1
Broadband penetration (as % of population)	8.1	15.5	21.5	25.4	28.8	22.9	5
Speed - % of broadband subscriptions above 2 Mbps		7.7	8.1	12.4	53.0	63.3	18
% of households with an internet connection	59	65	70	75	80	60	4
% of households with a broadband connection	16	33	44	58	61	49	6
% of enterprises with a (fixed) broadband access	48	64	76	81	87	81	9
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	4	4	3	10
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				31	31	12	1
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	59	63	65	72	77	56	5
% pop. who are frequent internet users (using the internet every day or almost every day)	36	44	47	56	65	43	5
% population who have never used the internet		29	27	20	16	33	5
Take up of internet services (as % of population)							
sending emails	59	63	65	71	74	53	4
looking for information about goods and services	53	61	64	68	69	50	5
uploading self-created content					15	11	7
ordering goods or services, over the internet, for private use	40	39	44	47	49	32	7
reading online newspapers/magazines	28	29	29	42	41	25	7
selling goods and services (e.g. via auctions)	5	6	5	12	12	10	8
internet banking	35	37	41	46	48	29	6
downloading computer or video games or their updates					9	9	11
downloading/listening to/watching music and/or films					42	28	2
paying for online audiovisual contents					12	5	3
listening to the web radio/watching web tv	15	19	22	29	36	20	3
seeking health information on injury, disease or nutrition	41	41	27	48	44	28	3
looking for a job or sending a job application	11	12	11	14	12	13	13
doing an online course				3	5	3	6
seeking information with the purpose of learning				47	50	26	1
eGovernment Indicators							
% basic public services for citizens fully available online	8		8	33		51	18
% basic public services for enterprises fully available online	38		50	50		72	
% of population using eGovernment services	45	46	46	52	48	28	4
% of population using eGovernment services for returning filled in forms					16	12	8
% of enterprises using eGovernment services	71		83	85	90	68	4
% of enterprises using eGovernment services for returning filled in forms	26		32	35	41	50	22
of which to submit a proposal in a public electronic tender system (e-procurement)			12	5	7	9	21
eCommerce							
eCommerce as % of total turnover of enterprises						12	
% enterprises selling online	11	10	11	13	10	16	15
% enterprises purchasing online	34	22	30	34	23	28	10
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					49	41	11
using applications for integrating internal business processes (large enterprises)					79	70	12
using applications for employees to access Human Resources services					13	11	14
exchanging automatically business documents with customers/suppliers					35	25	6
sending/receiving e-invoices				23	24	21	12
sharing information electronically with customers/suppliers on Supply Chain Manag.					23	16	6
using analytical Customer Relation Manag.				13	17	17	9
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.12	0.11				0.31	16
= = = = =, as % of total R&D expenditure	8.3	8.0				26.4	25
% of ICT exports on total exports	15.9	18.2	17.8	12.0			8
% of ICT imports on total imports	14.2	15.4	17.4	11.8			7
% of persons employed with ICT user skills.	27.0	27.5	27.2	27.7	29.1	18.4	1
% of persons employed with ICT specialist skills	3.6	3.5	3.2	3.4	5.0	3.0	2

18. Malta

Malta performs well in the fields of eCommerce, eBusiness and the provision of eGovernment services, and displays a relatively high proportion of eSkills among employees. However, it is lagging in terms of regular use of the internet and the take up of many internet services. ICT exports are very important for the economy. This is an indication of the economic importance of the information society in this country. Even more impetus is expected from the '*Smart Island National ICT Strategy 2008-2010*' which sets a vision for the country to become one of the top 10 information societies in the world. The strategic plan prepares Malta for the next generation of technology by laying the foundations for a world class inclusive infrastructure; developing a smart workforce; using IST to improve quality of life; re-inventing government and enhancing the productivity of the private sector and its competitiveness.

Broadband

After a stall in broadband growth in 2006, there was a substantial increase in 2007 and 2008. Broadband penetration now stands at 24% of population. This gives Malta the 11th place in Europe, up five places since last year. There also is virtually complete DSL and cable modem networks coverage, while mobile connectivity methods are not yet fully exploited.

55% of Maltese households (or 93% of those connected to the internet) have broadband access. For the enterprises, this figure is at 89%. Broadband speeds however are among the lowest in Europe and this is a consequence of interconnection issues to the main land.

Internet Usage

While internet use has been growing among the population, Malta is placed in the bottom third of EU Member States with respect to rates of regular and frequent internet users and almost half of the population has never used the internet. The take up of internet services is also generally below the EU average; with the exception of downloading computer and/or video games, reading online newspapers, downloading/listeningto/watching music and/or films and listening to web radio/watching web TV, for which use is slightly above the average.

Malta performs very well in terms of the provision online public services; with 92% of public services for citizens and 100% of public services for enterprises available online. In terms of take up, however, it performs less well. While an above average proportion of enterprises use online pubic services (74%, compared to an EU average of 68%), use by citizens is relatively low.

ICTs in the Economy

Malta's position is strong in eCommerce and eBusiness. No other EU Member States features such a high share of enterprises' turnover from eCommerce. And all the eBusiness indicators are above the EU average.

The latest figures indicate that the Maltese business sector tripled its R&D expenditure in ICT between 2004 and 2005. ICT R&D expenditure relative to GDP remains lower than average, but one third (compared to 11% in the previous year) of all R&D spending goes to the ICT sector, resulting in a steep increase of Malta's ranking (from 23rd to 8th position), mainly led by the presence of the semiconductors industry. In 2006, Malta had the highest proportion of ICT exports in total exports in the EU. ICT plays an important role in the Maltese economy, as also underlined by strong eSkills, both at user and specialist levels, in the workforce.

Malta

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	95.0	99.0	99.0	99.0	99.0	92.7	6
DSL coverage in rural areas (as % of total population)						76.6	
Broadband penetration (as % of population)	9.4	12.7	12.5	16.9	23.9	22.9	11
Speed - % of broadband subscriptions above 2 Mbps		0.0	59.6	29.0	21.2	63.3	25
% of households with an internet connection		41	53	54	59	60	12
% of households with a broadband connection		23	41	44	55	49	9
% of enterprises with a (fixed) broadband access		78	83	89	89	81	6
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	0	2	3	14
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				4	4	12	20
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)		34	36	43	46	56	20
% pop. who are frequent internet users (using the internet every day or almost every day)		25	26	34	36	43	18
% population who have never used the internet		57	58	51	49	33	21
Take up of internet services (as % of population)							
sending emails		32	31	40	43	53	19
looking for information about goods and services		27	26	34	42	50	19
uploading self-created content					5	11	23
ordering goods or services, over the internet, for private use		14	14	20	22	32	13
reading online newspapers/magazines		14	17	20	27	25	15
selling goods and services (e.g. via auctions)		1	3	7	5	10	14
internet banking		16	16	22	25	29	15
downloading computer or video games or their updates					12	9	5
downloading/listening to/watching music and/or films					29	28	13
paying for online audiovisual contents					3	5	15
listening to the web radio/watching web tv		8	10	14	21	20	11
seeking health information on injury, disease or nutrition		16	18	20	23	28	17
looking for a job or sending a job application		5	8	10	10	13	15
doing an online course				3	2	3	18
seeking information with the purpose of learning				21	23	26	13
eGovernment Indicators							
% basic public services for citizens fully available online	33		83	92		51	2
% basic public services for enterprises fully available online	50		63	100		72	
% of population using eGovernment services		19	17	25	20	28	17
% of population using eGovernment services for returning filled in forms					7	12	18
% of enterprises using eGovernment services		68	67	77	74	68	15
% of enterprises using eGovernment services for returning filled in forms		45	35	49	46	50	17
of which to submit a proposal in a public electronic tender system (e-procurement)		7	9	11	7	9	19
eCommerce							
eCommerce as % of total turnover of enterprises					22	12	1
% enterprises selling online		16	14	16	13	16	12
% enterprises purchasing online		33	25	27	13	28	17
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					58	41	5
using applications for integrating internal business processes (large enterprises)					72	70	17
using applications for employees to access Human Resources services					19	11	4
exchanging automatically business documents with customers/suppliers					28	25	14
sending/receiving e-invoices				24	25	21	10
sharing information electronically with customers/suppliers on Supply Chain Manag.					19	16	15
using analytical Customer Relation Manag.				22	19	17	8
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.04	0.14				0.31	15
= = = = =, as % of total R&D expenditure	11.2	33.4				26.4	8
% of ICT exports on total exports	32.4	26.7	27.3	23.5			2
% of ICT imports on total imports	26.5	22.4	22.7	18.7			2
% of persons employed with ICT user skills.	20.5	20.5	20.8	21.2	22.4	18.4	5
% of persons employed with ICT specialist skills	4.1	3.4	2.9	3.4	3.4	3.0	7

19. The Netherlands

The Netherlands is among the best performing ICT countries in Europe, leading the way in a broad range of information society developments. The connectivity of households is the highest in Europe and the take-up of internet services is widespread. There is still room for improvement however in the area of eGovernment despite worthwhile progress has been made in 2008, driven by the implementation of Citizen Service Numbers and the widespread use of DigiD. In Spring 2008, the national ICT agenda 2008-2011 was published, formulating the cabinet's objectives around five priority areas: eSkills, eGovernment, interoperability and standards, ICT and public domains, and services innovation and ICT.

