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Information Space
Innovation & Investment in R&D
Inclusion

Annual **Information Society** Report **2007**

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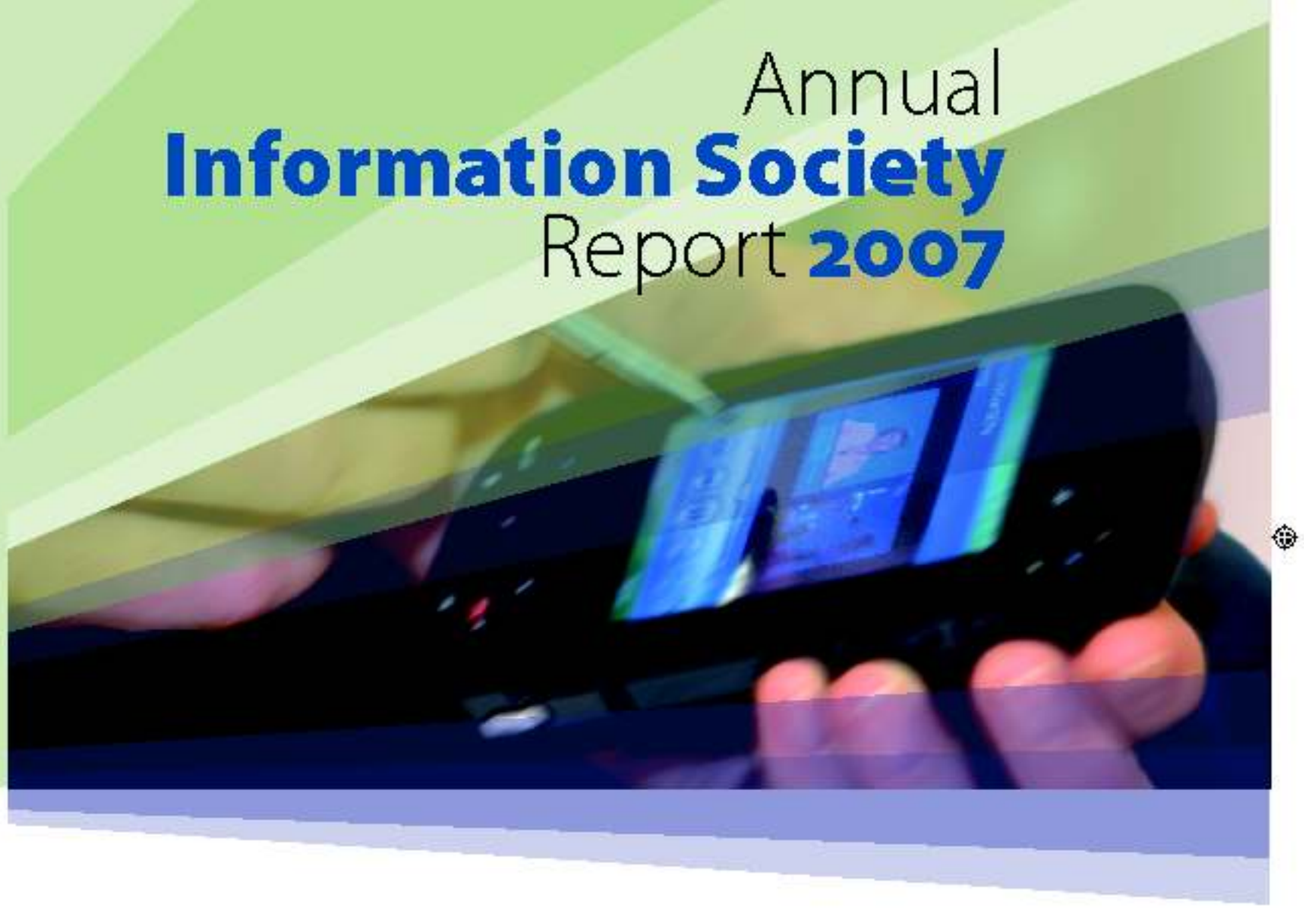

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European Commission
Information Society and Media

1 Introduction

i2010 is the Commission's initiative for information society and media policies. It ensures coherence across the Commission's information society and media policies and seeks to reinforce the important contribution of information and communication technologies (ICT) to the performance of our economies and the renewed Lisbon Strategy. i2010 operates in a fast changing environment and therefore requires regular up-dating and fine-tuning. The present report represents the second such up-dating and prepares the ground for a more extensive mid-term review in 2008.

The overall balance sheet for 2006 is positive.[1] The main indicators are moving in the right direction, with ICT remaining a major factor in driving growth and innovation. The scepticism that held back ICT investments four or five years ago has been replaced by greater confidence in our ability to develop and deploy ICT applications to our economic and social advantage. As regards policy actions, the different EU level initiatives announced at the launch of i2010 in June 2005 are well on track. At Member State level, all the 2006 National Reform Programmes put more emphasis on mainstreaming ICT policies.

The Commission implements i2010 in close co-operation with the Member States through the i2010 High Level Group. In 2006, as part of its industrial policy, it launched an ICT Task Force[2] representing industry and civil society to check whether its current policies are favourable to the competitiveness of the ICT sector or whether some adjustments are needed. This work and the report of the Task Force in particular lead the Commission to conclude that the present policy framework is broadly right. The Commission will follow up the Task Force recommendations, where not already in line with existing policies, with proposals for specific actions.

1 This assessment is based on EU25. Data on EU27 will be available from 2007.

2 http://ec.europa.eu/enterprise/ict/taskforce.htm

2 Developments in the information society during 2006

Six years after the burst of the Internet bubble, the information society is on a steady growth path. A decade of investment in ICT is bearing fruit, fuelling innovation in ICT areas and transforming the EU into a knowledge-based economy. Since 2005, the ICT sector has become increasingly driven by the expansion in the software market and relatively less by the electronic communication segment. This reflects innovation trends requiring more pervasive software products. Large sales in systems software and eBusiness applications indicate that businesses are adopting new and more mature eBusiness solutions, even if these new investments may still be limited to large companies or early adopters of advanced eBusiness solutions.

Users are quickly embracing new services brought about by convergence. Many Member States now have high levels of broadband adoption, which in turn stimulates the development of innovative advanced services. The transformation of the content market is already apparent in the growth of online music sales and new digital devices. Movie distribution and online TV are also advancing. The move from traditional content distribution to online availability is accompanied by an explosion of user-created content.

The public sector is not lagging behind. Online public services are getting more mature and producing visible efficiency gains: more services have been put online, the available services have become more sophisticated and more Europeans deal with the public sector online. Public administration is leading the way and health and education are closing in.

The EU can build on these achievements to pursue its growth and innovation policies and all Member States recognise the key role of ICT in achieving the Lisbon goals. Compared to 2005, the Member States' 2006 National Reform Programmes put more emphasis on mainstreaming ICT policies.[3] ICT are identified as drivers of innovation, as tools for transforming government and business models and as instruments for improving our quality of life. Broadband, eGovernment and digital literacy - the priority areas identified in 2005 - show good if somewhat uneven progress among the Member States. ICT research and development, trust and security issues, and measures to reduce administrative costs for businesses and administrations emerge as new priorities in a number of countries. There are still disparities between the Member States, but in some areas, for instance broadband take-up, emergence of new services or eGovernment, the leading EU countries are also world leaders.

3 Implementing the renewed Lisbon agenda – A year of delivery, COM(2006) 816, 12.12.2006

3 i2010 implementation in 2006 and actions for 2007/2008

3.1. Information space

Digital convergence is finally coming of age. Although the process is by no means completed, convergence is now very much a reality. Policy makers need to ensure that the legislation impacting on converging sectors provides the legal certainty needed for stakeholders to innovate. The aim is to respond to technological changes in a way that promotes competition, consolidates the internal market and benefits users. A review of the main policy issues at stake indicates that the overall legal and regulatory framework is favourable for the further development of convergence.[4]

The majority of actions planned in the first pillar of i2010, to create a single European information space, have been launched. In 2006 the **regulatory framework for electronic communications** has been reviewed and amendments will be tabled by mid 2007. The discussion will continue in 2007 with a green paper on the future of universal service in electronic communications. Better and efficient use of radio spectrum as an important element of the regulatory review has been promoted, including by introducing more flexibility[5]. This will continue with proposals on common approaches to collective use of spectrum and to the digital dividend. The Commission will also address the concerns and threats to privacy revealed by its 2006 public consultation on **radio spectrum identification (RFID)**.

The Commission will add further building blocks to European **audiovisual policy,** advancing the debate on media pluralism and media literacy. The new MEDIA 2007 programme, covering the period 2007-2013, will continue financial support for the European audiovisual sector. Furthermore, the Commission will outline measures to support the introduction and take-up of **mobile TV** across the EU.

With the arrival of new online services, market players are entering a learning process to develop **new, multilingual and innovative content**. The Film Online Charter, initiated by the Commission and agreed by business leaders in 2006, is a first milestone in this respect. The Commission is now exploring how the Charter can pave the way for a broader policy on online content to encourage the development of high quality and innovative online content.

On the policy side, the next challenge is to ensure that **users** are confident in the use of new services. In 2006 the Commission proposed a regulation to limit international roaming tariffs for the users of mobile services and in February 2007 it has launched a public consultation on the review of the consumer protection acquis at the European level.[6]

Finally, the Commission complemented its new strategy for a **secure information society** by a communication on fighting spam, spyware and malicious software and will

4 'The challenges of convergence', working paper for the i2010 High Level Group, 12.12.2006

5 Rapid access to spectrum for wireless electronic communications services through more flexibility, COM(2007) 50, 8.2.2007

6 Green Paper on the Review of the Consumer Acquis, COM(2006) 744, 8.2.2007, http://ec.europa.eu/consumers/cons_int/safe_shop/acquis/index_en.htm

address cybercrime in 2007. It will evaluate the functioning of the European Network and Information Security Agency (ENISA) to decide if the agency's mandate should be extended and monitor the implementation of security measures to assess the need for additional action by 2008.

In 2007-2008, the Commission will:

- Make proposals for the review of the regulatory framework for electronic communications, launch a debate on the future of universal service and continue to develop a coordinated framework for a flexible and efficient management of spectrum, in particular with respect to collective use of spectrum and the digital dividend;
- Assess policy needs for media literacy and propose comprehensive approaches to RFID and to mobile TV;
- Promote a comprehensive approach to the development of high quality innovative content;
- Follow up on the security strategy with a communication on cybercrime, evaluate ENISA to decide on a prolongation of its mandate and assess the need for additional action in the security field (2008).

3.2. Innovation and ICT R&D

Boosting research and innovation is at the centre of the Commission's strategy for growth and jobs. The EU has a target of 3% of its GDP dedicated to R&D, 2% of which should come from the private sector. The EU is still far from this target, with some 1.9% of GDP spent in R&D. The 2006 Annual Progress Report on Lisbon stresses that all Member States have set a national R&D investment target and that if all of these targets are met, the EU will reach a R&D level of 2.6% of GDP in 2010.

ICT industries account for a large share of aggregate business R&D spending (26% in 2003[7]). As emphasised by the ICT Task Force, increasing ICT R&D expenditure is key if the EU is to reach the 3% objective. European research and innovation receive a major boost with the launch of the **Seventh Framework Programme for Research (FP7)** that will run from 2007-2013. The EU will invest over €9 billion in ICT, the largest single item in FP7. The Commission will continue to cooperate with the nine European ICT Technology Platforms set up to strengthen partnership with industry and achieve a critical mass of research in strategic fields. Two of the platforms will provide the basis for **Joint Technology Initiatives (JTIs)**, a new type of initiative that will pool EU, Member State and industry funds into public-private research partnerships to boost European cutting-edge research.

The EU is also committed to improving the framework conditions for innovation[8], and has identified 10 key actions to this end.[9] The Commission is working on identifying relevant policy gaps to ensure that the EU's **standardisation policy** for the ICT sector meets the challenges of today's fast moving markets. It will also encourage public authorities to cooperate and reinforce the role of the EU public sector as a first buyer of **innovation and/or pre-commercial products and services**, thereby opening up new lead market opportunities for among others ICT-based products and services.

Innovation does not only arise from research but is increasingly driven by users of technologies or organisational change. The ICT policy support programme (ICT PSP) in the **Competitiveness and Innovation Programme (CIP)** stimulates innovation and competitiveness through promoting wider uptake and best use of ICT by citizens, governments and businesses, in particular SMEs. In 2007 the ICT PSP will focus on the role of the public sector as a user and will address three main themes: efficient and interoperable eGovernment services; ICT for accessibility, ageing and social integration; and, ICT for sustainable and interoperable health services. In 2007 the Commission will continue the review of the policy needs to promote and facilitate **eBusiness** in the framework of *eBusiness W@tch* and eBSN[10]). It will respond to the call of the ICT Task Force to design a long-term **eSkills** strategy, including the link with education and training.