Broadband

The Netherlands is one of the world's leaders in the broadband ranking and now stands in second place in the EU with 36.2% (one place up since last year). Speeds are generally high and coverage virtually complete. Nowhere else in Europe a higher proportion of households is connected to the internet, and broadband households' connectivity is only higher in Denmark. For the mobile connectivity methods, the country scores above average as well.

With 86% of the Dutch enterprises having broadband access, the EU average is exceeded by 5%. However, there has been no progress since last year, resulting in a loss of four places on the EU ranking.

Internet Usage

Good connectivity had translated into high shares of internet users in the population and growth in the use of advanced services. 83% of Dutch citizens are accessing the internet at least weekly, while 67% are doing so almost daily, well above the EU27 average. Furthermore, only 11% of the population has never used the internet, as compared to 33% for the EU. The Netherlands is also leading the way in the take-up of internet services, with well above average rates of use for all but one of the indicators: seeking information for the purpose of learning.

The Netherlands ranks first in terms of the take up of eGovernment services by its citizens and second in terms of take up by enterprises, despite an only slightly better than average provision of online public services.

ICTs in the Economy

The three indicators measuring eCommerce adoption by enterprises all reveal scores exceeding the EU27 average, resulting in top-5 rankings. eBusiness is widely taken up by enterprises, although there is scope for improvement in the electronic sharing of information with customers and suppliers.

Data on the size of the ICT sector are not available, but the ICT export sector appears important. The eSkills base is above average.

The Netherlands

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	99.0	99.0	99.0	99.0	99.0	92.7	6
DSL coverage in rural areas (as % of total population)		99.0	99.0	99.0	99.0	76.6	6
Broadband penetration (as % of population)	18.9	25.2	31.8	34.2	36.2	22.9	2
Speed - % of broadband subscriptions above 2 Mbps		39.1	46.6	63.3	72.9	63.3	7
% of households with an internet connection		78	80	83	86	60	1
% of households with a broadband connection		54	66	74	74	49	2
% of enterprises with a (fixed) broadband access	54	71	82	87	86	81	10
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	4	4	3	8
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				12	16	12	7
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)		74	76	81	83	56	2
% pop. who are frequent internet users (using the internet every day or almost every day)		53	61	66	67	43	3
% population who have never used the internet		18	16	13	11	33	2
Take up of internet services (as % of population)							
sending emails		73	76	79	82	53	1
looking for information about goods and services		70	73	76	76	50	1
uploading self-created content					19	11	3
ordering goods or services, over the internet, for private use		43	48	55	56	32	3
reading online newspapers/magazines		29	36	40	43	25	6
selling goods and services (e.g. via auctions)		14	18	20	25	10	1
internet banking		50	59	65	69	29	2
downloading computer or video games or their updates					15	9	2
downloading/listening to/watching music and/or films					46	28	1
paying for online audiovisual contents					7	5	6
listening to the web radio/watching web tv		20	28	35	32	20	5
seeking health information on injury, disease or nutrition		41	45	45	46	28	2
looking for a job or sending a job application		16	19	19	17	13	6
doing an online course				3	4	3	8
seeking information with the purpose of learning				14	15	26	21
eGovernment Indicators							
% basic public services for citizens fully available online	18		36	55		51	13
% basic public services for enterprises fully available online	50		75	75		72	
% of population using eGovernment services		46	52	55	54	28	1
% of population using eGovernment services for returning filled in forms					32	12	1
% of enterprises using eGovernment services	47	57	70	81	85	68	8
% of enterprises using eGovernment services for returning filled in forms	27	44	61	73	75	50	2
of which to submit a proposal in a public electronic tender system (e-procurement)			5	6	6	9	24
eCommerce							
eCommerce as % of total turnover of enterprises					14	12	5
% enterprises selling online	17	14	23	26	27	16	2
% enterprises purchasing online	22	20	32	36	40	28	4
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					72	41	1
using applications for integrating internal business processes (large enterprises)					84	70	6
using applications for employees to access Human Resources services					19	11	5
exchanging automatically business documents with customers/suppliers					34	25	8
sending/receiving e-invoices				11	29	21	6
sharing information electronically with customers/suppliers on Supply Chain Manag.					13	16	19
using analytical Customer Relation Manag.				14	20	17	6
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.33	0.32				0.31	8
= = = = =, as % of total R&D expenditure	32.6	32.1				26.4	9
% of ICT exports on total exports	18.2	19.9	19.0	18.4			4
% of ICT imports on total imports	19.7	21.2	19.7	19.4			1
% of persons employed with ICT user skills.	21.2	20.2	20.9	20.7	20.0	18.4	10
% of persons employed with ICT specialist skills	4.2	4.2	3.8	3.9	4.0	3.0	6

20. Poland

The information society in Poland is still only developing slowly and in two thirds of all benchmarking indicators Poland is close to the bottom of the EU ranking. Poland is however taking active steps through a national ICT strategy, the 'Computerization Plan for Poland in 2007-2010' and a new one was adopted in December 2008 for the period up to 2013: 'Strategy for Information Society Development till 2013'. The two strategies are principally aimed at counteracting digital exclusion for low-income citizens and at widening access to the internet for micro, small and medium entrepreneurs. The former plan aims at developing data communication systems used to carry out public tasks, while the latter focuses on the use of ICT for accelerating the growth of intellectual and social capital of citizens, for increasing productivity and competitiveness of Polish companies and for improving the effectiveness of the public administration.

Broadband

Broadband penetration by population in Poland stood at 13.6% in 2008. It went up by almost 60% since last year, but is still one of the lowest in EU27. DSL coverage at the national level and in rural areas is widely below the EU average. It is therefore no surprise that broadband connectivity for both households and enterprises is at a low level, with Poland ranking 20th and 25th respectively.

Internet Usage

While they have grown steadily over the past few years, rates of regular and frequent internet in Poland are still relatively low compared to the EU average. Furthermore, there are as many people (44%) never having used the internet as there are regular users. Correspondingly, rates of usage of internet services are also relatively low in EU comparison, with the exception of seeking information with the purpose of learning.

Similar conclusions hold for the take-up of eGovernment services. With availability of public services far below the European average, take-up by citizens is low, while use by businesses has reached EU average levels.

ICTs in the Economy

Investment in ICT R&D is very small, but progress in terms of ICT exports (in terms of ranking) confirms an important role for the Polish economy in the manufacturing of ICT goods.

ICT take-up by businesses, reflected by eCommerce and eBusiness indicators, is still at a low level. The share of turnover generated through eCommerce is a quarter lower than on average in Europe, while the proportion of enterprises selling online is only half of the average figure.

The automatic exchange of business documents, however, slightly exceeds the EU average and, together with eGovernment take-up, is a promise for progress in the further development of the information society.

Poland

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	55.2	55.5	60.0	64.0	69.6	92.7	26
DSL coverage in rural areas (as % of total population)		35.0	40.0	42.5	42.5	76.6	23
Broadband penetration (as % of population)	1.4	2.7	5.2	8.4	13.2	22.9	24
Speed - % of broadband subscriptions above 2 Mbps		0.0	3.3	8.0	13.6	63.3	26
% of households with an internet connection	26	30	36	41	48	60	20
% of households with a broadband connection	8	16	22	30	38	49	20
% of enterprises with a (fixed) broadband access	28	43	46	53	59	81	25
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	1	1	3	21
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				3	6	12	19
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	22	29	34	39	44	56	21
% pop. who are frequent internet users (using the internet every day or almost every day)	12	17	22	27	32	43	21
% population who have never used the internet		58	52	48	44	33	20
Take up of internet services (as % of population)							
sending emails	19	24	27	32	38	53	21
looking for information about goods and services	15	18	25	27	33	50	22
uploading self-created content					7	11	17
ordering goods or services, over the internet, for private use	5	7	12	16	18	32	16
reading online newspapers/magazines	14	13	16	15	19	25	23
selling goods and services (e.g. via auctions)	1	1	5	5	7	10	12
internet banking	4	6	9	13	17	29	19
downloading computer or video games or their updates					7	9	18
downloading/listening to/watching music and/or films					21	28	18
paying for online audiovisual contents					2	5	22
listening to the web radio/watching web tv	6	6	10	13	18	20	15
seeking health information on injury, disease or nutrition	5	7	11	13	19	28	21
looking for a job or sending a job application	5	5	7	7	8	13	19
doing an online course					2	3	22
seeking information with the purpose of learning				19	28	26	9
eGovernment Indicators							
% basic public services for citizens fully available online			8	17		51	25
% basic public services for enterprises fully available online	25		38	38		72	
% of population using eGovernment services	13	13		15	16	28	19
% of population using eGovernment services for returning filled in forms					5	12	23
% of enterprises using eGovernment services	74	64	61	64	68	68	19
% of enterprises using eGovernment services for returning filled in forms	68	60	56	56	60	50	11
of which to submit a proposal in a public electronic tender system (e-procurement)		6	7	8	6	9	23
eCommerce							
eCommerce as % of total turnover of enterprises	3	4	6	6	9	12	11
% enterprises selling online	4	5	9	9	8	16	17
% enterprises purchasing online	9	9	16	13	11	28	19
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					24	41	26
using applications for integrating internal business processes (large enterprises)					58	70	23
using applications for employees to access Human Resources services					8	11	22
exchanging automatically business documents with customers/suppliers					26	25	17
sending/receiving e-invoices				8	11	21	22
sharing information electronically with customers/suppliers on Supply Chain Manag.					14	16	17
using analytical Customer Relation Manag.				12	12	17	19
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.02	0.03				0.31	23
= = = = =, as % of total R&D expenditure	11.5	14.7				26.4	21
% of ICT exports on total exports	4.1	4.2	5.1	5.7			13
% of ICT imports on total imports	8.4	8.8	9.2	9.1			11
% of persons employed with ICT user skills.	15.1	14.7	15.1	15.1	15.4	18.4	23
% of persons employed with ICT specialist skills	2.8	2.8	2.8	2.8	2.9	3.0	15

21. Portugal

Portugal has a fairly strong position in the information society as far as eBusiness and eCommerce are concerned. It is also one of the leading countries in terms of eGovernment availability. The country is lagging behind in eSkills and in households' connectivity, but mobile broadband penetration has had a strong development. The 'Connecting Portugal' programme launched in 2005 aims at improving the spread of the information society. Priority is given to increase the ICT capacity of the scientific community (eScience) and of basic and secondary schools and students through the Technological Plan for Education. In eScience, this includes the development of a high performance network for research and education, digital scientific libraries (including the provision of online access to scientific publications by research and higher education institutions), open access scientific repositories and the National Grid Computing Initiative. Regarding basic and secondary education, all the 1st to 12th grade public schools are connected to broadband since January 2006, and in 2007 pioneering programs were launched to facilitate the acquisition of laptops with broadband connections to students.

Broadband

As fixed broadband penetration only increased very little, Portugal fell from 17th to 21st place. However, mobile broadband connectivity is higher than the EU average (ranking 3rd) and the speed of the subscribed fixed broadband is comparatively high (4th in connections above 10 Mbps, and 3rd for connections above 2 Mps). Despite high coverage and speeds, household's connectivity and fixed broadband connectivity is far below average (rankings 22nd and 19th respectively). The situation is more positive for enterprises' broadband connectivity, with a score equal to the EU average.

Internet Usage

Portugal is one of the countries with the lowest rates of regular and frequent internet users, and has a high share of the population who have never used the internet. Subsequently, usage of online services is also relatively low. The main exception to this is for the use of internet with the purpose of learning, which at 33% of the population is well above the EU average of 26%.

Portugal is one of the best EU Member States in terms of the provision of online public services. 83% of public services for citizens are available online, exceeding the EU average of 51%, and 100% of services for enterprises are available online. While enterprises are actively exploiting the new opportunities well above EU average, including in the area of e-procurement, take-up by citizens remains more limited.

ICTs in the Economy

Portugal scores well in eCommerce and eBusiness. The contribution of eCommerce to total turnover is equal to the EU average, while slightly more Portuguese companies sell and fewer purchase online. Portugal is among the leading countries for enterprises' implementation of eBusiness applications, with almost every indicator exceeding the EU average.

The ICT sector as a whole does not play a major role in the Portuguese economy. Investment in R&D is very small, as are exports of ICT products. Its contribution to GDP and employment is below average too. Although some evidence suggests that the situation may have improved in the last years, fully comparable data are not yet available. Finally, the country is underachieving in terms of eSkills, for which it worsened its ranking over the last year.

Portugal

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	92.0	92.6	94.0	95.0	95.0	92.7	12
DSL coverage in rural areas (as % of total population)		79.0	84.0	86.0	86.0	76.6	12
Broadband penetration (as % of population)	8.1	11.6	13.9	16.1	16.5	22,9	21
Speed - % of broadband subscriptions above 2 Mbps		16.2	43.0	54.9	85.1	63.3	3
% of households with an internet connection	26	31	35	40	46	60	22
% of households with a broadband connection	12	20	24	30	39	49	19
% of enterprises with a (fixed) broadband access	49	63	66	76	81	81	15
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	3	5	3	7
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				8	16	12	8
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	25	28	31	35	38	56	22
% pop. who are frequent internet users (using the internet every day or almost every day)	16	19	22	27	29	43	23
% population who have never used the internet		63	60	56	54	33	24
Take up of internet services (as % of population)							
sending emails	24	26	29	33	36	53	22
looking for information about goods and services	23	26	30	33	34	50	21
uploading self-created content					7	11	18
ordering goods or services, over the internet, for private use	5	6	7	9	10	32	22
reading online newspapers/magazines	15	16	16	15	20	25	21
selling goods and services (e.g. via auctions)	1	1	1			10	
internet banking	8	8	10	12	14	29	21
downloading computer or video games or their updates					7	9	16
downloading/listening to/watching music and/or films					19	28	24
paying for online audiovisual contents					2	5	19
listening to the web radio/watching web tv	8	9	11	14	17	20	17
seeking health information on injury, disease or nutrition		10	14	18	22	28	18
looking for a job or sending a job application	3	4	5	6	8	13	21
doing an online course				1	2	3	19
seeking information with the purpose of learning				26	33	26	5
eGovernment Indicators							
% basic public services for citizens fully available online	25		42	83		51	5
% basic public services for enterprises fully available online	63		88	100		72	
% of population using eGovernment services	13	14	17	19	18	28	18
% of population using eGovernment services for returning filled in forms					13	12	11
% of enterprises using eGovernment services	57	58	60	72	75	68	14
% of enterprises using eGovernment services for returning filled in forms	50	52	54	66	68	50	6
of which to submit a proposal in a public electronic tender system (e-procurement)		6	10	9	14	9	4
eCommerce							
eCommerce as % of total turnover of enterprises	5		8	7	12	12	10
% enterprises selling online	6	9	7	9	19	16	7
% enterprises purchasing online	8	12	14	12	20	28	11
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					53	41	7
using applications for integrating internal business processes (large enterprises)					82	70	8
using applications for employees to access Human Resources services					21	11	3
exchanging automatically business documents with customers/suppliers					39	25	2
sending/receiving e-invoices				14	24	21	11
sharing information electronically with customers/suppliers on Supply Chain Manag.					31	16	2
using analytical Customer Relation Manag.				15	16	17	11
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP		4.0				5.0	
ICT sector share of total employment		1.4				2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.07	0.08				0.31	18
= = = = =, as % of total R&D expenditure	23.9	26.0				26.4	11
% of ICT exports on total exports	6.9	7.4	7.9	7.3			11
% of ICT imports on total imports	8.6	9.0	9.1	9.1			12
% of persons employed with ICT user skills.	13.4	12.6	12.2	11.5	11.8	18.4	26
% of persons employed with ICT specialist skills	2.1	2.3	2.7	2.8	2.7	3.0	21

22. Romania

The information society is at early stages of development in Romania. The use of eProcurement, an important development for this country, is progressing at a good pace (the number of auctions in the Electronic System of Public Acquisitions (SEAP - www.e-licitatie.ro) grew from under 2% to over 12%). In November 2008 the *Agency for Information Society Services (ASSI)* published its eGovernment strategy which aims at improving the performance of the public administration at the service of citizens. This is complemented by several initiatives: recently, the e-Romania Portal was launched, offering online administrative services for citizens and companies. It aims, inter alia, to cut administrative costs between 30% and 70% by the end of 2009. Secondly, there is the *eStore* Portal for the promotion of electronic commerce and the business networks. And finally, initiatives were started aiming at enhancing digital inclusion to reduce the rural-urban digital divide, stimulate the use of ICTs in schools as well as facilitating the interaction between citizens and administration.

Broadband

Broadband penetration is growing slowly and now stands 11.7%, the third lowest in the EU. In order to solve this problem, the Romanian Government has launched the National Strategy for Broadband Development, with the aim of achieving an increase in the penetration rate at household level to 40% by 2010 and up to 80% by 2015. Broadband coverage is still limited, translating into low take-up of broadband by both households and enterprises. On the positive side, almost 80% of all broadband subscriptions are fast (+2Mb/s), suggesting good basis for future leapfrogging of traditional broadband access. Still, only one third of households had an internet connection.

Internet Usage

Low connectivity is reflected in rates of internet usage. Despite a gradual increase over the past few years, Romania records the lowest rates of regular and frequent internet use in the EU. In addition, a majority of Romanian citizens (64%) have never used the internet. On the whole, most internet services are used to a significantly lesser degree than on average in the EU.

Similar conclusions can be drawn for eGovernment. Take up by citizens and enterprises is one of the weakest in Europe. Having said this, availability of online public services for enterprises exceeds the EU27 average, as does use of e-procurement.