7 Commission Services estimate based on OECD/Eurostat survey of R&D expenditure 2003

8 An innovation-friendly, modern Europe, COM(2006) 589, 12.10.2006

9 Putting knowledge into practice: A broad-based innovation strategy for the EU, COM(2006) 502, 13.9.2006

10 *http://www.ebusiness-watch.org/* and *http://ec.europa.eu/enterprise/e-bsn/index_en.html*

11 COM (2006) 386, 13.7.2006

Member States and regions are encouraged to support the spread of ICT according to their needs both for the development of ICT products and services and of infrastructure. Under the Structural Funds the EU devoted about €7 billion during 2000-2006 on ICT-related projects. ICT are also one of the priorities in the 2007-2013 Community Strategic Guidelines on cohesion.[11]

In 2007-2008, the Commission will:

- Propose JTIs on nanoelectronics (ENIAC) and on embedded systems (ARTEMIS) for decision by the Council;
- Review standardisation for ICT;
- Address the potential of pre-commercial procurement for improving the quality of public services and Europe's innovation performance;
- Continue policy coordination for ICT uptake, review eBusiness policies and trends and define any necessary policy measures;
- Address the need for action in the field of eSkills and employability as part of the follow-up to the ICT Task Force.

3.3. Inclusion, better public services and quality of life

Inclusion

As innovation transforms the role of users, there is a growing need to keep all users are on board. The eInclusion conference in Riga initiated this reflection process, with a Ministerial Declaration laying out political guidance for further action. As a next step the Commission will outline its vision for the **2008 eInclusion initiative**, building on extensive consultations. It will review progress in the field of **eAccessibility** and consider the need for further action, including proposals for legal measures.[12] The Commission will continue its support for bringing high-speed **broadband access** to all Europeans. This will feed the ambitious Commission initiative on 'Regions of economic change' launched under the Structural Funds.[13] As a further delivery on the commitments in the Riga Declaration, the Commission will review measurements and policies on **digital literacy,** in close relationship with education and training.

In 2007-2008, the Commission will:

- Set out a vision for a comprehensive policy on eInclusion (2007) and prepare the European initiative on eInclusion for 2008;
- Review progress in eAccessibility and propose further actions, if needed;
- Support awareness raising (major event on broadband for rural communities in 2007) and exchange of best practice (website) on bringing high-speed broadband access to all Europeans;
- Launch the regional networks 'Better ICT connections between regions' and 'Bringing eGovernment to regions and businesses' as part of the initiative of regions for economic change;
- Review digital literacy measurement and policies.

Better public services

In 2006, online public services grew more mature most visibly in the areas of eGovernment and eHealth. Member States are making progress in their national **eGovernment** initiatives and are cooperating on common EU level activities to reach the ambitious goals of the eGovernment action plan by 2010. In 2006, the EU eHealth portal was launched. All Member States have completed their eHealth strategies and a compilation of national good practice in the field of **eHealth** will be made available.

Member States acknowledge the European dimension of public ICT-enabled services and have identified key enablers to reach cross-border interoperability. In the framework of the IDABC programme, the Commission

12 The Commission will for example include a provision aiming at making audiovisual media services accessible to people with visual or hearing disability in its amended proposals for the Audiovisual Media Services (AVMS) directive.

13 Regions for economic change, COM(2006) 675, 8.11.2006

14 *http://ec.europa.eu/idabc/en/document/6227*

will revise the European Interoperability Framework in 2007.[14] The Commission will also issue a recommendation on eHealth interoperability and will launch measures in support of an innovation-friendly eHealth market in the area of personal health monitoring and management. By 2008 the objective is to put in place health information networks based on fixed and wireless broadband, as well as mobile infrastructures and Grid technologies.

During 2007-2008, **large-scale pilots under the ICT policy support programme** will continue to support better public services in areas such as eID, secure document transmission between administrations, eProcurement, eParticipation, emergency patient data and electronic prescribing. The large-scale pilots in the area of eProcurement and eID will also be supported by the ongoing work of the IDABC programme in these fields.

In 2007-2008, the Commission will:

- Continue to support the implementation of the eGovernment action plan, including by pursuing its efforts to integrate and transform its own administration, and revise the European Interoperability Framework;
- Issue a recommendation on eHealth interoperability, promote an innovation-friendly eHealth market and establish an interoperable health information network (2008);
- Launch large-scale pilot projects under the CIP.

Quality of life

ICT are not only a driver of innovation and competitiveness, but also change the way people live and communicate. i2010 responds by focusing on areas where technological innovations could significantly improve quality of life: ageing, cultural diversity, intelligent cars, and climate change.

In 2007, the Commission will launch a flagship initiative on **Ageing well in the information society**. This will comprise a research initiative on Ambient Assisted Living (AAL), based on Article 169 of the EU Treaty, integrating technologies into products and services to ensure a continuum from advanced research to deployment. This will be complemented by longer-term research in FP6 and FP7 and deployment activities under the CIP, such as home care for elderly.

The **Digital Libraries and the Intelligent Car flagship initiatives** are being implemented. The Commission issued guidance on digitisation, online accessibility of cultural material and digital preservation, and on scientific resources. The Member States were asked to bring eCall back on track. In 2007 the Commission will assess progress on the Intelligent Car and on negotiations on the voluntary introduction of eCall in vehicles.

New ICT-based technologies are essential not only for greater resource efficiency but also to achieve qualitative shifts towards radically different, more sustainable economic and social consumption patterns. In 2007, an i2010 flagship initiative will be developed to address priorities such as **energy efficiency and environmental sustainability**.

In 2007-2008, the Commission will:

- Launch the flagship initiative on 'Ageing well in the information society', propose the Article 169 AAL initative and launch pilots under the CIP focusing on independent living and chronic disease monitoring;
- Review the implementation of the recommendation on digitisation and online accessibility of cultural material and digital preservation (2008)
- Assess implementation of the Intelligent Car flagship and of eCall;
- Develop a flagship initiative on ICT for sustainable growth.

4 Identifying future trends

The Lisbon strategy has made innovation a top priority and the EU has developed a comprehensive policy agenda for this purpose. ICT are widely recognised as a key enabler for innovation. To build on the achievements of i2010 in 2005 and 2006, the EU has to take a more forward-looking approach and tighten the link between ICT policies and Lisbon priorities. Policy makers also have to understand how new economic and societal developments can extend the benefits of the information society to new groups and foster competition and European industrial leadership while including society at large. Therefore the following three issues should be addressed in the i2010 mid-term review 2008.

A new wave of innovation in networks and Internet

The information society is becoming a reality. Low cost networks, extended by mobile or wireless networks, allow seamless connection and use of applications and services integrated in the network and these are becoming more widely used in society.

This move is supported by emerging technological trends such as the migration towards very high-speed networks, ubiquitous wireless technologies, web 2.0, the Internet of Things, Grids, new network architectures, web-based services, user interfaces, user-created content and social networking. These trends will affect the business and working environment, providing new industrial opportunities and new solutions for eBusiness and employment, thus improving the work-life balance. They will also extend the role of users as innovators. This is already visible in the explosion of user-created content.

Even though many aspects of future networks and the Internet will not be realised for some time, obstacles to the development of the information society can already be identified. These concern issues from investment in higher bandwidth, net neutrality, through spectrum availability to security. An early debate with stakeholders on longer term developments ought to look at the need for possible policy action.

A user's perspective on innovation

With the emergence of new services, the next challenge is the user. The rise of user-created content is opening further perspectives for a more creative and innovative Information Society. In the same way that users exploited open source software to develop new collaborative processes, they are now using ICT to create and exchange their own content in innovative ways. This is raising new challenges, notably with regard to legal liability for content distribution, the re-use of copyright protected material and the protection of privacy.

Consequently, the traditional vision of the users will change in the information society. Nevertheless policies aiming at lifting the obstacles to wider use of ICT - as defined in i2010 - will not become obsolete. With the 2008 eInclusion initiative, i2010 has an inbuilt focus on users and the interest of consumers is already present in the Commission's ICT

policies. One recent example is the Commission proposal on roaming to eliminate unjustified charges on consumers.

New segments of the population are using ICT services and products. Users are increasingly concerned with privacy, lack of interoperability, lack of transparency on contractual terms and pricing, excessive complexity of applications and inefficiencies of litigation. Policy makers now have to respond to these concerns.

Improving framework conditions

The EU innovation strategy sees the completion of the internal market as the way forward to ensure effective competition and provide sufficient scale to help large companies and many SMEs to compete globally. Therefore the Commission has planned a revision of the internal market strategy aiming at enhancing innovation and implementing better regulation.

One of i2010's main objectives is to create a single information space. Up to now, the emphasis has been on networks and content regulation. The EU – even if progress has been made – with its 27 separate markets is still far away from a single information space. Markets for online services are already global but many EU consumers avoid buying goods and services via the Internet from another Member State. Legal concerns are still an obstacle for enterprises to engage in eBusiness and in some areas regulatory barriers generating potential obstacles to competitiveness have been identified.[15]

We need a broader perspective taking into account new trends. For instance, the Internet enables patients to look around for treatment anywhere in the EU or beyond, and similarly doctors to provide services at a distance. This impacts on the organisation of services and has implications for public finances. Reflection on the internal market should therefore go beyond the assessment of legal obstacles addressed in the review of the regulatory framework on electronic communications and the Audiovisual Media Services Directive. Building on the work of the ICT Task Force, the reflection must tackle barriers that hinder the provision of pan-European online services, explore how ICT can reinforce the internal market and try to assess the cost and risks of fragmentation of the European information society.

15 *http://ec.europa.eu/enterprise/ict/taskforce.htm*

5 Roadmap for **future actions** in view of the i2010 mid-term **review**

To prepare the discussions on the i2010 mid-term review of 2008, the Commission proposes to involve the Member States, the i2010 High Level Group, industry, civil society and other stakeholders more closely in the development of the different topics. The Commission will:

- Develop the topics identified in chapter 4 above in cooperation with the i2010 High Level Group.
- Launch a public consultation involving all stakeholders to validate the approaches proposed for developing the key topics.
- Address the main issues for the mid-term review at a high level i2010 event in 2008.

The outcome of these discussions will inspire the European Spring Council 2008, which is to address the issues of the next generation of networks and the Internet. The i2010 mid-term review should ensure that i2010 continues to be a valid reference framework for Europe's information society and media policies, enabling Europe to reap the full benefits of developments to implement the Lisbon Growth and Jobs agenda.

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European Commission
Information Society and Media

1 Introduction

This Commission Staff Working Paper is presented as background for the i2010 Annual Information Society Report for 2007. Its purpose is to report on market trends and progress in the information society in Member States[1] and EEA countries. The report provides the basis to assess the validity of i2010 policies in preparation for the mid-term review in 2008.

The past year has been one of consolidation, the overall rapid ICT (information and communication technologies) market growth of earlier years has slowed but the first signs have appeared of fundamental change as Europe moves towards a knowledge-based economy. Many countries now have high levels of broadband adoption and are seeing the introduction of innovative advanced services. The transformation of the content market was already apparent in the revolution caused by online sales and new digital devices. Movie distribution and online TV are moving in a similar direction accompanied by an explosion of user content. The public sector is not lagging behind and there is a growing maturity of online public services. Public administration is leading the way with health and education closely following.

It would be wrong to give the impression that all is well and nothing remains to be done but watch the market take off, and so this Report sounds certain warnings. There has been buoyant demand for ICT products and services, in particular software, in which European industry is relatively weak in some respects, for instance, there is only one EU company in the world top 25. Growth of content is hampered by problems of connectivity and the need to overcome the inhibiting effects of piracy. The expected impact of ICT on core business processes in Europe has not yet materialised despite the general consensus of its potential to boost productivity. Finally, there remain dangers of social groups or regions being excluded from these benefits although 2006 saw the launch a major new initiative at European level to co-ordinate policies for inclusion.

Labour productivity growth rose to 1.5 per cent[2] in 2006 in EU27, although performance varies across Member States. ICT remain crucial to the achievement of productivity gains and this is reflected in the Member States' Progress Reports in 2006. Compared to 2005, Member States' put more emphasis on mainstreaming ICT policies which are broadly perceived as (i) drivers and components of innovation and development; (ii) tools for transforming government and business models; and (iii) tools to improve the quality of life for citizens. The Commission assessment of the 2006 Progress Reports was that overall progress is good, in particular in the priority areas that were identified last year: eGovernment, broadband communications and digital literacy. However, progress is uneven among the Member States, and implementation of the policies is delayed in some areas.

1 If not specified otherwise, data for the EU refer to only the 25 Member States in 2006. EU27 figures will be available from 2007.

2 Commission Services estimate based on University of Groeningen database.

2 The European ICT sector: an international perspective

2.1. Recent developments and outlook

The ICT sector remains one of the most dynamic sectors of the economy with higher than average growth rates and research intensity. Over the last decade, innovations by the sector have made ICT products and services cheaper and lead to their wide adoption by the economy at large. ICT products have become increasingly commoditised and future growth can be expected mainly in new, niche and replacement products as well as in software and IT services. As a result, the sector should not be expected to sustain the rapid growth of the past and structural change within the sector is visible. Overall, growth in the ICT sector in the EU is forecast to be 2.9% in 2006, down from 4.2% in 2005.[3]

Within the ICT sector, the EU has traditionally had a comparative advantage in Electronic Communication Services, a sector that has recently faced a slowdown on the European market. The new dynamic growth area with ICT is software and IT services, a sub-sector largely dominated by US companies (table 1). This shift is one of the main changes that have been identified since the last i2010 Annual Report.

Electronic communication services

Electronic communications is an important sector in its own right. Electronic communication services account for 35% of value added of the ICT sector, or 1.8% of the EU economy, and drive 12% of overall labour productivity growth[4]. The annual growth rate of revenues for electronic communication services has been slowing down since 2002 and 2005/6 has confirmed this trend. In real terms, however, the sector is still growing faster than the rest of the economy, thanks to fast declining prices.