ICTs in the Economy

Levels of eCommerce and eBusiness are still low. The eSkills base is also relatively weak.

The ICT industry is nevertheless important for the Romanian economy and it is highly prioritised by the Government: although it contributes little to total GDP (3.6%) and employment (1.5%), it is responsible for 5.3% of total exports.

Romania

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)					67.6	92.7	27
DSL coverage in rural areas (as % of total population)				0.0	34.0	76.6	24
Broadband penetration (as % of population)			5.0	9.8	11.7	22.9	25
Speed - % of broadband subscriptions above 2 Mbps				33.3	79.1	63.3	5
% of households with an internet connection	6		14	22	30	60	26
% of households with a broadband connection			5	8	13	49	27
% of enterprises with a (fixed) broadband access	7		31	37	44	81	27
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	0	1	3	27
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				1	2	12	25
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	10		18	22	26	56	27
% pop. who are frequent internet users (using the internet every day or almost every day)	4		9	12	15	43	27
% population who have never used the internet			74	69	64	33	27
Take up of internet services (as % of population)							
sending emails	10		16	20	24	53	27
looking for information about goods and services	5		10	12	17	50	27
uploading self-created content					5	11	22
ordering goods or services, over the internet, for private use	0		1	3	4	32	26
reading online newspapers/magazines	3		7	9	14	25	27
selling goods and services (e.g. via auctions)	0		0	1	1	10	23
internet banking	0		1	2	2	29	26
downloading computer or video games or their updates					8	9	14
downloading/listening to/watching music and/or films					16	28	26
paying for online audiovisual contents					4	5	11
listening to the web radio/watching web tv	2		4	6	7	20	27
seeking health information on injury, disease or nutrition			5	6	11	28	25
looking for a job or sending a job application	1		3	3	3	13	27
doing an online course				1	1	3	23
seeking information with the purpose of learning				8	11	26	25
eGovernment Indicators							
% basic public services for citizens fully available online				8		51	27
% basic public services for enterprises fully available online				75		72	
% of population using eGovernment services			3	5	9	28	26
% of population using eGovernment services for returning filled in forms					3	12	27
% of enterprises using eGovernment services	31		39	42	39	68	27
% of enterprises using eGovernment services for returning filled in forms	12		13	20	23	50	25
of which to submit a proposal in a public electronic tender system (e-procurement)			6	8	10	9	9
eCommerce							
eCommerce as % of total turnover of enterprises			1	2	2	12	17
% enterprises selling online			2	3	3	16	23
% enterprises purchasing online				8	4	28	24
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					28	41	23
using applications for integrating internal business processes (large enterprises)					53	70	26
using applications for employees to access Human Resources services					12	11	15
exchanging automatically business documents with customers/suppliers					18	25	23
sending/receiving e-invoices				15	11	21	23
sharing information electronically with customers/suppliers on Supply Chain Manag.					7	16	26
using analytical Customer Relation Manag.				14		17	
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	3.7	0.0	3.6			5.0	14
ICT sector share of total employment	1.2	1.3	1.5			2.7	15
ICT R&D expenditure by the business sector, as % of GDP	0.01	0.01				0.31	27
= = = = =, as % of total R&D expenditure	4.6	5.7				26.4	27
% of ICT exports on total exports	4.6	5.4	6.6	5.3			14
% of ICT imports on total imports	8.8	9.2	8.8	8.0			15
% of persons employed with ICT user skills.		6.3	8.7	9.1	9.8	18.4	27
% of persons employed with ICT specialist skills		1.8	2.4	2.5	2.5	3.0	23

23. Slovakia

The information society in Slovakia is still lagging behind in comparison to general developments in the EU. However, Slovakia has strategic advantages for future developments: important ICT exports, a high level of adoption of internet by the population, and a high take-up of eBusiness applications by enterprises. The slow development of broadband, however, remains a constraint.

Broadband

Fixed broadband penetration is at only 10.9%, the lowest rate in Europe. Despite this result, there has been positive progress in terms of households' connectivity, approaching the EU average and climbing some places in terms of ranking, probably because of the larger than average size of Slovakian households. For DSL coverage, Slovakia remains at the bottom end of the EU ranking. As of December 2008, DSL coverage was 78% of population (compared to a EU27 average of 92.7%) and 43% of population in rural areas (the EU27 average standing at 76.6%). Penetration of cable modem in Slovakia is relatively important (about 35% of the market), although limited to urban areas. Take-up of FTTx services is developing quickly and approaches 70,000 lines at the end of 2008. More than half of broadband users subscribe to speeds above 2 Mb/s, mainly through cable and FTTx access. Slovakia is also experiencing a generally rapid development of commercial and municipal wireless broadband with increasing take-up rates.

Internet Usage

Despite the absence of widespread broadband networks, there are slightly more regular and frequent internet users in Slovakia than on average in the EU. At 25%, Slovakia also has a lower proportion of the population which have never used the internet. The picture with regard to take-up of internet services is rather mixed. While a larger proportion of the population uses services such as sending emails, reading online newspapers/magazines and downloading computer or videogames or their updates, the proportion of the population which uses other services is relatively low.

The availability of eGovernment services in Slovakia is lagging, especially for citizens. Despite low availability, take up by citizens and enterprises is above the EU average; with, in particular, Slovak enterprises having one of the highest rates of eGovernment take up in the EU.

ICTs in the Economy

Slovakia is lagging behind on the eCommerce dimension, with all indicators below average. This could be related to the low diffusion of broadband. The picture is far more positive for eBusiness. All applications are implemented more often than on average. This is a particularly good result, given the fact that last year's report expressed concerns about the eBusiness use by Slovak enterprises.

The contribution of the ICT sector to GDP and employment is similar to the average situation. For ICT exports and specialist eSkills, Slovakia even is one of the highest scoring countries.

Slovakia

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	44.2	61.0	65.7	73.9	77.9	92.7	25
DSL coverage in rural areas (as % of total population)		25.0	29.5	38.5	43.5	76.6	22
Broadband penetration (as % of population)	1.0	2.6	5.2	8.8	10.9	22.9	27
Speed - % of broadband subscriptions above 2 Mbps		0.6	1.8	48.6	65.5	63.3	13
% of households with an internet connection	23	23	27	46	58	60	14
% of households with a broadband connection	4	7	11	27	35	49	22
% of enterprises with a (fixed) broadband access	25	48	61	76	79	81	18
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	3	5	3	6
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				4	9	12	15
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	40	43	43	51	62	56	11
% pop. who are frequent internet users (using the internet every day or almost every day)	20	23	26	33	44	43	12
% population who have never used the internet		42	41	35	25	33	8
Take up of internet services (as % of population)							
sending emails	38	42	42	50	58	53	10
looking for information about goods and services	27	30	33	39	49	50	12
uploading self-created content					4	11	24
ordering goods or services, over the internet, for private use	10	9	11	16	23	32	11
reading online newspapers/magazines	23	23	25	25	34	25	9
selling goods and services (e.g. via auctions)	2	0	2	2	5	10	16
internet banking	10	10	13	15	24	29	16
downloading computer or video games or their updates					11	9	8
downloading/listening to/watching music and/or films					28	28	15
paying for online audiovisual contents					3	5	16
listening to the web radio/watching web tv	6	6	8	11	17	20	18
seeking health information on injury, disease or nutrition	18	9	14	16	25	28	14
looking for a job or sending a job application	11	11	10	11	13	13	11
doing an online course				1	1	3	25
seeking information with the purpose of learning				3	14	26	22
eGovernment Indicators							
% basic public services for citizens fully available online	8		8	17		51	25
% basic public services for enterprises fully available online	25		38	63		72	
% of population using eGovernment services	25	27	32	24	30	28	12
% of population using eGovernment services for returning filled in forms					12	12	13
% of enterprises using eGovernment services	47	57	77	85	88	68	6
% of enterprises using eGovernment services for returning filled in forms	18	16	45	56	51	50	14
of which to submit a proposal in a public electronic tender system (e-procurement)		2	4	6	7	9	22
eCommerce							
eCommerce as % of total turnover of enterprises		0	0	3	8	12	14
% enterprises selling online	6	7		5	5	16	21
% enterprises purchasing online	3	7		8	9	28	22
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					45	41	16
using applications for integrating internal business processes (large enterprises)					76	70	13
using applications for employees to access Human Resources services					13	11	13
exchanging automatically business documents with customers/suppliers					36	25	4
sending/receiving e-invoices				14	23	21	13
sharing information electronically with customers/suppliers on Supply Chain Manag.					20	16	9
using analytical Customer Relation Manag.				11	13	17	18
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	3.9		4.7			5.0	7
ICT sector share of total employment	2.6		2.7			2.7	10
ICT R&D expenditure by the business sector, as % of GDP	0.02	0.02				0.31	26
= = = = =, as % of total R&D expenditure	7.0	6.1				26.4	26
% of ICT exports on total exports	6.6	9.4	12.6	14.5			7
% of ICT imports on total imports	8.5	9.4	9.8	14.8			5
% of persons employed with ICT user skills.	15.7	15.4	15.4	15.6	15.9	18.4	22
% of persons employed with ICT specialist skills	3.0	3.2	3.3	3.5	3.2	3.0	8

24. Slovenia

Slovenia is fairly advanced in the information society. The past year was characterised by further improvements in terms of connectivity and Slovenia is one of the leading countries in eGovernment. Significant initiatives have been taken in the field of eLearning. The general framework for the development of the information society in Slovenia is provided by the national 'Strategy for the Development of the Information Society in the Republic of Slovenia (si2010)', which, in terms of its structure, follows the European i2010 initiative. The main objectives of the Strategy are to promote competitiveness and productivity, ensure balanced social and regional development, and improve the quality of life of society as a whole and of each individual.

Broadband

The latest indicators reveal stabilization in DSL coverage, which now exceeds the EU average also for rural areas. Broadband penetration stands at 21%, just below average. Households and enterprises' connectivity is in line with the EU average. Despite progress, there is room for improvement in terms of broadband speeds, as only a third of broadband subscribers can experience speeds above 2Mb/s. Finally, Slovenia is experiencing the take up of mobile broadband through 3G at faster rates than most other countries.

Internet Usage

There are slightly less regular and frequent internet users in Slovenia than on average in the EU. Similarly, there is a somewhat large proportion of people never having used the internet. Subsequently, most indicators measuring take-up of internet services are comparable to the EU average.

Slovenia is one of the leading countries in the adoption of eGovernment. Both online availability and take-up of public services are above average. Especially for enterprises, the rankings are among the highest in Europe.

ICTs in the Economy

2008 data for eCommerce are not available, but progress was flat in previous years. The take-up of most eBusiness applications is higher than average with the exception of Human Resources services, e-invoices and Customer Relation Management.

Data on the contribution of the ICT sector to the economy are not available. Slovenia experiences a fairly good eSkills base which represents a strong basis for future developments.

Slovenia

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)		55.0	88.2	92.2	92.2	92.7	18
DSL coverage in rural areas (as % of total population)		27.0	78.5	85.5	82.6	76.6	14
Broadband penetration (as % of population)	5.9	9.8	14.0	17.3	21.0	22.9	13
Speed - % of broadband subscriptions above 2 Mbps			15.0	17.5	37.2	63.3	22
% of households with an internet connection	47	48	54	58	59	60	13
% of households with a broadband connection	10	19	34	44	50	49	13
% of enterprises with a (fixed) broadband access	62	74	75	79	84	81	11
% of individuals using a mobile phone via UMTS (3G) to access the internet			3	5	6	3	4
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				6	8	12	16
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	33	40	47	49	52	56	16
% pop. who are frequent internet users (using the internet every day or almost every day)	22	27	36	38	40	43	15
% population who have never used the internet		48	43	39	40	33	18
Take up of internet services (as % of population)							
sending emails	29	36	42	44	47	53	17
looking for information about goods and services	29	36	42	47	48	50	15
uploading self-created content					10	11	11
ordering goods or services, over the internet, for private use	8		13	16	18	32	17
reading online newspapers/magazines	16	20	24	23	34	25	10
selling goods and services (e.g. via auctions)	2		8	9	17	10	4
internet banking	9	12	16	19	21	29	17
downloading computer or video games or their updates					9	9	12
downloading/listening to/watching music and/or films					29	28	14
paying for online audiovisual contents					3	5	14
listening to the web radio/watching web tv	6	10	15	23	26	20	6
seeking health information on injury, disease or nutrition	13	15	22	26	27	28	10
looking for a job or sending a job application	6	7	9	11	10	13	16
doing an online course				2	3	3	13
seeking information with the purpose of learning				24	31	26	6
eGovernment Indicators							
% basic public services for citizens fully available online	50		58	92		51	2
% basic public services for enterprises fully available online	38		75	88		72	
% of population using eGovernment services	13	19	30	30	31	28	11
% of population using eGovernment services for returning filled in forms					7	12	17
% of enterprises using eGovernment services	47	72	75	83	88	68	5
% of enterprises using eGovernment services for returning filled in forms	36	45	49	61	69	50	4
of which to submit a proposal in a public electronic tender system (e-procurement)		5	4	5	11	9	7
eCommerce							
eCommerce as % of total turnover of enterprises			9	9		12	
% enterprises selling online	15	12	11	10		16	16
% enterprises purchasing online	17	15	18	21		28	15
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					47	41	12
using applications for integrating internal business processes (large enterprises)					75	70	14
using applications for employees to access Human Resources services					8	11	23
exchanging automatically business documents with customers/suppliers					26	25	16
sending/receiving e-invoices				7	8	21	25
sharing information electronically with customers/suppliers on Supply Chain Manag.					27	16	5
using analytical Customer Relation Manag.				14	9	17	22
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP	0.1	0.1				0.3	12
= = = = =, as % of total R&D expenditure	15.8	17.5				26.4	19
% of ICT exports on total exports	4.2	3.6	3.5	2.4			26
% of ICT imports on total imports	6.8	6.1	5.7	5.2			26
% of persons employed with ICT user skills.	20.8	19.7	19.8	20.8	19.6	18.4	11
% of persons employed with ICT specialist skills	2.5	2.7	2.9	2.8	2.9	3.0	17

25. Spain

Spain scores well in the areas of eGovernment services and availability for citizens and businesses and in some broadband indicators. However, general ICT usage by businesses and households is still below the EU average and progress is slow. The '*Avanza Plan*', the national ICT strategic plan, is expected to fill the gap with the European Union: the plan comprises a series of specific programmes focused on citizens, companies, the digital context, digital public services and the eAdministration. Since the end of 2008, the implementation of the '*AvanzaDos Plan*' has begun with new strategic lines for developing the information society for the period up to 2012. Specific initiatives have been taken for boosting infrastructures and provide IT equipments to schools and universities.

Broadband

DSL coverage in Spain further increased, but broadband penetration remains below average. The connectivity of households is lower than average as well, both for broadband and narrowband connections. Enterprises on the other hand are better connected and Spain ranks in second place in the EU. A significant share of broadband subscriptions (the fourth highest in the EU) features speeds above the 2 Mbit/s threshold.

Spain scores well in mobile connectivity indicators. The take-up of 3G even is the second highest in Europe (after Sweden) and wireless solutions have been deployed in rural areas.

Internet Usage

Spanish citizens are not heavy internet users. The shares of both regular and frequent internet users in the population are significantly below the EU average, resulting in a 19th and 20th place respectively. For the take-up of internet services, Spain is not a frontrunner either. A lot of indicators are below average and show low rankings. Exceptions are: doing online courses, reading newspapers online and online media consumption or downloading.

The take-up of eGovernment services by citizens is in line with the EU average. But for the use by enterprises, Spain is one of the lowest ranking countries. The high online availability of services for both citizens and enterprises is thus not reflected in the adoption.

ICTs in the Economy

For eCommerce, Spain ranks in the middle part of the EU ranking, with all three indicators below average. For eBusiness, the picture is mixed, as the country scores average for some indicators (suggesting a more intensive take up by large enterprises), and poorly for others (exchanging automatically documents with customers and suppliers and sanding/receiving e-invoices).

The ICT sector is not particularly important for the economy and eSkills, both user and specialist levels, are below average.

Spain

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	87.0	89.0	90.0	91.0	93.0	92.7	16
DSL coverage in rural areas (as % of total population)		82.0	86.0	88.0	89.7	76.6	9
Broadband penetration (as % of population)	8.0	11.7	15.2	18.3	20.2	22.9	15
Speed - % of broadband subscriptions above 2 Mbps		4.0	26.5	83.4	83.7	63.3	4
% of households with an internet connection	34	36	39	45	51	60	17
% of households with a broadband connection	15	21	29	39	45	49	14
% of enterprises with a (fixed) broadband access	72	76	87	90	92	81	2
% of individuals using a mobile phone via UMTS (3G) to access the internet				5	6	3	2
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				10	12	12	11
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	31	35	39	44	49	56	19
% pop. who are frequent internet users (using the internet every day or almost every day)	18	21	25	30	34	43	20
% population who have never used the internet		50	47	43	38	33	17
Take up of internet services (as % of population)							
sending emails	31	34	37	42	46	53	18
looking for information about goods and services	30	33	38	42	46	50	16
uploading self-created content					8	11	13
ordering goods or services, over the internet, for private use	8	12	15	18	20	32	15
reading online newspapers/magazines	21			24	27	25	16
selling goods and services (e.g. via auctions)	2	2	3	3	4	10	17
internet banking	12	14	15	16	20	29	18
downloading computer or video games or their updates					7	9	15
downloading/listening to/watching music and/or films					31	28	10
paying for online audiovisual contents					3	5	13
listening to the web radio/watching web tv		24		17	23	20	10
seeking health information on injury, disease or nutrition	9	13	19	21	25	28	13
looking for a job or sending a job application				10	12	13	12
doing an online course				5	6	3	3
seeking information with the purpose of learning				19	25	26	10
eGovernment Indicators							
% basic public services for citizens fully available online	33		33	58		51	9
% basic public services for enterprises fully available online	88		88	88		72	
% of population using eGovernment services			25	26	29	28	13
% of population using eGovernment services for returning filled in forms					9	12	16
% of enterprises using eGovernment services	50	55	58	58	64	68	22
% of enterprises using eGovernment services for returning filled in forms	32	35	38	38	45	50	18
of which to submit a proposal in a public electronic tender system (e-procurement)		2	2	3	5	9	25
eCommerce							
eCommerce as % of total turnover of enterprises	3	3	7	9	8	12	12
% enterprises selling online	2	3	8	8	10	16	14
% enterprises purchasing online	3	4	15	16	19	28	12
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					40	41	19
using applications for integrating internal business processes (large enterprises)					74	70	16
using applications for employees to access Human Resources services						11	
exchanging automatically business documents with customers/suppliers					13	25	25
sending/receiving e-invoices				9	12	21	21
sharing information electronically with customers/suppliers on Supply Chain Manag.					20	16	10
using analytical Customer Relation Manag.				15	17	17	10
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	3.9	3.8	3.8			5.0	13
ICT sector share of total employment	2.0	1.9	1.9			2.7	13
ICT R&D expenditure by the business sector, as % of GDP	0.08	0.09				0.31	17
= = = = =, as % of total R&D expenditure	14.3	14.3				26.4	22
% of ICT exports on total exports	4.6	4.6	4.3	3.8			23
% of ICT imports on total imports	7.5	7.5	7.5	7.9			16
% of persons employed with ICT user skills.	15.7	15.4	15.5	15.6	16.0	18.4	21
% of persons employed with ICT specialist skills	2.7	2.7	2.7	3.0	2.9	3.0	16