The decline in revenue growth in the electronic communication segment is mainly driven by a slowdown in the growth of fixed and mobile voice services. This is a consequence of trends such as decreasing prices in markets characterised by improved competition, the emergence of Voice of IP (VoIP) and the saturation of GSM markets. Fixed data, broadband in particular, is the fastest growing segment with growth of 8.5% in 2006[3].

Although increased competition and new technologies have caused a slowdown in traditional activities, telecom operators are looking for opportunities that may bring rewards in the longer term. Mergers and acquisitions have been significant; a few operators have been investing or have announced investments in the upgrade of their

Table 1 **Growth in ICT Services in the EU**

	Share of ICT sector (2006)	Growth rates		
		2004-5	2005-6	2006-7
Software & IT Services	31%	5.8%	5.7%	5.9%
Electronic communications services	45%	3.5%	2.3%	1.4%

Source: EITO 2007, not including Malta and Cyprus

3 EITO 2007

4 Commission services estimate based on University of Groeningen database and Eurostat (2003)

Table 2 **Software and IT Services**
(Compound Annual Market Growth2005-2008)

	Software	IT-services
EU27	6.4%	5.4%
USA	6.7%	6.3%
Japan	7.0%	3.2%

Sources: EITO 2007 (EU27, but no data for Cyprus or Malta); Gartner Dataquest Market Databook, June 2006 (USA, Japan)

infrastructure to next generation networks and have been developing innovative media-based broadband services. Operators have also internationalised their activities in developing markets in the EU and third countries. Investment in other European countries may lead to further consolidation and to the emergence of truly pan-European operators.

Software and IT Services

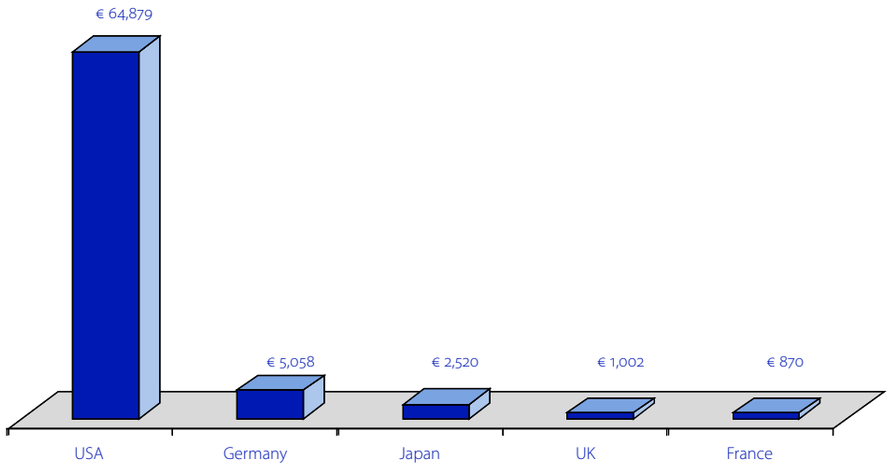
The software (11% of the total ICT market value) and IT services (20%) markets have had the highest growth rates in the European ICT-sector (table 1) and this is expected to continue over the coming years. According to a leading market analyst[5] the growth prospects for the EU software market will remain good over the next five years. It seems that the EU software market is as dynamic as the US and Japan markets. However, growth in IT services is expected to be lower in comparison to software and to the US market. Faster growth in the US may be due to higher past investment in software which is now driving demand for associated IT services e.g. maintenance, upgrading.

Although the EU and the US software markets are of similar size, the supply side is dominated by US companies (see figure 1). Out of the top 20 companies in the world, only 3 are European. Europe is home for globally leading companies in some product segments such as enterprise software but the packaged software market is dominated by US companies.

To analyse growth in the software market, it is necessary to distinguish between the primary or core market and the secondary external market i.e. software that is either developed for internal use or bought as part of another product, thus not recorded in the core software market.

The demands of eBusiness drive many aspects of the core software market. Examples of the main demand drivers are: system software in the areas of security and storage software; Business Performance Management solutions focused on compliance in relation to, for example, finance; collaborations tools which bridge with other applications; and Enterprise Resource Planning Solutions. A large part of the revenue streams to software vendors, at least in packaged software, are maintenance and upgrades and this proportion is growing as the market consolidates. Moreover technological trends towards open source, software as service, convergence and web services, and Service Oriented Architecture are creating new demands.

Figure 1 **Software Supply**
(country of origin and revenues (€ m.) of top 20 world software companies)



Sources: PAC/AFDEL index 2006 Worldwide, November 2006

5 Gartner Dataquest Market Databook, June 2006 Update

Open source software might provide an opportunity for Europe to gain a bigger share of the software market[6]. This is due to the fact that open source may provide a better business model for small and medium enterprises (SMEs) and the European secondary sector. Europe can gain from being home of a strong community of open source developers. It may be that open source software is understated as it is not recorded in national accounts as software expenditure. As European firms invest more in open source compared to the US, the difference between the two regions becomes even smaller.

Software is also developed outside the core software and IT services market[7]. Growth for such software products is primarily generated by the manufacturers' need to differentiate products and services and is driven by demand from end-users. Software provides the essential functionality in industrial and commercial systems; for example, air traffic, chemical processing plants, financial information, stock and point-of-sale systems in retailing and, of course, eGovernment services. In the automotive sector, embedded systems are used to make intelligent cars providing more road safety and more sustainability through better protection of the environment. Embedded systems in consumer electronics allow consumers to take advantages of the possibilities provided by the convergence development.

2.2. R&D in ICT: the basis of competitiveness in a globalised economy

Economic 'globalisation' refers to the increasing integration of economies around the world, particularly through capital, trade and international R&D flows but also to global relocation of production. ICT goods and services are central to the growth in each of these and the ICT sector itself is one of the leading examples with high international trade and R&D flows.

The EU economy has faced difficulties remaining competitive in an increasingly globalised economic environment. Although there has been a recent rebound in productivity and output growth in Europe and a slowdown in the USA in 2006; on average since the mid-nineties, Europe had lower GDP growth than its partners; sluggish productivity growth and slow growth of GDP per capita.

The poor EU performance in ICT has often been emphasised as one of the reasons for the EU not drawing much benefit from globalisation. The academic debate on the gap between US and EU productivity growth has focused on lower levels of ICT adoption in Europe. American companies seem to make more effective use of information technologies than European companies, which have been slow in introducing innovative business processes. More recently, the poor performance of the ICT sector itself in Europe has been identified as a major weakness in the ongoing process of globalisation, characterised by greater trade integration and by higher research intensity in trade.[8]

The technology and research content of world trade has increased sharply over time, with R&D-intensive products, in particular ICT, being a major driving force in world trade since the 1990's. Over the period 1992-2003, the EU managed to maintain a dominant world market share thanks to its leadership in a variety of medium technology and capital intensive goods industries, e.g. cars and specialised equipment, and in one high-tech industry (pharmaceuticals). However, the EU has had a poor trade performance in other high-technology sectors most notably ICT. This contrast strongly with the performance of US and Japan and is a source of major concern, especially because many developing countries have started to invest heavily in R&D and education in order to move up the value chain.

On the positive side, in the same period of time the EU managed to show a surplus on its trade in services, in particular, in financial and computer related services which are most often associated with the off-shoring phenomenon. This suggests that the service off-shoring

6 *Economic impact of open source software on innovation and the competitiveness of the Information and Communication Technologies (ICT) sector in the EU* – Commission Services (2006)

7 This is software developed internally or bought as part of another product, thus not visible in the core software market. This involves mainly manufacturing sectors such as automotive, aerospace, medical equipment, automation, telecom equipment, and electronics. These specific sectors constitute, in terms of value added, 14% of the total European manufacturing industry. The value of this software market is very difficult to quantify.

8 *i2010 First Annual Report on the Information Society COM(2006)215 and Global Trade Integration and Outsourcing: How Well is the EU Coping with the New Challenges?,* European Commission Economic Papers (October 2006)

outside the EU is not significant but could possibly reflect greater 'off-shoring' within the EU.

Despite these relatively reassuring trends, the concern on the EU's poor performance in ICT remain strong and requires a renewed effort in terms of investments in R&D and innovation.

ICT related R&D: US expenditure more than twice that of EU

The EU has a target of 3% of its GDP dedicated to R&D, 2% of which should come from the private sector. Recent data show that the EU is still far from the target, with a share of GDP spent in R&D more or less stable at around 1.9%. The 2006 Annual Progress Report on Lisbon underlines that all Member States have set a national R&D investment target and that if all of these targets are met, the EU will reach an R&D level of 2.6% of GDP in 2010. This would be a significant improvement, even if the key EU target of 3% is only reached later. In addition, research and development activities in the area of ICT emerge as new priorities in a number of Member States.

R&D investments worldwide are highly concentrated in three sectors[9]: Automobiles & Parts; IT Hardware (including telecom equipment); and Pharmaceutical & Biotechnologies. Each of these sectors has around 18% of global R&D investments. ICT industries account for a large share of the aggregate spending in total business R&D. This share was about 26% in 2003, while in the US this share was about 35%.[10]

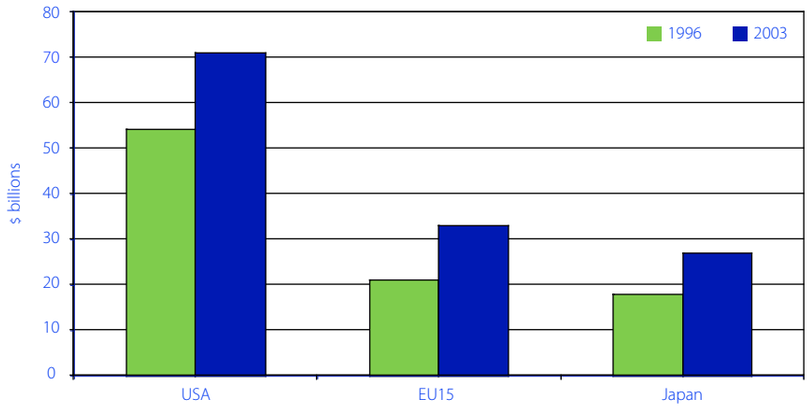
In the ranking of the world top-50 companies by R&D investment, there are 18 EU companies, the same as the USA. European R&D spending in pharmaceuticals, automobile and chemical industries is higher than that of the US and Japan. In contrast, Europe lags considerably behind in ICT. In 2003, US R&D expenditures in ICT R&D were more than twice those of the EU (see figure 2).

OECD data show that a striking feature of the composition of R&D has been a shift away from computer hardware towards 'computer and related activities' (which includes 'software and IT-services').

Among the 'IT hardware' companies listed in the top 50 by overall R&D investment (all sectors), the EU specialises in telecommunication equipment manufacturers and the US in semiconductors, computer hardware and telecommunications equipment, while Japan is exclusively represented by computer hardware companies.

The increase in R&D expenditure corresponding to 'computer and related activities' has been particularly sharp in the US, where it tripled between 1996 and 2003. The increase was anyway significant also in the EU, where, in the same period, R&D expenditure in this ICT segment more than doubled (Figure 3). However, the volume of R&D in this category in absolute terms is still relatively low in the EU compared to the US.

Figure 2 **R&D Expenditure in ICT**



Sources: ANBERD database, OECD

9 *2006 EU Industrial R&D Investment Scoreboard*, European Commission(2006) (http://iri.jrc.es/research/scoreboard_2006.htm)

10 Commission Services estimate based on OECD/Eurostat survey of R&D expenditure 2003

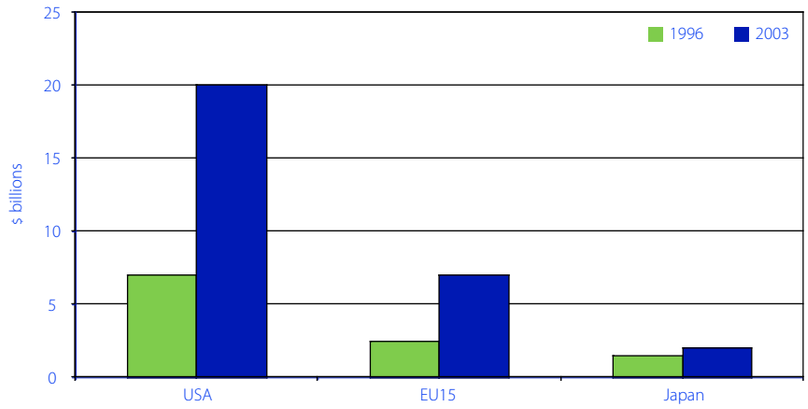
There are no EU companies among the top-50 classified as 'Software and IT-services', and the investment by the leading company (US) in this segment is more than five times higher than that of the European leader which ranks outside the top-50 the list.

R&D investment is a crucial factor also in the primary software sector, as a very clear source of competitive advantage. There is a close correlation between research intensity and sales in the software sector. In other words, competitive advantage in the software sector requires increased R&D expenditure (see figure 4).

But the EU may be better placed in secondary software

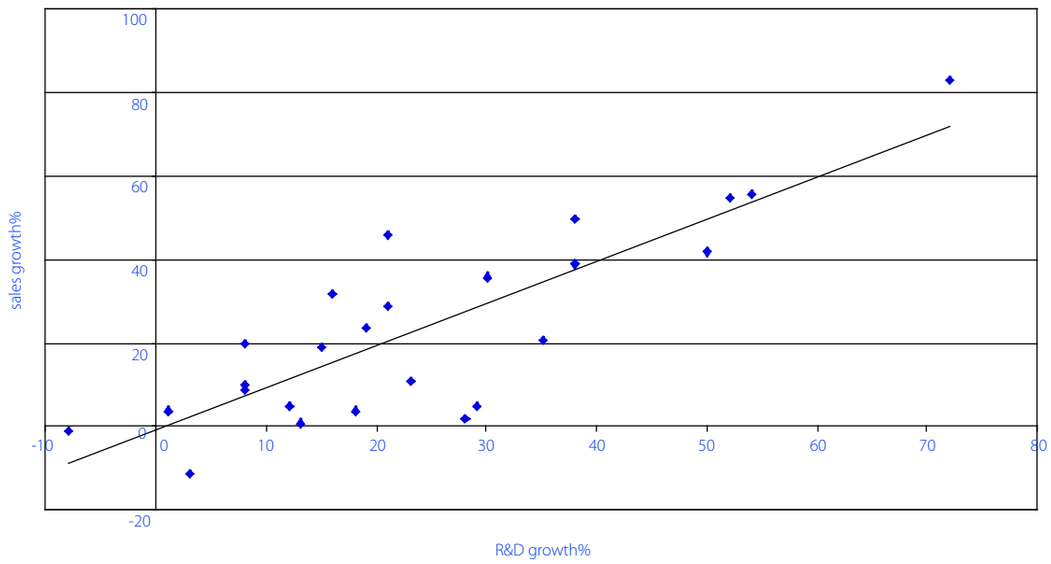
'Software and IT-services' is one of the sectors with the highest average R&D growth rate over the last year[11]. There is evidence that more research in software is done

Figure 3 **R&D Expenditure — Computer and Related Activities (ISIC72)**



Sources: ANBERD database, OECD

Figure 4 **Software: Sales v. R&D (top 25 software companies worlwide)**

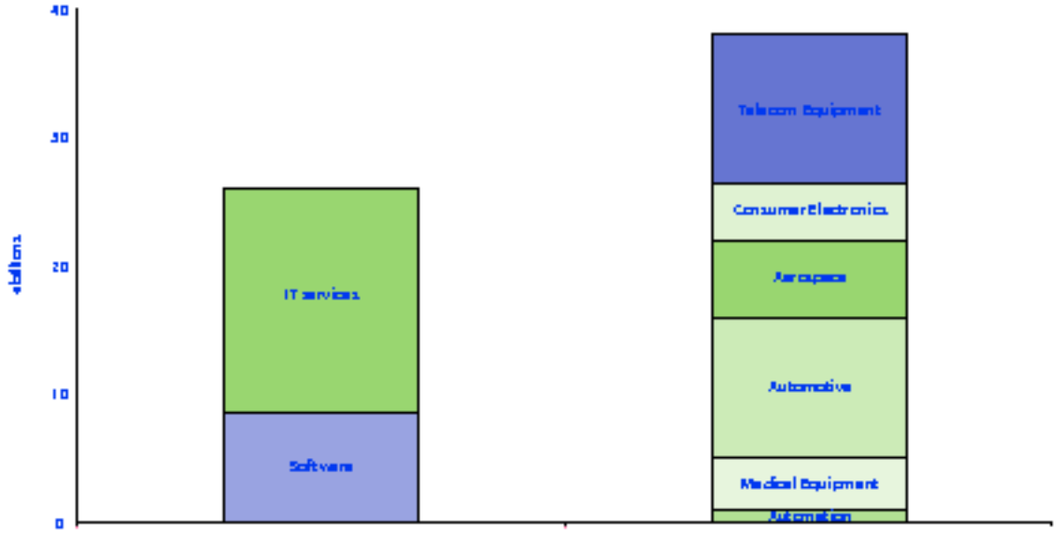


Source: DTI Scoreboard 2006 (note: three of the top 25 have sales growth over 140% and have been excluded)

11 *2006 EU Industrial R&D Investment Scoreboard*, European Commission (2006) (http://iri.jrc.es/research/scoreboard_2006.htm)

12 *Software intensive systems in the future,* IDATE News 366, 18 January 2006

Figure 5 **R&D in Software (expenditure in primary v. secondary markets, 2002)**



Source: IDATE

in the secondary software market, than in the primary software market (Figure 5).

On a worldwide basis, the secondary software sector, including automation, medical equipment, automotive, aerospace, consumer electronics and telecom equipment, spent €58 billion on R&D in software[13]. This includes R&D in software developed internally, subcontracted or bought. R&D expenditure on software in the primary software sector was at the same time € 39 billion. The EU has a strong position in the six industrial sectors mentioned above. Therefore the relative R&D position of the EU in the secondary software market is likely to be better than in the primary and this mitigates the overall conclusion of weak R&D investment in the EU.

A more fragmented market with smaller companies in less R&D-intensive sectors

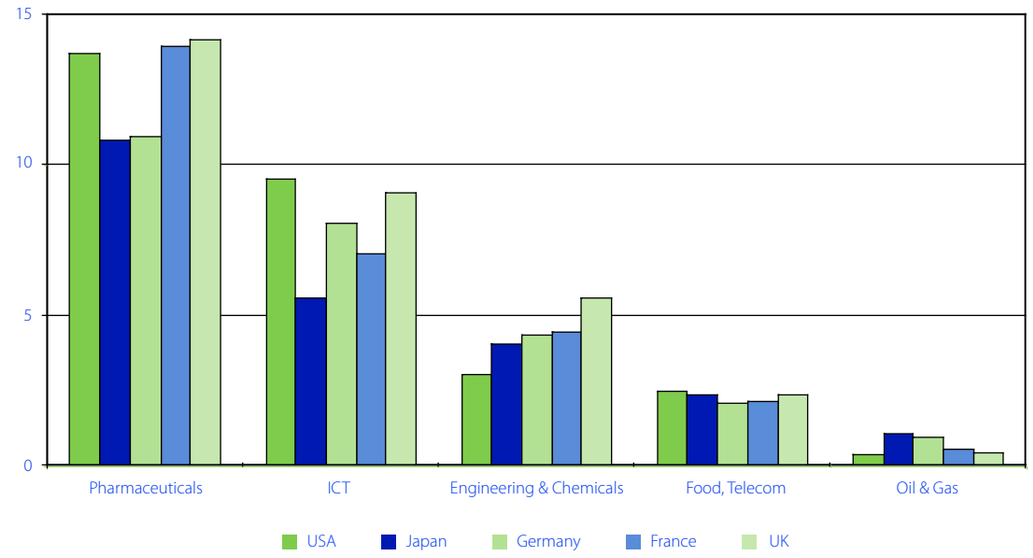
The research expenditure gap between the EU and the US is not due to a lower R&D intensity (R&D expenditure as a proportion of sales) among EU companies. To illustrate this point, figure 6 shows the R&D intensity for the top R&D investing companies in the US, Japan, UK, France, and Germany in five sectors: 1) Pharmaceuticals, 2) ICT, 3) Engineering and Chemicals, 4) Food, Telecom, 5) Oil Gas. This shows that R&D intensities of European companies are roughly equal to those of US including in the ICT sector.

The explanation for the research gap, particularly in ICT R&D, is the smaller size of the sector and its structural composition, in particular, the greater proportion of smaller enterprises in the European business landscape.

The main European weakness is the small number of 'middle-sized' companies[14]. Out of the top 1250 worldwide companies that perform R&D, 27% are middle-sized. In this category, 43% of the firms are from the US and, of those, 63% belong to the most R&D-intensive sectors, pharmaceuticals, software, and technology hardware. Some of them grow rapidly into companies with big turnovers and thus have the potential to be among the most R&D intensive companies. In comparison, only around 10% of middle-sized companies in the three most R&D-intensive sectors were European.

13 Data in this paragraph are taken from the DTI R&D Scoreboard 2006, (http://www.innovation.gov.uk/rd_scoreboard/downloads/2006_rd_scoreboard_analysis.pdf) This defines middle-sized companies as those with turnover between €35 million and €350 million. The figures on the EU comparisons are taken from *Recent Trends in the Internationalisation of R&D in the Enterprise Sector*, Thomas Hatzichronoglou OECD, Paper presented at STI conference, Helsinki 2006.

Figure 6 **R&D Intensity**



Source: DTI R&D Scoreboard 2006

The European ICT market is structurally different from the US with a greater number of smaller companies in more fragmented markets, especially in software, and fewer companies in very R&D-intensive sectors. This structural difference leads to lower R&D investment compared to the US and ICT R&D in the EU not being focused on the most dynamic segments. Thus, the main European weakness is a smaller and more fragmented IT market and not lack of competitiveness of EU companies which are as research intensive as their US counterparts.

Internationalisation of R&D

One of the most dynamic elements of the process of globalisation in the last decade is the internationalisation of R&D. Recent surveys organised by member countries and co-ordinated by the OECD and Eurostat show that industrial R&D is becoming increasingly internationalised and that over the last ten years it has become the most dynamic activity of multinationals companies. According to the OECD, R&D performed abroad by OECD companies amounted to over 16% of total business sector R&D in 2001. This represents almost a 40% increase compared to 1993[14].

According to this analysis, since the mid-80's the demand-side focus of R&D internationalisation has increasingly given way to supply-side motivations for multinationals to establish foreign R&D affiliates. The relative attractiveness of countries as locations for R&D facilities has also shifted from countries offering strategic market access to countries offering advanced knowledge systems, high quality R&D personnel, excellent universities and good collaboration between academia and the private sector.

In the short-run, this shift has favoured the US, which from the mid-90's has been able to attract a large amount of the new wave of internationalised R&D, at the expenses of EU countries which remain attractive more for production reasons and therefore for the demand-side driven research internationalisation.

14 *Globalisation: Trends, Issues and Macro Implications for the EU*, European Commission Economic Papers (September 2006)

3 Convergence

In recent years, regulatory and policy actions have concentrated on setting up the right conditions for ensuring broadband coverage and growth in take-up. These have included monitoring the adoption and implementation of the regulatory framework and looking at the state of competition both at platform and at operator level.

There is still a significant gap in the take-up of broadband by different EU Member States and the overall EU broadband market is still far from reaching a saturation point. There remain some problems with regards to broadband coverage, especially in rural and isolated areas.

However, most Member States are on track both in terms of coverage and take-up to achieve the i2010 objective to create affordable and secure high bandwidth communications. Broadband take-up, along with the convergence of networks, content services and electronic devices, is progressively creating the critical mass of users and the technological environment necessary for the first generation of high-bandwidth content services to emerge. The emergence of these services is in turn further stimulating broadband take-up and the wider adoption of ICT. However, a number of technological, economic and legal challenges must be addressed for online content services to achieve their full potential for growth and innovation. In particular, available bandwidth in Europe is adequate for content services such as music downloads but insufficient for higher bandwidth services, such as online movies, television or games. These new content services require wider broadband penetration and increased download and upload capacity.

The terms of debate are shifting from market size and availability of broadband over legacy networks to the migration to next generation networks, online availability of high-quality content, user-created content and interoperability.

3.1. Broadband

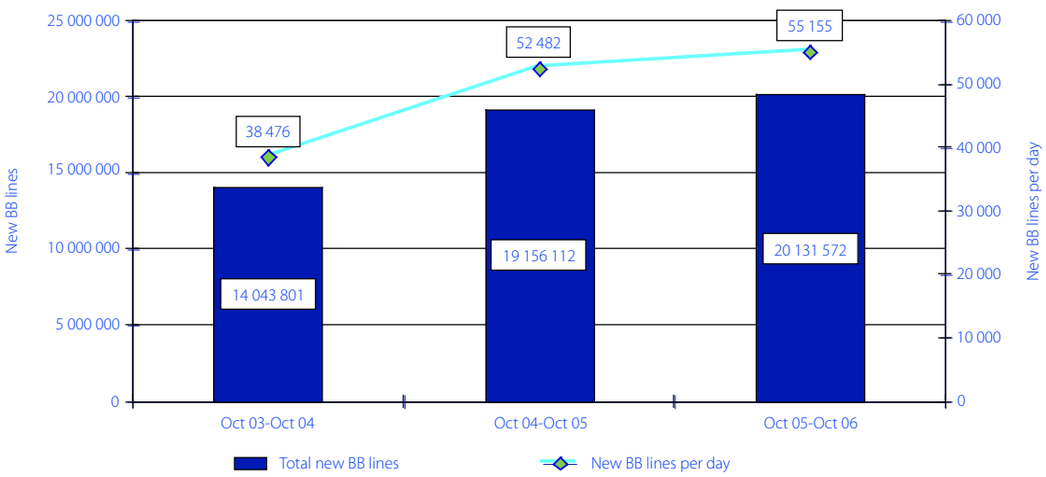
Broadband lines growth still on the rise

In 2006 there was a record in the number of new broadband connections. 20.1 million new lines in the year to October 2006 as against 19.2 million and 12.5 million in 2005 and 2004 respectively (figure 7).

With 72.7 million lines as of 1 October 2006, broadband reached 15.7% of the EU25 population. Take up of broadband is still very uneven among Member States, with the penetration rate in the most advanced countries approaching 30%, while it is below 10% in 8 countries. In the other countries the penetration rate varies between 11% and 20% (figure 8).