26. Sweden

Sweden is among the top nations for information society developments and is firmly within the group of leading countries in the European Union. It also has a competitive and dynamic ICT sector. New important actions have been launched in 2008 by the Swedish government. They include: a new citizen-centred national eHealth strategy designed to use ICT to achieve improvements for patients, health professionals and decision-makers; the adoption of a new action plan for eGovernment aiming to improving the coordination of related strategies within the Swedish Government Offices and retaking a leading position in the eGovernment field by 2010; actions to support ICT & Ageing as well as accessibility and usability of eServices websites.

Broadband

Broadband penetration stands at 31.3%, the third highest figure in the EU and amongst the world leaders. There is also almost full (97.9%) DSL coverage. This results in the second highest percentage of households with internet connections, 85% of which are broadband. Enterprises' broadband connectivity exceeds the EU average too, yielding Sweden a fifth place for this indicator. Sweden is also a frontrunner for the take-up of new mobile methods as well. Nowhere else in Europe, for example, 3G access is more widespread.

Internet Usage

As a result of high connectivity, Sweden ranks 1st and 2nd for the proportion of regular and frequent internet users in the population. Correspondingly, the country has the lowest share of people that have never used the internet.

High connectivity is also reflected in the take-up of online services. There is only one indicator for which the score is slightly below average: downloading computer or video games or their updates. For all the other activities, Sweden is one of the leading countries.

The same holds for the take-up of eGoverment services by citizens, despite somewhat lower availability. As far as eGovernment for enterprises goes, Sweden scores above average as well, although the difference is smaller.

ICTs in the Economy

Like for most other dimensions, Sweden is among the top countries for the use of ICT in the economy. It is one of the six best performing countries for eCommerce and exceeds EU averages for most eBusiness indicators. Relative to other areas of take up, however, there is clear scope for improvement in the take up of eBusiness solutions.

Sweden also has a large ICT sector. Its contribution to employment and GDP is the highest and second highest in Europe respectively. Roughly 10% of the exports are ICT exports. Expenditure in ICT R&D as a percentage of GDP is the second highest in Europe. The important role of ICT in the Swedish economy is further strengthened by its large base of ICT specialists.

Sweden

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	91.0	93.5	95.3	97.8	97.9	92.7	8
DSL coverage in rural areas (as % of total population)		66.0	84.0	90.0	90.0	76.6	7
Broadband penetration (as % of population)	15.4	20.7	25.9	31.2	31.3	22.9	3
Speed - % of broadband subscriptions above 2 Mbps		41.5	27.3	56.5	66.6	63.3	11
% of households with an internet connection		73	77	79	84	60	2
% of households with a broadband connection		40	51	67	71	49	3
% of enterprises with a (fixed) broadband access		83	89	87	89	81	5
% of individuals using a mobile phone via UMTS (3G) to access the internet			5	9	9	3	1
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				15	22	12	3
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	75	76	80	75	83	56	1
% pop. who are frequent internet users (using the internet every day or almost every day)	52	57	61	58	69	43	2
% population who have never used the internet		12	10	15	9	33	1
Take up of internet services (as % of population)							
sending emails	64	67	74	69	78	53	2
looking for information about goods and services	59	70	74	70	75	50	2
uploading self-created content					15	11	8
ordering goods or services, over the internet, for private use	43	50	55	53	53	32	4
reading online newspapers/magazines	28	39	41	43	45	25	4
selling goods and services (e.g. via auctions)	6	10	14	13	15	10	6
internet banking	40	51	57	57	65	29	3
downloading computer or video games or their updates					8	9	13
downloading/listening to/watching music and/or films					34	28	7
paying for online audiovisual contents					16	5	1
listening to the web radio/watching web tv	13	21	28	33	42	20	1
seeking health information on injury, disease or nutrition	18	23	28	25	32	28	8
looking for a job or sending a job application	16	23	24	18	22	13	3
doing an online course				3	3	3	12
seeking information with the purpose of learning				27	33	26	4
eGovernment Indicators							
% basic public services for citizens fully available online	64		64	75		51	7
% basic public services for enterprises fully available online	88		88	75		72	
% of population using eGovernment services	39	52		53	52	28	3
% of population using eGovernment services for returning filled in forms					26	12	3
% of enterprises using eGovernment services	92	80	80	79	78	68	12
% of enterprises using eGovernment services for returning filled in forms	53	48	53	55	58	50	13
of which to submit a proposal in a public electronic tender system (e-procurement)		10	12	11	11	9	8
eCommerce							
eCommerce as % of total turnover of enterprises			14	14	13	12	6
% enterprises selling online	20	23	24	27	19	16	6
% enterprises purchasing online	38	41	44	48	50	28	2
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					47	41	13
using applications for integrating internal business processes (large enterprises)					79	70	11
using applications for employees to access Human Resources services					16	11	9
exchanging automatically business documents with customers/suppliers					25	25	18
sending/receiving e-invoices				18	17	21	18
sharing information electronically with customers/suppliers on Supply Chain Manag.					27	16	4
using analytical Customer Relation Manag.				22	23	17	5
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	6.8	7.0	6.9			5.0	2
ICT sector share of total employment	4.5	4.8	4.8			2.7	1
ICT R&D expenditure by the business sector, as % of GDP	0.97	1.06				0.31	2
= = = = =, as % of total R&D expenditure	36.3	37.6				26.4	4
% of ICT exports on total exports	11.2	11.2	10.7	10.6			9
% of ICT imports on total imports	11.5	11.2	11.4	11.2			8
% of persons employed with ICT user skills.	20.1	19.3	19.6	19.8	20.0	18.4	8
% of persons employed with ICT specialist skills	4.4	4.9	4.9	4.9	5.0	3.0	1

27. United Kingdom

The United Kingdom is one of the best performing countries in Europe, with most of the benchmarking indicators above EU average. There is high connectivity, which leads on the one hand to a widespread take-up of internet services by households and on the other hand to a significant share of eCommerce, although eBusiness take up is lagging behind. Moreover, the ICT sector holds an important share of the British economy. The recent 'Digital Britain' report sets out the next steps of the British government to maximise the economic and social opportunities of ICT, with four action points: to assist the private sector in delivering an effective modern communications infrastructure, including a universal service commitment to ensure access to 2Mb/s broadband services by 2012, and proposals to assist the development of next generation broadband to those areas that will not benefit from commercial deployments; to enable Britain to be a global centre for the creative industries in the digital age, including public service content, within a clear and fair legal framework; to ensure that people have the capabilities and skills to flourish in the digital economy, and that all can participate in digital society; and actions to modernise and improve its service to the taxpayer through digital procurement and the digital delivery of public services.

Broadband

Broadband penetration in the UK has further increased to 28.4%, meaning that it has almost tripled since 2004 (10.4%). There is also almost complete DSL coverage and the proportion of +2Mb/s connections is in line with the EU average. Mobile connectivity is well established as well.

This results in one of the highest shares of internet connected households in Europe (with 86% of them using broadband). Over 87% of the British enterprises have broadband internet access, an increase of 9 p.p. or five places in the ranking relative to last year.

Internet Usage

Due to high household connectivity, the UK ranks 6th in terms of the percentage of regular and frequent internet users in the population. The country is also one of the frontrunners for a wide variety of internet services. All activities except for seeking health and learning information are carried out more often online than on average amongst EU Member States.

However, there was a fallback in the ranking of the take-up of eGovernment services by citizens in 2008, despite high online availability of public services. For enterprises, the availability was very high as well, and there was an increase in their use of eGovernment, however the UK still remains at the bottom end of the EU ranking for this indicator.

ICTs in the Economy

The UK is one of the frontrunners in the field of eCommerce, with one in three companies selling online, and only in Malta accounts for a larger portion of turnover generated by eCommerce.

Despite the importance of electronic trade, British companies seriously lag behind in terms of the use of eBusiness applications, where it is among the lowest of all Member States.

The ICT sector as a whole is an important contributor to the GDP and to employment, but business expenditure in ICT R&D is below average. Finally, the UK is second in terms of employees with ICT user skills, but there is room for improvement in terms of specialist eSkills.

United Kingdom

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	95.0	99.4	99.5	99.6	99.8	92.7	5
DSL coverage in rural areas (as % of total population)		94.9	95.0	96.1	99.4	76.6	5
Broadband penetration (as % of population)	10.2	16.5	21.7	25.7	28.4	22.9	6
Speed - % of broadband subscriptions above 2 Mbps		1.4	30.8	46.6	65.8	63.3	12
% of households with an internet connection	56	60	63	67	71	60	7
% of households with a broadband connection	16	32	44	57	62	49	5
% of enterprises with a (fixed) broadband access	50	65	77	78	87	81	8
% of individuals using a mobile phone via UMTS (3G) to access the internet			2	2	3	3	12
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				13	18	12	6
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	49	54	57	65	70	56	6
% pop. who are frequent internet users (using the internet every day or almost every day)	29	34	39	48	53	43	6
% population who have never used the internet		28	29	22	19	33	6
Take up of internet services (as % of population)							
sending emails	53	57	53	61	66	53	7
looking for information about goods and services	49	57	55	62	64	50	7
uploading self-created content					19	11	4
ordering goods or services, over the internet, for private use	37	44	45	53	57	32	2
reading online newspapers/magazines	18	24	23	22	37	25	8
selling goods and services (e.g. via auctions)	5	8	12	13	15	10	5
internet banking	22	27	28	32	38	29	11
downloading computer or video games or their updates					10	9	10
downloading/listening to/watching music and/or films					34	28	6
paying for online audiovisual contents					12	5	4
listening to the web radio/watching web tv	10	15	15	18	26	20	7
seeking health information on injury, disease or nutrition	26	25	18	20	26	28	11
looking for a job or sending a job application	14	16	16	15	20	13	4
doing an online course				5	5	3	5
seeking information with the purpose of learning				24	25	26	11
eGovernment Indicators							
% basic public services for citizens fully available online	60		80	91		51	4
% basic public services for enterprises fully available online	57		57	88		72	
% of population using eGovernment services	22	24		38	32	28	10
% of population using eGovernment services for returning filled in forms					12	12	12
% of enterprises using eGovernment services	34	39	52	54	64	68	21
% of enterprises using eGovernment services for returning filled in forms	12	19	38	40	51	50	15
of which to submit a proposal in a public electronic tender system (e-procurement)			12	10	9	9	11
eCommerce							
eCommerce as % of total turnover of enterprises	14	16	17	19	21	12	2
% enterprises selling online	29	25	30	29	32	16	1
% enterprises purchasing online	53	51	51	49	47	28	3
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					27	41	24
using applications for integrating internal business processes (large enterprises)					51	70	27
using applications for employees to access Human Resources services					8	11	21
exchanging automatically business documents with customers/suppliers					11	25	26
sending/receiving e-invoices				15	11	21	24
sharing information electronically with customers/suppliers on Supply Chain Manag.					7	16	27
using analytical Customer Relation Manag.				13	14	17	16
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP	6.6	6.8	6.9			5.0	3
ICT sector share of total employment	3.7	3.7	3.5			2.7	5
ICT R&D expenditure by the business sector, as % of GDP	0.25	0.24				0.31	10
= = = = =, as % of total R&D expenditure	23.6	23.0				26.4	16
% of ICT exports on total exports	7.9	9.9	13.3	4.7			19
% of ICT imports on total imports	10.6	10.0	10.7	8.9			13
% of persons employed with ICT user skills.	24.3	24.8	24.9	25.2	25.2	18.4	2
% of persons employed with ICT specialist skills	3.3	3.2	3.2	3.2	3.1	3.0	10

28. Iceland

Iceland shows extraordinary scores for connectivity and citizens' use indicators. For these dimensions, it is more advanced than the EU Member States. However, the availability of eGovernment services does not seem to match the overall development of the information society in the country. To this end, the Icelandic Government published in May 2008 a new 2008-2012 policy on the Information Society, known as e-nation aiming at providing efficient, simple and secure online accessibility of all public services. eProcurement was one of the biggest projects in the IT budget for 2008 and 2009. It has a strong focus on open standards and interoperability and aims at enabling all public administrations to carry out 100 % of their procurement electronically by 2009.

Broadband

Households' connectivity is high. A remarkable rate of 88% of households has internet access, almost fully (95%) through broadband connections. Virtually all enterprises (99.5%) have broadband internet access. This means that narrowband has already become obsolete.

Furthermore, a third of the population accesses the internet through mobile laptops. Broadband coverage is high, despite the remoteness of some regions, and further progress is expected to take place on average speed, which nowadays exceeds 2Mb/s for 72% of broadband lines.

Internet Usage

Iceland also outperforms all the EU27 countries in terms of regular, frequent and non users of the internet. 88% of the Icelandic population are regular internet users, which is better than the 83.5% in Sweden, while 78% even are frequent users, exceeding Denmark's 71%. Only 8% have never used the internet (compared to 9% in Sweden).

This outstanding situation is reflected in the take-up of internet services. For nearly all indicators (even for the most frequent activities), the EU average is largely exceeded.

The use of eGovernment services by citizens and enterprises is much higher than the EU average as well. But the online availability of public services is insufficient to Icelandic standards. This one of the rare indicators for which Iceland is not one of the best performing countries in the european area.

ICTs in the Economy

Both eCommerce and eBusiness indicators confirm a positive performance in the use of ICT. The eSkills base is close to EU averages.

Iceland

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	92.0	92.0	92.0	92.0	94.8	92.7	
DSL coverage in rural areas (as % of total population)		79.0	79.0	79.0	86.0	76.6	
Broadband penetration (as % of population)						22.9	
Speed - % of broadband subscriptions above 2 Mbps		44.3	44.1	46.1	72.3	63.3	
% of households with an internet connection	81	84	83	84	88	60	
% of households with a broadband connection	45	63	72	76	83	49	
% of enterprises with a (fixed) broadband access			95		99	81	
% of individuals using a mobile phone via UMTS (3G) to access the internet			1	1	3	3	
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				29	28	12	
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	77	81	84	86	88	56	
% pop. who are frequent internet users (using the internet every day or almost every day)	61	65	71	74	78	43	
% population who have never used the internet		11	9	8	8	33	
Take up of internet services (as % of population)							
sending emails	73	75	77	80	83	53	
looking for information about goods and services	72	73	76	78	78	50	
uploading self-created content					20	11	
ordering goods or services, over the internet, for private use	37	44	50	50	47	32	
reading online newspapers/magazines	61	65	67	67	69	25	
selling goods and services (e.g. via auctions)	6	6	8	12		10	
internet banking	54	61	67	72	68	29	
downloading computer or video games or their updates					9	9	
downloading/listening to/watching music and/or films					37	28	
paying for online audiovisual contents					13	5	
listening to the web radio/watching web tv	21	31	43	48	57	20	
seeking health information on injury, disease or nutrition	40	39	40	44	39	28	
looking for a job or sending a job application	16	16	17	16	14	13	
doing an online course				9	13	3	
seeking information with the purpose of learning				42	65	26	
eGovernment Indicators							
% basic public services for citizens fully available online	36		36	42		51	
% basic public services for enterprises fully available online	71		63	63		72	
% of population using eGovernment services	58	55	61	59	63	28	
% of population using eGovernment services for returning filled in forms					20	12	
% of enterprises using eGovernment services			95		91	68	
% of enterprises using eGovernment services for returning filled in forms			81		87	50	
of which to submit a proposal in a public electronic tender system (e-procurement)			16		11	9	
eCommerce							
eCommerce as % of total turnover of enterprises			8			12	
% enterprises selling online			22		21	16	
% enterprises purchasing online			38		35	28	
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					46	41	
using applications for integrating internal business processes (large enterprises)					78	70	
using applications for employees to access Human Resources services					12	11	
exchanging automatically business documents with customers/suppliers					18	25	
sending/receiving e-invoices					20	21	
sharing information electronically with customers/suppliers on Supply Chain Manag.					10	16	
using analytical Customer Relation Manag.					19	17	
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP						0.31	
= = = = =, as % of total R&D expenditure						26.4	
% of ICT exports on total exports							
% of ICT imports on total imports							
% of persons employed with ICT user skills.	18.3	23.3	18.6	19.7		18.4	
% of persons employed with ICT specialist skills	3.2	3.1	3.0	3.1		3.0	

29. Norway

Norway is placed among the top nations for information society developments and firmly belongs to the group of leading European countries. All available indicators show better scores than the EU27 average.