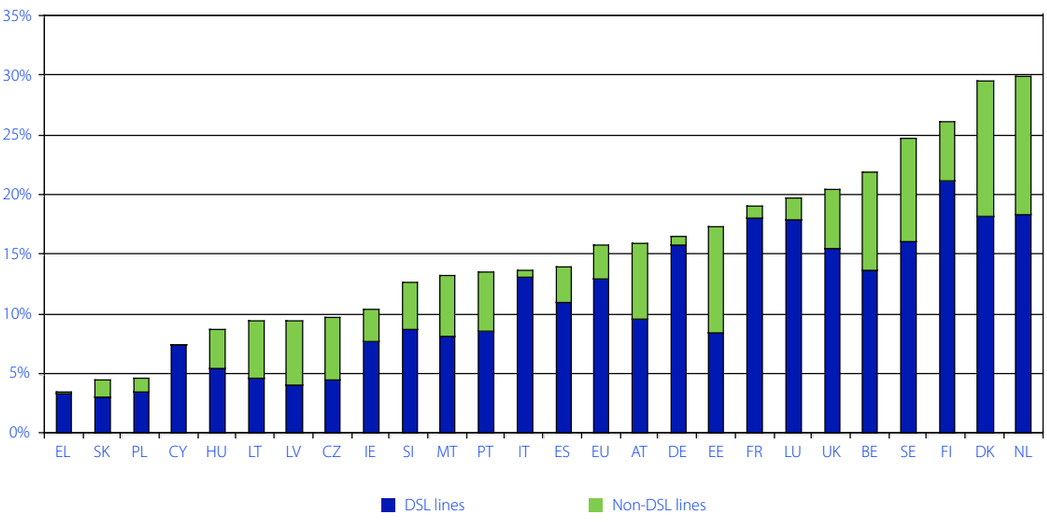
It is significant that countries with the highest penetration levels show again the highest increases, and the gap between countries has slightly widened (figure 9). But prospects for growth of broadband lines still seem promising in many Member States. In parallel to an increase in broadband coverage and download speeds, telecom operators' move to offer bundled services like triple-play services, including fixed-mobile convergence, and related flat-tariff packages make it increasingly

Figure 7 **New broadband lines per year**



Source: Commission Services based on COCOM data

Figure 8 **Broadband penetration rate and technology breakdown (October 2006)**



Source: Commission Services based on COCOM and IDATE data, October 2006. Data for AT refer to July 2006

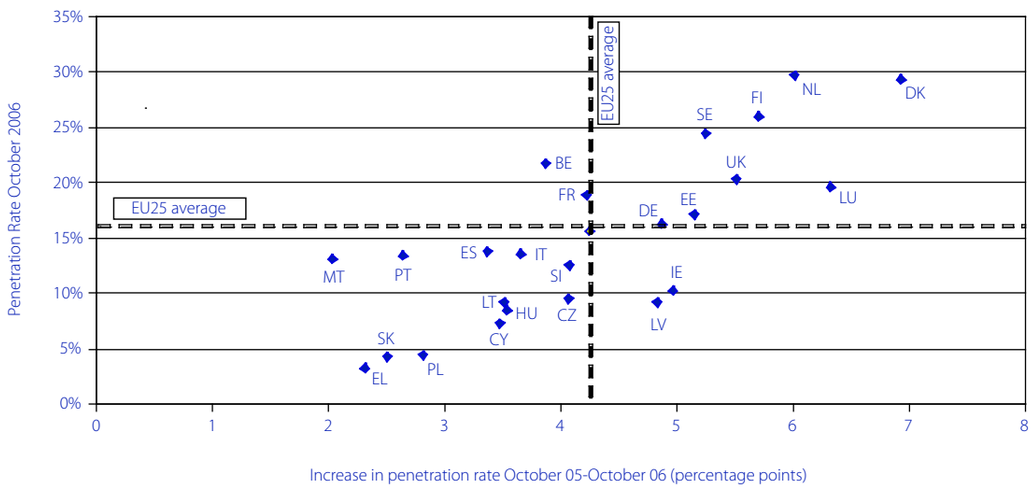
interesting for consumers to sign up for broadband connections. The potential for broadband growth not only refers to the relatively high number of households currently connected to the Internet via a narrowband connection that could eventually shift to a broadband connection (around 40% of all EU25 Internet connected households). It also refers to the significant number of non-connected households that so far did not see a real incentive in subscribing to a broadband offer. It can therefore be expected that as the growth potential in countries such as Denmark and the Netherlands slows down[15], other countries will continue sustaining the current growth rate.

At the international level, and according to the latest OECD data[16], both Denmark and the Netherlands feature the highest broadband penetration levels, along with Iceland, and appear to have overcome traditional leading

15 Penetration rate is measured as the number of lines per 100 inhabitants. A 30% penetration rate in DK and NL would indicate that around 60% of households are equipped with a broadband connection, approaching the 80% Internet penetration.

16 OECD data refer to June 2006 and are available at *http://www.oecd.org/document/9/0,2340,en_2649_34223_37529673_1_1_1_1,00.html*

Figure 9 **Penetration rate in October 2006 and speed of progress**



Source: Commission Services based on COCOM data. Data for AT not available

countries like Korea. Six EU Member States have a higher penetration level than the United States and Japan, while the EU countries immediately behind the US and Japan have had much higher growth rates.

When making international comparisons, quality of service is an important variable. Japan leads in terms of fibre-to-the-home (FTTH) with 6.3 million fibre broadband subscribers in June 2006. In this country there are more subscribers to fibre than to other access modes. In Korea, the total number of ADSL connections continues to decline as more users upgrade to fibre. In the USA, investment in fibre is continuing, while China is reputed to have at least 5 million FTTH connections. In Europe, investment in fibre has been more limited (less than 1 million lines in October 2006 and 87% of these are in Sweden, Italy and the Netherlands), and around two thirds of this investment has been supported by public authorities. While broadband coverage has increased in the latest years, further efforts are still needed in some regions, especially in rural areas, where consumers cannot yet benefit from a broadband connection due to demographics, geographical and technical factors. Further information on this issue is summarised in Section 5.

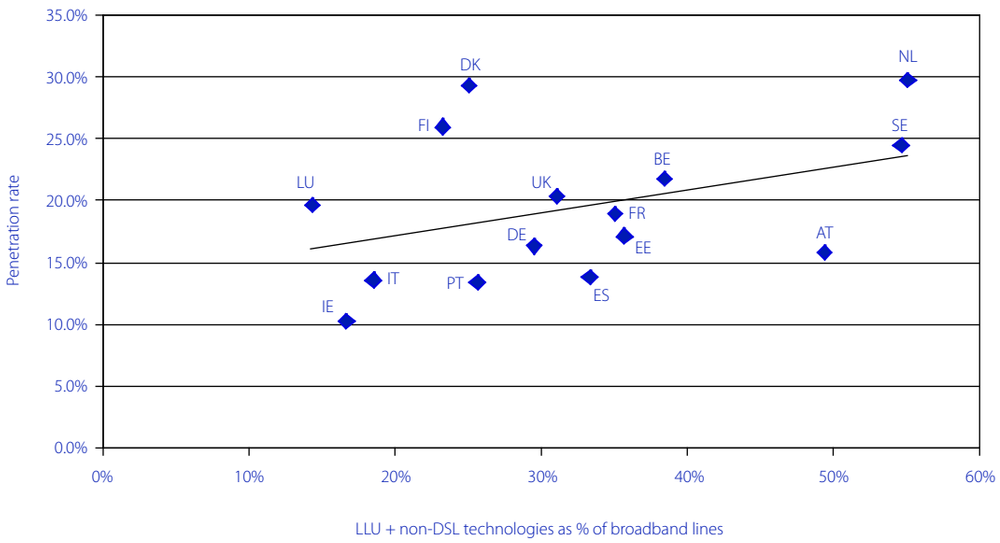
Competition: The effective role of regulation

While many factors contribute to broadband take-up, effective competition has played a key role in driving up penetration rates. Recent developments in terms of unbundling have brought about new perspectives for competition developments. Until recently, the best performing countries in broadband take-up have traditionally been characterised by competition between alternative platforms (mostly DSL v. cable), which allows consumers to choose between different modes of access. However, competition from alternative platforms is limited in Europe where DSL now represents more than 80% of broadband lines.

As the broadband market strongly relies on the network of incumbent operators, increased access to these networks has been crucial to the development of competition in countries that largely rely on DSL. Since 2004, sector regulation has brought about significant shifts the DSL market. Over the past few years, the incumbents' market share has declined in the fixed broadband market (59% in 2003 – 48% in 2006). It is not a coincidence that these shifts are more evident in countries where the unbundling of the local loop has progressed significantly. In the DSL market, new entrant market share has grown from 22% of broadband lines in 2003 to 43% in 2006. The number of unbundled loops in particular has increased from 27% to 46% of new entrants' DSL lines in the same period. Unbundling of the local loop allows alternative operators to provide single billing to their customers, provides the basis for the development of triple-play strategies (which bundle voice, data and video) and let operators modify the characteristics of the service in a competitive way.

This development is particularly clear in countries like France and Sweden, where DSL is the main broadband platform and effective regulation has led to a decline in tariffs and an increase in unbundled loops (an increase of

Figure 10 **Infrastructure competition and penetration rate, October 2006**



Source: Commission Services based on COCOM data. Data for AT refer to July 2006

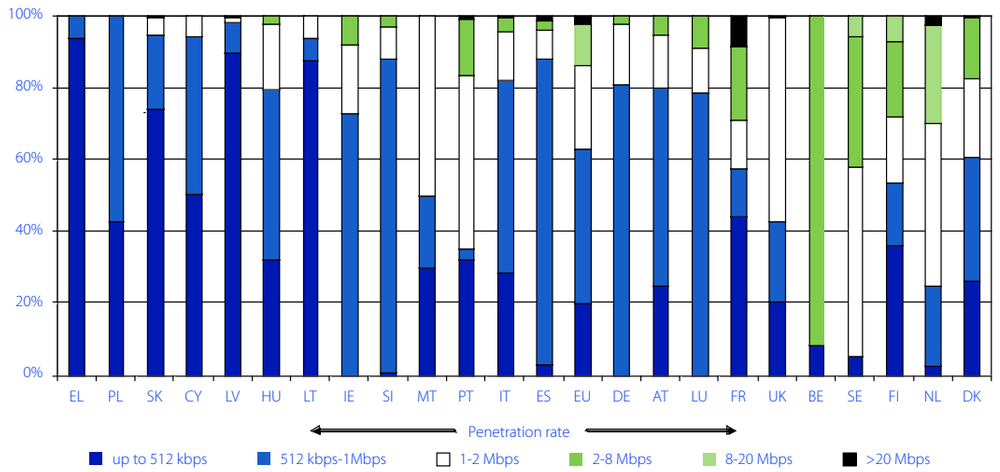
more than 50 times in France and 30 in Sweden since 2003). In The Netherlands, fast growing penetration rates have been driven by a combination of effective competition in the DSL market (where all entry takes place exclusively through local loop unbundling) and between alternative platforms (cable networks). Infrastructure competition, including both LLU and alternative technologies, remains one of the main drivers of broadband take-up in the best performing countries (figure 10).

In figure 10, Finland and Denmark are outliers. Although LLU has progressed, in Denmark the incumbent still owns a significant share of cable networks, and in Finland the incumbent market share is still relatively high. Lower competition in the DSL market has consequences for the connection speeds available in these two countries, as shown in figure 11. Although they have very high levels of broadband penetration, the proportion of users with download speeds above 1Mbps is far lower than other leading markets.

Growing broadband penetration boosts download speeds and take-up of online services.

Data from user surveys point to a positive correlation between availability of broadband at home and use of online activities. 80% of individuals with a broadband

Figure 11 **Infrastructure competition and penetration rate, October 2006**



Source: Commission Services based on COCOM data. Data for AT refer to July 2006

connection use the Internet regularly, while only 63% with a dial up connection do it.

Countries with the highest broadband penetration rates benefit from faster download speeds (figure 11), and make a more intense use of high bandwidth demanding services, such as online gaming, music downloads or web TV. Moreover, there is a positive correlation between Internet skills and broadband penetration (table 3).

Within the group of most advanced countries, there are significant differences in the distribution of download speeds (Figure 11), influenced amongst other factors by the degree of competition. Within the group of countries with a penetration rate just above or below the EU average, download speeds between 512kb and 1 Mb/s seem to be the norm, and the number of regular users ranges from 30 to 60%. In this group, the use of applications that do not require high speeds, such as e-mail, is marginally lower than in most advanced countries, and there are significant differences with regards to the use of online gaming or web and radio TV, where broadband connectivity is needed.

Table 3 **Broadband: penetration and use** (in % of population aged 16-74)

	BB Penetration	Regular. Int. Use	E-MAIL	GAMES/MUSIC	WEB RADIO/TV	TELEPHONY	INTERNET SKILLS[17]
NL	30	76	76	42	28	10	29
DK	29	78	74	26	27	13	33
FI	26	71	67	33	20	14	28
SE	25	80	74	34	28	9	26
BE	22	58	54	20	11	8	19
UK	20	57	53	24	15	7	18
LU	20	65	65	26	22	16	31
FR	19	39	34	9	10	5	
EE	17	56	49	28	17	14	24
DE	16	59	60	18	12	10	25
AT	16	55	52	15	7	7	20
EU	16	47	44	18	12	7	20
ES	14	39	37	23		6	20
IT	14	31	29	11	5	3	16
PT	13	31	29	16	11	6	13
MT	13	36	31	17	10	4	15
SI	13	47	42	21	15	4	19
IE	10	44	45	11	9	6	7
CZ	10	36	37	12	6	9	14
LV	9	46	41	24	17	14	17
LT	9	38	32	24	17	11	16
HU	9	42	37	22	12	8	19
CY	7	29	25	17	9	5	11
PL	5	34	27	16	10	8	17
SK	4	43	42	18	8	7	19
EL	3	23	17	11	5	2	9

Notes
Regular internet use defined as at least once per week. Broadband penetration is % of total population
Sources: Broadband Penetration: COCOM (2006)
Other indicators: Eurostat, Community Survey on ICT use in households and by Individuals, 2006

17 Individuals are counted as skilled if they have carried out at least 3 different Internet related activities in the past 3 months.

3.2. Content Markets

As a result of convergence between broadband networks, content services and electronic devices, it is now possible to broadcast, stream or download digital content through different networks on both fixed and mobile platforms. This is creating new delivery channels for traditional content like television, radio programmes, films, games or music. At the same time, convergence is opening the path to the development of groundbreaking content services, such as online gaming or interactive TV, meeting consumers' willingness to personalise content and to interact with it.

A major trend resulting from convergence is the development of new applications building on the capacity of ICT to involve users in the content creation and distribution process. Social computing applications such as blogs, podcasts, wiki, or video sharing, enable users to easily create and share text, videos or pictures. The rise of user-created content has taken major proportions, in the last years, and freely available user-created content is now competing with content produced by established providers, both in term of audience and share of advertising revenues.

Technological changes and convergence are also bringing about industrial change and leading to a growing interdependency between the content and ICT sectors. While innovation and uptake in the field of ICT offer promising opportunities for distribution and creation of content, the wide availability of digital content is driving adoption and usage of ICT and stimulating further technological development.

European users' eagerness to access a greater variety of content is accelerating broadband uptake and the updating of mobile handsets or replacement of video and music players. The boom in sales of electronic devices exclusively purchased to access digital content, such as personal digital audio players, clearly illustrates this trend. (Table 4)

Table 4 **Personal Digital Audio (MP3) Players**

Units Sold (000's)	2003	2004	2005	2006	2007[18]
France	250	1,550	4,860	6,125	6,300
Germany	870	3,160	8383	7,113	7,003
Italy	59	433	2,535	3,750	4,000
Spain	82	1,041	3,077	3,844	4,538
UK	288	1,750	7,372	10,530	11,553
Total Western Europe (10)2	1,828	9,837	30,739	36,051	37,036

Source: EITO 2007

By bringing down technical, financial and geographical barriers to the distribution of content, ICT also offer opportunities for the European content sector to reach new audiences, develop niche markets, or distribute its great variety of content on a global scale. While the digital exploitation of content is still emerging in Europe, it should constitute a growing share of the content sector revenues in the coming years. Music and video games sectors - the most advanced sectors in online content services deployment - will represent respectively 20% and 33% of the total revenue by 2010[19].

The rise of user-created content is opening further perspectives for a more creative and innovative Information Society. In the same way that users exploited open source software to develop new collaborative processes, they are now using ICT to create and exchange their own content in innovative ways. In a knowledge-based economy, where creativity is an important source of competitiveness, the rise of user-created content holds great promise as a driver of ICT adoption and use and new creative skills.

Europe has witnessed an impressive array of online content developments over the last two years. If the market for online content is still emerging, it is one of the most dynamic, innovative and fastest growing parts of the content sector. Market research demonstrates that the

18 Western Europe here includes: Austria, Belgium, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland and UK.

19 *Interactive content and convergence; implications for the Information Society*, Commission Services (2006)

outlook is bright, with revenues reaching €8.3 billion by 2010 in Europe, a growth of over 400% in five years. However, as for the move in the online environment, the music, movies, games, TV, publishing and radio sectors are evolving at very different pace, some being more advanced and promising than others in the mid term. (Table 5)

Table 5 **Digital Content**
Market Value and Penetration

	2005		2010	
	Revenue (€m)	% of sector	Revenue (€m)	% of sector
Music (online and mobile)	196.3	2.0	1,794	20.4
Movies (VOD)	30	0	1,269	7
Games (online, mobile)	699	11.2	2,302	33.4
TV programmes (VOD and digital advertising)	4.5	na	689	na
Publishing	849	2	2,001	5.4
Radio	15	0.3	250	4.8
Total	**1,793**		**8,303**	

Source: Interactive content and convergence; implications for the Information Society, Commission Services (2006)

Music: The music sector is one of the most advanced content sectors, leading the way for the development of new usages and business models. After having been hit severely by digital piracy, the music sector has managed to establish a legitimate online market for its products and services, mainly through sales of music track downloads. In 2005, there were nearly 200 online music services in Europe[20]. Online music market revenues are expected to grow by a factor of ten over the next five years.

The European market for music on mobile phones (full track download and ring back tones) is also developing fast, reaching €76.3 million in 2005. Mobile music market revenues are expected to grow and by 2010 online and mobile music revenues are expected to reach 20% of total European music revenues.

Film: As stated in the 2005 Cannes Declaration[21]; '[the] *advent of film online offers immense opportunities for the film industry both with regard to access to new audiences and with regard to wider circulation of European films, including on international markets.*' Still the online distribution of film is only a nascent market in Europe and represents a negligible share of the film industry revenue. Most of the market is represented by on-demand film distributed from set-top box based walled-garden services. Online distribution of film is only starting. However, online distribution revenues for films are expected to take off and, by the end of 2010, the film online segment will account for 7% of the film revenues in Europe. The mobile phone distribution of film is not expected to become significant before 2010, due to the characteristics of film in itself and bandwidth requirements.

Video Games: Born in the digital era, video games are one of the most advanced markets in terms of online distribution and exploitation. Video games are already available for online distribution on a great variety of platforms such as PC, video games consoles, mobile phones or interactive TV systems. The video game industry is also developing innovative content and business models, making the most of ICT and convergence, such as online gaming or game streaming.

The total value of the European online distribution and exploitation of video game content is already significant (representing 11% of the video game retail market). By 2010, online distribution and exploitation of video games on both mobile and fixed platforms is expected reach 33% of total European video games revenues.

Television, the most popular medium, has also started its move into the online environment, with the rise of IPTV, and the distribution of television programme over the Internet. IPTV constitutes a new delivery platform, using Internet protocol and broadband to deliver television

20 *Digital Music Report,* International Federation of Phonographic Industry, 2005.

21 Declaration of the European Ministers for Audiovisual Affairs and the Member of the Commission in charge of Information Society and Media attending the 2005 Europe Day at Cannes – 17 May 2005. See http://ec.europa.eu/comm/avpolicy/docs/other_actions/cannes_declaration_2005_en.pdf

programmes in a 'walled garden' environment. It is increasingly used by telecom operators to deliver TV over their DSL networks and develop their triple play offers. IPTV is forecast to rise from 700,000 subscribers in 2006 to nearly 9 million by 2009[22].

Broadcasters and pay-TV operators are also starting to distribute their content over the open Internet. This segment is likely to become an ever-significant aspect of the total European TV market.

Radio online is already reaching 15 million weekly listeners in Europe and is expected to more than double by 2010 to reach 32 million listeners. Digital radio broadcasting on mobile is likely to be the fastest growing radio segment, with 21.7 million weekly users by 2010. Radio podcast services are also expected to grow rapidly from 200.000 weekly listeners in 2005 to 11 million in 2010. However, by 2010, advertising revenues from all forms of digital radio distribution should only account for approximately less than 5% of all radio advertising revenues.

Publishing: In the publishing industry, European newspapers already draw 1 to 4 per cent of their advertising revenues from online advertising and this is growing rapidly exceeding 5% of the revenues of the sector in 2010, almost exclusively from online mobile advertising.

Next Challenges for Content

By some measures, Europe is second behind Japan and Korea for mobile content distribution and second behind the US for broadband distribution. Although the European online content market is set on a path to steady growth, technological, economic and legal challenges need to be overcome for Europe to realise faster market uptake.

Broadband take-up in Europe, which started significantly in 2003, has created a critical mass of users for a first generation of online content services to emerge. The positive trend in broadband take-up is expected to support further developments and growth in the online content sector. However, the differences of broadband take-up between EU Member States risk remaining high, leading to disparities in the online content services adoption. Furthermore, the rise of advanced online content - providing for an increased level of quality and/or interactivity - such as downloads of High Definition movies, or online gaming, will require improvement of broadband download and upload capacity.

The slow uptake of 3G in Europe, the mobile data and international roaming costs, as well as sometimes confusing pricing and data tariff structure, constitute major roadblocks to the development of online content services on mobile. As for the provision of mobile television services, on-demand video services are already available with 3G point-to-point technologies. However, this does not offer an economically viable solution to provide mobile television services on a large scale. Digital broadcasting allows for the provision of mobile television services, but requires proper spectrum allocation to develop. The fragmentation of industry standards for mobile platforms and Digital Rights Management (DRM) are further concerns in the mobile environment, where content like games or video needs to be reformatted to many different mobile phone platforms, generating additional costs and complexity.

Another major challenge is the need for many market players to adapt to new distribution technologies and business models, cutting across national borders and traditionally separate sectors. The emerging online content services compete with more established content distribution channels for consumer attention, but also for access to attractive and exclusive content. In this context, online content services providers are still facing difficulties in setting terms of trade with content owners, and accessing content due to existing exclusive distribution deals or conflicting rights. The complexity in the clearance of underlying rights for online exploitation, due to the lack of European wide licenses mechanisms or the difficulties in identifying and locating right holders also affect the deployment of content services on a national or Pan-European basis. While innovative and collaborative solutions to exploit and license content online are progressively being found, this remains a major obstacle slowing down the roll out of online content services. In this respect the main challenge is to find ways to maximise the circulation and exploitation of digital content rights in Europe.

Securing access and distribution of content in the digital environment also remains a major challenge, since online piracy still siphons off potential revenue and deters media companies from putting their content online. Efficient DRM systems to manage and protect digital content may offer an alternative for a secure and sustainable roll-out of digital distribution. However, concerns over consumer acceptance of DRM, the lack of interoperability,

standardisation or licensing in DRM systems, may hinder digital content services and devices in the mid term, and lead to the development of alternatives solutions.

Many other challenges affecting the roll-out of online content services remain to be addressed in the coming years, such as the consumer acceptance of new distribution and business models, the lack or cost of adapted payment or billing systems, or the skill shortage in some media companies to develop and manage online content services. In addition, the rise of user-created content is raising a whole range of new challenges, notably with regard to legal liability for content distribution, the re-use of copyright protected material, or the protection of privacy.

4 The Impact of ICT on non-ICT sectors

Consumers are currently driving convergence. The recent upsurge in the software market indicates that businesses are also adopting new and more mature eBusiness solutions, which will make them ready to benefit from convergence. However, the take up of ICT by the business sector remains limited, in particular to large companies. After a decade of sustained investment in ICT, the public sector is consolidating the efficiency gains and has improved service delivery through the availability of on line services. Efforts are being made to spread these trends throughout the public sector.

4.1. eBusiness in enterprises

ICT tend to have a positive impact on productivity through different channels[23]. In the short term, rapid technological progress in the production of ICT goods by the ICT sector leads to reductions in the relative prices of ICT products and encourages businesses and the economy at large to invest in ICT. This short-term impact on productivity can be measured (the so-called 'ICT-related productivity growth') from macroeconomic statistics. Empirical evidence based on growth accounting models shows that ICT drove a 0.5% annual productivity growth in the EU, in the period 2000-2004. ICT contribution accounted for almost half of the overall productivity increase of 1.1% in the same period.

However, the impact of ICT in the longer term is even more profound, because it enables enterprises to introduce important organizational innovations and it tends to translate into leaner and more efficient business processes. IT systems and applications allow a better management of internal business processes through their integration, as well as improved and more efficient relations with customers and suppliers. In particular, eBusiness tends to automate processes along the whole value chain, with benefits for all the enterprises belonging to it.

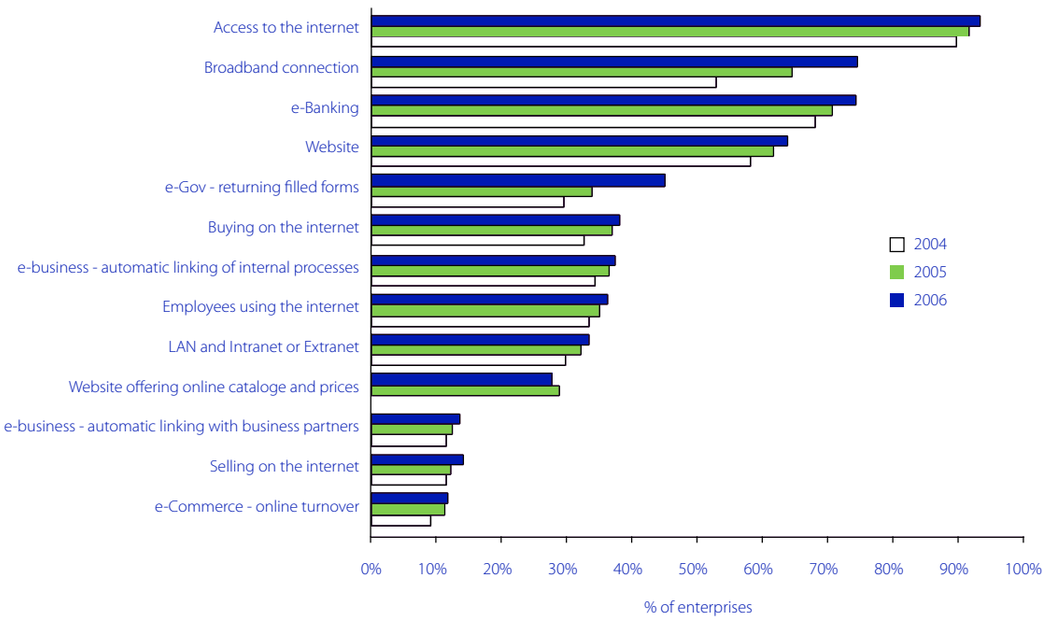
The Commission has shed some light on the role of eBusiness in speeding up productivity growth through an *ad hoc* study[24] that combined data on economic performance and on eBusiness take-up[25], in different economic sectors, in some EU Member States. The analysis found a positive correlation between the use of ICT and productivity growth, meaning that, *ceteris paribus*, economic sectors with more eBusiness intensive users perform better than the others. This result points more directly to the positive role of ICT in the economy, through innovation in the organization and the management of processes. ICT take-up by enterprises

23 For a complete coverage of this issue, see *i2010 First Annual Report on the Information Society,* COM(2006)215, 19.5.2006

24 *An econometric analysis of the impact of the eBusiness readiness Indicators on Labour Productivity Growth* - European Commission (2006) Joint Research Centre (Econometrics Unit at IPSC): The analysis is made on data taken from the OECD STAN database and from the Eurostat survey on ICT use in enterprises. Countries covered are: AT, BE, CZ, DE, DK, ES, FI, IE, IT, LU, NL, PT, SE and UK.