Broadband

Norway is one of the most advanced countries for internet connectivity, with high broadband penetration, good DSL coverage and fast broadband lines. Moreover, both 3G and wireless laptop connections are used more than twice as much as on average in the EU.

This provides a good basis for positive outcomes in terms of households and enterprises' connectivity: 73% of households and 86% of enterprises subscribe to broadband connections.

Internet Usage

Norway's status as one of the world's leading internet countries is not only reflected by the very high number of internet connected households, but also by the widespread take-up of most internet services.

With 30% more regular and frequent internet users than on average in the EU27, the results of the top scoring EU countries (Sweden and Denmark respectively) are even exceeded. Moreover, the share of people having never used the internet before is lower than in Sweden, Europe's best performing country on this indicator.

Nearly all the reported internet activities are done significantly more often than on average in the EU. The most popular activities are sending emails, looking up information about goods and services, internet banking and reading online newspapers; where rates of use exceed the EU average by between 30 and 50pp. However, use of other services is also for the most part significantly higher. However, uploading self-created content and selling goods and services are only marginally above the EU average.

It is no surprise then that the use of eGovernment is also higher than on average in the EU, especially for citizens' services. Availability of these services is also high. While also above the EU average, enterprise related eGovernment indicators differ less from the EU average.

ICTs in the Economy

The take up of eBusiness applications has progressed and tops EU averages. The importance of eCommerce is even more significant. Norway is clearly benefiting from the good opportunities provided by the important eSkills base it enjoys.

Norway

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)	82.0	88.4	91.0	95.8	95.8	92.7	
DSL coverage in rural areas (as % of total population)		82.7	86.0	94.0	94.0	76.6	
Broadband penetration (as % of population)		18.1	24.3	29.1	33.5	22.9	
Speed - % of broadband subscriptions above 2 Mbps		27.0	22.8	62.0	78.2	63.3	
% of households with an internet connection	60	64	69	78	84	60	
% of households with a broadband connection	30	41	57	67	73	49	
% of enterprises with a (fixed) broadband access	60	78	86	85	86	81	
% of individuals using a mobile phone via UMTS (3G) to access the internet			0	4	7	3	
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				21	28	12	
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)	68	74	77	81	86	56	
% pop. who are frequent internet users (using the internet every day or almost every day)	43	50	59	66	72	43	
% population who have never used the internet		15	17	11	8	33	
Take up of internet services (as % of population)							
sending emails	66	68	72	76	82	53	
looking for information about goods and services	62	67	74	76	80	50	
uploading self-created content					12	11	
ordering goods or services, over the internet, for private use	41	55	61	63	63	32	
reading online newspapers/magazines	56	60	65		73	25	
selling goods and services (e.g. via auctions)	4	6	10	8	11	10	
internet banking	55	62	67	71	75	29	
downloading computer or video games or their updates					14	9	
downloading/listening to/watching music and/or films					42	28	
paying for online audiovisual contents					10	5	
listening to the web radio/watching web tv	21	24	34	37	42	20	
seeking health information on injury, disease or nutrition	29	26	34	37	41	28	
looking for a job or sending a job application	16	18	22	22	22	13	
doing an online course				4	6	3	
seeking information with the purpose of learning				46	52	26	
eGovernment Indicators							
% basic public services for citizens fully available online	40		60	80		51	
% basic public services for enterprises fully available online	75		88	75		72	
% of population using eGovernment services	37	52	57	60	62	28	
% of population using eGovernment services for returning filled in forms					27	12	
% of enterprises using eGovernment services	69	84	74	71	76	68	
% of enterprises using eGovernment services for returning filled in forms	40	59	62	61	63	50	
of which to submit a proposal in a public electronic tender system (e-procurement)		20	15	15	16	9	
eCommerce							
eCommerce as % of total turnover of enterprises	8	15	14	18	22	12	
% enterprises selling online	13	26	28	32	30	16	
% enterprises purchasing online	27	36	49	48	44	28	
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					60	41	
using applications for integrating internal business processes (large enterprises)					81	70	
using applications for employees to access Human Resources services					18	11	
exchanging automatically business documents with customers/suppliers					37	25	
sending/receiving e-invoices				29	31	21	
sharing information electronically with customers/suppliers on Supply Chain Manag.					22	16	
using analytical Customer Relation Manag.				18	21	17	
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP						0.31	
= = = = =, as % of total R&D expenditure						26.4	
% of ICT exports on total exports							
% of ICT imports on total imports							
% of persons employed with ICT user skills.	19.5	19.6	19.7	19.2	19.1	18.4	
% of persons employed with ICT specialist skills	4.5	5.0	4.7	5.0	4.7	3.0	

30. Croatia

Available data for Croatia are based on Eurostat. They show that the country is lagging behind EU Member States in most dimensions of the information society, with the notable exception of ICT take up by businesses. Several initiatives have been launched in 2008 to progress information society in Croatia and bridge the digital gap: the Electronic Communication Act to comply with the aquis communitaire; the Operational Plan of implementation of eCroatia to progress of the ICT infrastructures; the Action Plan for the development of broadband internet access to achieve 500 000 broadband connections until the end of 2008. More recently (January 2009 the Croatian Government has adopted the Strategy for the Development of eGovernment over the period 2009-2012 to build a modern, transparent, efficient and streamlined public services for citizens.

Broadband

The percentage of households with broadband connections is below EU average but 88% of Croatian firms do have broadband access, exceeding the EU average of 81%.

Internet Usage

In Croatia, regular and frequent internet users are largely underrepresented compared to the average situation in Europe. More than half of the Croatians have even never used the internet before.

These rates are reflected in the take-up of internet services. Except for reading online newspapers, Croatians perform the reported activities far less than on average in the EU. This is also the case for eGovernment services. Especially for the use by citizens, the gap is still very wide.

ICTs in the Economy

While developments in eCommerce are slow, the take up of eBusiness solutions is positive. Most applications are used even more than on average in the EU27. However, the availability of eSkills among employees is limited and this may put a brake to further eBusiness developments.

Croatia

Broadband	2004	2005	2006	2007	2008	EU27	ranking
Total DSL coverage (as % of total population)						92.7	
DSL coverage in rural areas (as % of total population)						76.6	
Broadband penetration (as % of population)						22.9	
Speed - % of broadband subscriptions above 2 Mbps						63.3	
% of households with an internet connection				41	45	60	
% of households with a broadband connection				23	27	49	
% of enterprises with a (fixed) broadband access				80	88	81	
% of individuals using a mobile phone via UMTS (3G) to access the internet				1	2	3	
% of indiv. using a laptop via wireless connect. away from home/work to access the inter.				5	9	12	
Internet Usage							
% pop. who are regular internet users (using the internet at least once a week)				32	39	56	
% pop. who are frequent internet users (using the internet every day or almost every day)				21	27	43	
% population who have never used the internet				56	54	33	
Take up of internet services (as % of population)							
sending emails				26	31	53	
looking for information about goods and services				30	33	50	
uploading self-created content					6	11	
ordering goods or services, over the internet, for private use				7	7	32	
reading online newspapers/magazines				17	28	25	
selling goods and services (e.g. via auctions)				2	4	10	
internet banking				9	13	29	
downloading computer or video games or their updates					6	9	
downloading/listening to/watching music and/or films					18	28	
paying for online audiovisual contents					2	5	
listening to the web radio/watching web tv				9	10	20	
seeking health information on injury, disease or nutrition				15	20	28	
looking for a job or sending a job application				8	11	13	
doing an online course				1	1	3	
seeking information with the purpose of learning				13	17	26	
eGovernment Indicators							
% basic public services for citizens fully available online						51	
% basic public services for enterprises fully available online						72	
% of population using eGovernment services				14	12	28	
% of population using eGovernment services for returning filled in forms				5	3	12	
% of enterprises using eGovernment services				51	57	68	
% of enterprises using eGovernment services for returning filled in forms				33	37	50	
of which to submit a proposal in a public electronic tender system (e-procurement)				20	17	9	
eCommerce							
eCommerce as % of total turnover of enterprises				3	4	12	
% enterprises selling online				11	16	16	
% enterprises purchasing online				19	22	28	
eBusiness: % of enterprises							
using applications for integrating internal business processes (all enterprises)					45	41	
using applications for integrating internal business processes (large enterprises)					68	70	
using applications for employees to access Human Resources services					18	11	
exchanging automatically business documents with customers/suppliers					32	25	
sending/receiving e-invoices				19	25	21	
sharing information electronically with customers/suppliers on Supply Chain Manag.					36	16	
using analytical Customer Relation Manag.				10	11	17	
Indicators on the ICT sector, ICT skills and R&D							
ICT sector share of total GDP						5.0	
ICT sector share of total employment						2.7	
ICT R&D expenditure by the business sector, as % of GDP						0.31	
= = = = =, as % of total R&D expenditure						26.4	
% of ICT exports on total exports							
% of ICT imports on total imports							
% of persons employed with ICT user skills.					13.6	18.4	
% of persons employed with ICT specialist skills					2.0	3.0	

European Commission

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