25 eBusiness take-up is measured by a composite indicators, comprising the following list of variables: online sales and purchases, integration of internal business processes, automatic linking with business partners and e-banking.

Figure 12 **ICT use in Enterprises**



Source: Eurostat, Community Survey on ICT use in Enterprises, 2006

allows a remodelling of business processes and this tends to positively affect productivity growth.

Additional evidence on the positive role of eBusiness in driving up the efficiency of business processes is provided by the 2006 edition of the *e-Business W@tch*[26]. According to the survey, 44% of enterprises, representing 57% of the overall employment, said that they had experienced a positive effect of ICT on the efficiency of their business processes. The perceived positive impact of ICT is correlated with the enterprise size: 76% of large (250+ employees) gave a positive feedback compared to 38% of micro enterprises (less than 10 employees).

ICT does not only translate into leaner processes but it is also felt as an important factor for improving relations with client: 44% of businesses, comprising 52% of total employment reported an ICT led improvement in the quality of the customer service.

Main trends in ICT uptake by enterprises

Evidence from the Community enterprise survey on use of ICT shows a mixed picture on ICT uptake by businesses.

The main positive evidence is in the use of broadband connections (figure 12) that has strongly increased over the last 3 years and is now used by three quarters of EU enterprises. Steady improvements can be observed in the area of eGovernment with almost half of businesses returning filled forms electronically.

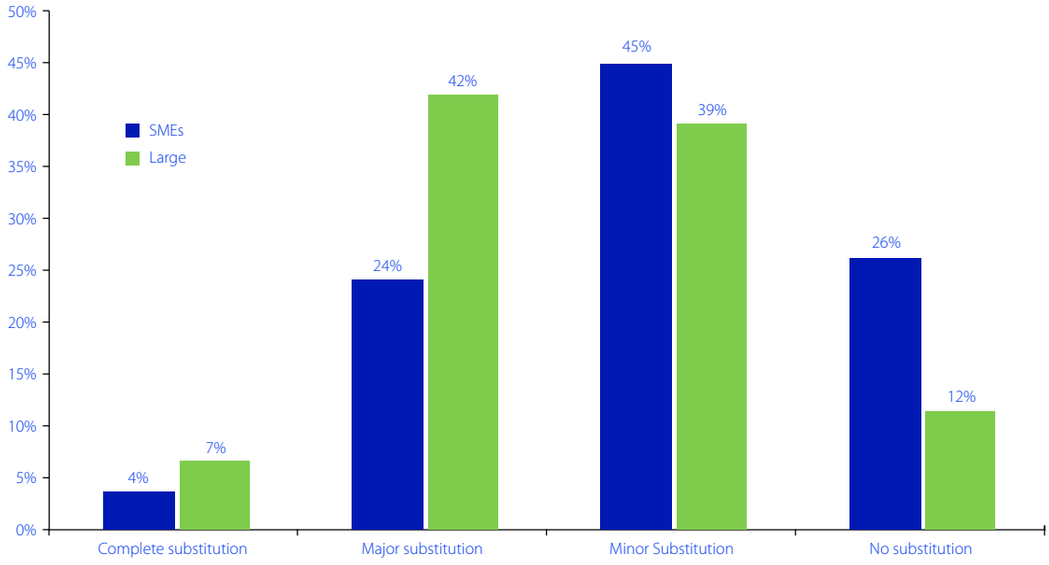
However, the impact of ICT in core business processes is less visible: 14% of EU businesses are selling on the Internet and a slightly lower percentage has established automatic links with their business partners, although a moderate positive trend can be observed for both indicators. 64% of EU businesses have a website but only a minority of them are using it for offering services to business partners such as providing an online catalogue and information on prices.[27]

The slow take-up of ICT in remodelling processes and practices is confirmed by the fact that the migration from traditional to electronic forms of communication is quite limited: only 30% of EU enterprises have replaced postal mail with messages sent over electronic channels (e-mail, Internet or extranet) for the exchange of documents with business partners (figure 13). For the remaining 70% the substitution process is partial or it has not yet started.

26 *2006 eBusiness Watch* – European Commission (2006) - http://www.ebusiness-watch.org/resources/documents/BR06.pdf - It focuses on: Food & beverages, Footwear, Pulp and paper, Consumer Electronics, Shipbuilding and repair, Construction, Tourism, Telecommunications and Hospital services. Countries covered are: CZ, DE, ES, FR, IT, HU, NL, PL, FI, UK (they account for 85% of the EU GDP).

27 The need to increase the level of uptake of ICT by business and especially SMEs was one of the recommendations of the ICT Task Force, a group composed of representatives of ICT industry, trade unions, SMEs chambers of commerce, consumers, investors and academia set up to make recommendations to foster the competitiveness of Europe's ICT industry.

Figure 13 **From Post to Electronic Communication**



Source: Eurostat, Community Survey on ICT use in Enterprises

There are several reasons behind this limited take-up ranging from cultural factors and a resistance to change in some organizations, to concerns for the integrity and the confidentiality of the messages and concerns for the legal validity of electronic documents.[28]

Furthermore, although e-commerce has been discussed as a major instrument in companies' effort to expand their markets, especially for the smaller among them, the 2006 *e-Business W@tch* results confirm a trend that was already identified in 2005: for the majority of firms which reported some electronic trading activity (i.e. either buying or selling online), the location of the main business partners with whom they trade electronically is within the same national or even regional borders — and only 10% said that they order electronically mainly from international suppliers, while less than a quarter said that they receive online orders mainly from international buyers. Interestingly, no major differences have been identified in this respect between different size classes, and even the substantial difference between those selling and those buying online should be mainly attributed to the significant international dimension of e-tourism.

This apparent reluctance of companies for cross-border electronic trading in Europe could be attributed to a variety of reasons, ranging from cultural and societal (such as language or preference to doing business with already known and trusted partners) to uncertainties about the legal and regulatory environment (e.g. in terms of applicable taxation or complaint's resolution mechanisms), to worries about the involved logistics operations or the security of such transactions and the electronic systems that support them. Nevertheless, this is an issue which should be closely monitored and analysed if European companies are to reap the full potential of electronic commerce.

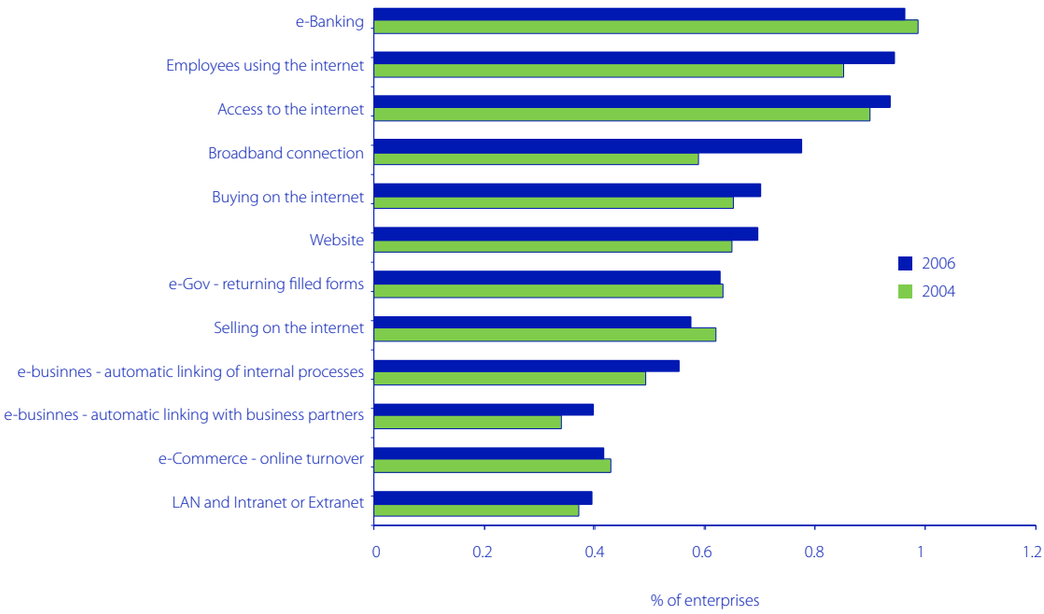
These obstacles tend to affect SMEs to a larger extent, and this translates into their lower take-up relative to large enterprises.

The gap between large enterprises and SMEs applies in general to all the indicators on ICT adoption in enterprises, the intensity being correlated with the complexity of the applications (figure 14). The difference in the level of ICT take-up between the two groups reduced between 2004 and 2006 mostly notably for broadband connectivity.

The apparent slow progress in the take up of eBusiness solutions indicated here needs to be qualified. The survey on ICT usage shows the number of companies adopting eBusiness solutions, but gives no indication on the volume of investment in ICT by businesses and on the

28 See *Legal and Administrative Practices Regarding the Validity and Mutual Recognition of Electronic Documents*, Commission Services 2006 http://ec.europa.eu/enterprise/ict/policy/legal/2006-bm-cr/dumortier-final-report-draft.pdf

Figure 14 **Take-up of ICT**
SMEs v. large enterprises



Source: Eurostat, Community Survey on ICT use in Enterprises

size of the economy affected by ICT investment. Large companies are heavy ICT users and generate most of the value added of the economy. Therefore the impact of eBusiness in terms of efficiency goes well beyond what the low take-up rates in the survey might suggest. Moreover as mentioned in section 2, sales of eBusiness solutions are on the rise with software upgrades, maintenance and interfaces representing more than 3 times the initial investment in software and indicating a continuous move towards more integrated and more efficient systems. This trend is confirmed by the 2006 *e-Business W@tch*, which shows that 65% of enterprises (measured by employment share) made investment in ICT hardware, software or networks in 2005. In addition, companies representing 25% of the overall employment in the economy are planning to increase their budget in ICT[29], while only 8% are expecting to reduce it. The impact of eBusiness on the economy is therefore larger than suggested by data on the survey on ICT usage.

Obstacles to ICT uptake

The still limited diffusion of eBusiness in the European economy is due to a set of different obstacles that can be grouped into two main categories[30]:

- structural factors relating to the general economic environment and including, *inter alia*, cultural resistance of EU businesses to innovation, low flexibility in the production environment and the labour market;

- ICT specific factors, ranging from lack of affordable eBusiness solutions suitable for SMEs, to ICT skills shortage and interoperability problems.

Statistical evidence available from 2006 *e-Business W@tch*[31] (Table 6), the Eurostat survey on ICT use in enterprises and other sources, gives some indications on ICT specific obstacles, by looking at company perceptions. In addition, detailed results by enterprise size, suggest the need of policies targeted to SMEs that are in general more sensitive to most of the existing preventing factors.

Lack of awareness of the possible benefits appears to be one the most relevant issues. The majority of micro and small enterprises (up to 49 employees) not adopting

29 Investments in ICT include hardware, software, services and personnel.

30 ICT Task Force (http://ec.europa.eu/enterprise/ict/policy/doc/icttf_report.pdf)

31 The assessment in the eBusiness watch confirms the comprehensive review of obstacles to eBusiness carried by the ICT Task Force.

eBusiness believe their size prevents them from having a good return on investment. This result supports the findings of the OECD study on eBusiness which found that the leading reason given by European SMEs for not engaging in eCommerce was that it did not suite the nature of their business[32].

Another major impediment to eBusiness is the **cost of the necessary technologies**, a reason given by 40% of enterprises to the eBusiness Watch. This applies particularly to micro enterprises but is a general problem regardless of the company size. Businesses and in particular small ones tend to be cautious about implementing costly projects when there is a large margin of uncertainty on expected future returns.

Table 6 **Perceived Barriers to e-Business by Enterprise Size**

	Total	1-9	10-49	50-249	250+
Company too small	68	75	54	36	19
e-Business technologies too expensive	40	46	30	37	40
Technology too complicated	35	37	31	33	13
Compatibility problems with partners	26	31	19	34	20
Security issues	33	36	25	31	35
Legal challenges	21	25	17	23	24
Reliability of IT suppliers	22	22	24	30	19

Source: e-Business w@tch 2006

Lack of skills also plays an important role though not for large enterprises. More than 30% of enterprises with less than 250 employees cited technological complexity as a reason for not implementing eBusiness in their organizations. This is not surprising, since only 12% of micro enterprises and 15% of small ones employ ICT specialists. Further, the 2006 survey on ICT use in Enterprises shows that 12% of enterprises needing to recruit personnel with ICT specialist or user skills had problems in doing so, due either to lack of skills on the labour market or to the high level of remuneration costs.

Enterprises refer also to **interoperability** as an obstacle to automatic linking with business partners. This is a problem encountered by 26% of enterprises not implementing eBusiness. In addition interoperability is considered an important issue for the implementation of eBusiness projects by 27% of all enterprises surveyed.

Data security is felt relevant by 36% of enterprises not implementing eBusiness. The automatic exchange of sensitive information poses concerns for enterprises and it could constitute an obstacle to eBusiness take-up.

Legal concerns do not appear to be a major obstacle but 20% of enterprises considered it a relevant factor. This finding is in line with the results of the public consultation[33] launched by the European Commission on the subject of legal barriers to eBusiness between September and November 2003. Most of the contributions were made by SMEs, in line with the fact that more than 90% of EU enterprises are SMEs. The majority of responses confirmed that enterprises do not perceive legal issues as a major barrier for conducting eBusiness. The most cited impediment was the lack of clarity of the existing regulation, while lack of cross country harmonization, absence of regulation, and lack of awareness of the existing regulation followed with equal weight. Insufficient knowledge of existing legislation on eBusiness should be regarded as a major problem, because it applies to roughly the half of respondents.

4.2. Online Public Services: Government, Health and Education

2006 saw a growing maturity of online public services: more services were put online, the level of sophistication increased and more Europeans dealt with the public sector online. The leading Member States were placed at or near the top of rank in international comparative studies of public services provision. The investment efforts made by governments are being rewarded with visible benefits in terms of efficiency or quality of service delivery. Public services at large are confronted with more complexities than government administrations when developing IT solutions, partly because they involve actors beyond the public sphere. However services like health and education are catching up quickly.

32 OECD: ICT, eBusiness and SMEs (2004) http://www.oecd.org/dataoecd/32/28/34228733.pdf

33 The open consultation on legal barriers in eBusiness took place between 15 September and 17 November 2003. Replies were received from 671 enterprises across the European Union and the Acceding and Candidate Countries.

34 *eGovernment Economics Project (EGEP) Measurement Framework* Commission Services 2006 http://217.59.60.50/eGEP/Static/Contents/final/D.1.3Expenditure_Study_final_version.pdf

Investment

Online services are not a separate category in public accounts and it is difficult to measure levels of investment. The Commission[34] estimates total ICT expenditure by public administrations in the EU to be about €36.5billion and eGovernment expenditure to have been €11.9billion in 2004. Most eGovernment related expenditure is investment and this represents about 5% of public investment. The majority of ICT expenditure is in regional and local governments which together make up 55% the total.

Investment is boosting online availability of government services[35]. Basic services in all Member States are now available online and there has been significant increase in the level of sophistication of service delivery. Nearly half of the 20 basic services in Member States offer full online transactions. The average level of sophistication and the proportion of services available at the fully transactional level grew by 10 percentage points in part as a consequence of the rapid progress made in the new Member States (by 16 and 14 percentage points respectively for the two indicators).

Efforts by all levels of government are now beginning to show signs of achieving real change. This is demonstrated below in terms of take-up of services and the fact that some Member States are world leaders in the provision of online public services.

Investment in eHealth has recently taken off. Health was investigated in the e-Business W@tch survey of 2006 which surveyed 834 acute care hospitals in 18 countries. It found that hospitals were in general better equipped with basic ICT equipment than other sectors and that they were relatively strong in relation to eProcurement. However it identified their main weaknesses as being in relation to the introduction of ICT solutions directly with patients.

Health information is very sensitive and this makes exploitation and implementation of innovative solutions more difficult. It is further complicated by the need for new skills and reorganisation in healthcare, the significant involvement of public authorities, the fragmentation of the market, and concern surrounding a number of perceived legal issues pertaining to health like reimbursement, security and privacy issues.

Despite the difficulties, the potential returns on eHealth investment are large and offer a solution to the strain of health care budgets that is evident in many member states. It is estimated that by 2010 eHealth will account for 5% of the total Member States' health budgets. The Commission has launched studies to investigate eHealth developments in more and will report on these in future i2010 Annual Reports.

Take-up

The Eurostat enterprise survey found that 64% of enterprises now use the Internet to interact with public authorities. This underlines the important contribution that **online public services** make to business efficiency. Services that are available for full online transactions can reduce business costs and, in this way, eGovernment strategies make a direct contribution to the Lisbon agenda.

There is a growing consensus that eGovernment is a key factor for increasing competitiveness. Public services, more responsive and better fitted to user needs, provided electronically, are perceived as essential to reap the benefits of the information society and reach the two of the four priorities of the renewed Lisbon Strategy: unlocking the business potential, ageing population. Many Member States report in their 2006 Progress Reports on the reduction of administrative costs for the public administration as well as for businesses. Measures taken include Internet portals to reduce the costs of company registration; the introduction of electronic ID cards; unified ICT platforms for back-office reorganisation; and, the launch of portals for citizens. These developments will affect the administrative burden and make a substantial contribution to the Lisbon political commitments to reduce the administrative burden by 25% by 2012.

For EU25, the Eurostat household survey found that 35% of internet users (i.e. individuals who used the Internet within the last three months) used the internet to replace personal contacts or visits to public administrations and a further 37% would be interested in doing so. Only 28% of internet users stated they were not interested and the overwhelming majority are potential clients for online public services.

35 *Online Availability of Public Services: How is Europe Progressing?* Commission Services (June 2006) http:/europa.eu.int/information_society/eeurope/i2010/docs/benchmarking/online_availability_2006.pdf

36 *Benchmarking Access and Use of ICT in European Schools 2006* – European Commission http://ec.europa.eu/information_society/eeurope/i2010/docs/studies/final_report_3.pdf

Turning to **education**, a European schools survey[36] in 2006 confirmed there has been a significant rise in the availability and use of ICT over the past five years. 96% of schools now have Internet access and 67% already have a broadband connection for educational purposes. However take-up needs to continue improving to catch up with the US where 95% of public schools had already a broadband connection in 2003.

The schools survey also found that take-up of ICT has been widespread in the teaching profession. Over 90% classroom teachers use computers or the Internet to prepare lessons. 74% also use them as a teaching aid. Over 80% think that pupils are more motivated and attentive when computers and the Internet are used in class, and that they have significant learning benefits for collaborative work.

Take-up of online **health** services is less advanced than public administration services, however, the interest is already there with one European in five using the Internet to seek health related information and this rises to nearly half in the leading member states. ICTs are already widely used in health for example for communication between primary and secondary care but not yet for services to patients. This was reflected on the very low proportions in the household survey – less than 2% – using advanced online health services.

EU v. Rest of the World

It is difficult to compare public service provision between countries with widely differing governmental structures. Some attempts[37] have been made using composite indicators to reduce the variation to a single measure. Three broad conclusions can be drawn:

- USA and Canada lead the rankings with the best EU member states a close second.

- There is a wide dispersal in the ranking of EU member states with the best close to the best in world but others lagging behind. The UN study notes that income is a key determinant of relative positions but it is not the only explanatory factor.

- The studies give stable and consistent results. This is true across the different studies and also over time, for example, the UN study covering nearly all countries found only minor reshuffling of ranks in the top 50 which includes all EU countries.

Impact

An estimate of the overall impact of online public services on the EU economy was given by the Commission's eGEP study[38]. This estimated that projections on eGovernment expenditure would lead to a 1.5% GDP growth increase for the period 2005-2010. This excludes the impact of cost savings from eProcurement and eGovernment expenditure and the addition of these would increase the overall GDP growth attributable to eGovernment in the period 2005-2010 to 2%.

At the micro level, several Member States have estimated the impact of public services. These include:

- The BundOnline service ATLAS (www.atlas.zoll.de) replaces written customs declarations and notices of duties and taxes with electronic notification, making customs clearance faster and more efficient. In 2004, 11 million declarations and notices online resulted in savings of around €107m, equivalent to about €10 per declaration/notice.

- The UK Environment Agency achieved savings of over £1m in nine months deploying a system to award contracts for goods and services via electronic auction.

- The French government has developed an evaluation methodology called MAREVA. To give a precise evaluation of financial gains of eGovernment services for the State and the public sector, as well as of gains and benefits for their users. This is currently being applied to the 40+ projects of the ADELE programme

37 These include: *United Nations Global E-Government Readiness Survey 2005*. The UN Survey assesses more than 50,000 features of the e-government websites of the 191 UN Member States to ascertain how ready the Governments around the world are in employing ICTs to improve the access to and use of basic social services. *Leadership in Customer Service: New Expectations, New Experiences,* Accenture,(2006). This covers 22 countries of which 12 are in the EU and its overall assessment allocates the countries into 4 classes. Only the USA and Canada are in the highest class but 3 EU member states are in the second class and one is overall ranked third.

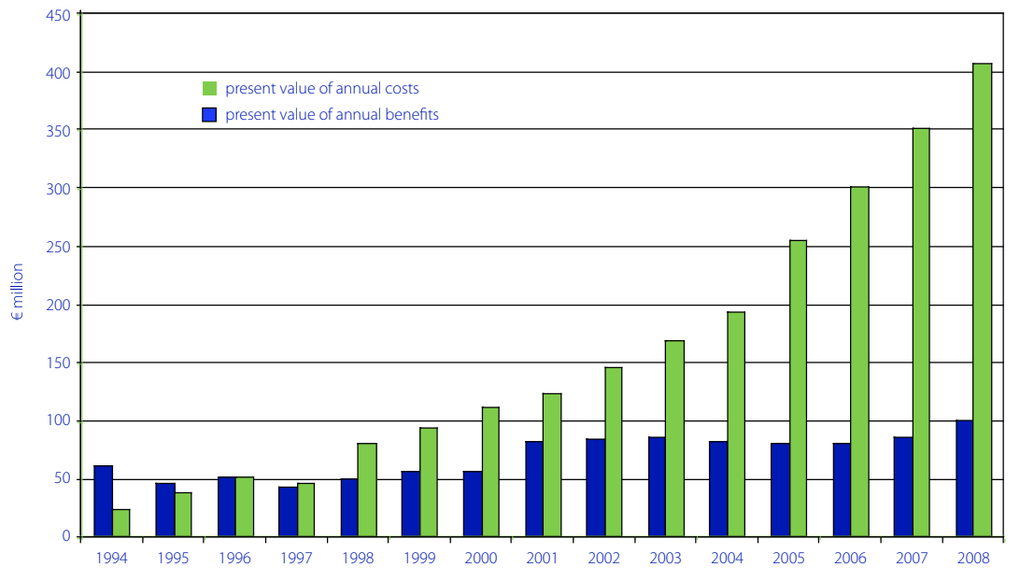
38 *eGovernment Economics Project: Measurement Framework.* Commission services (2006) http://217.59.60.50/eGEP/Static/Contents/final/D.2.4_Measurement_Framework_final_version.pdf

39 *Good Health Services across Europe – Evidence on their economic benefits and lessons learned.* This forms part of the Study on Economic Impact of Health. www.ehealth-impact.org

which represent an investment of €188 million this year. They are expected to deliver €490m direct productivity gains. Overall, the programme's budget for 2004-2007 is €1.8 billion and savings of €5 billion per annum are expected by 2007.

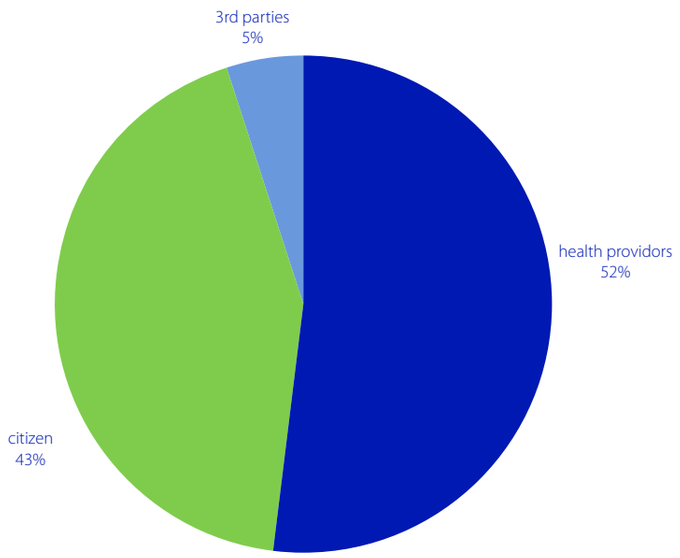
To assess the impact of eHealth, the Commission examined ten applications[39]. On average the present value of annual benefits exceeds annual costs for the first time in year four. Where the eHealth application is upgrading or modifying an already existing service, development costs are in addition to the running costs of the existing service. Benefits are only be realised after the application has been implemented, or it is in routine operation. For the ten cases, benefits were realised very shortly after implementation was completed and utilisation was

Figure 15 **eHealth: the costs and benefits**



Source: Commission Services (see footnote 37)

Figure 16 **eHealth: who benefits?**



Source: Commission Services (see footnote 37)

underway. The study also found that once the cumulative benefits exceed the costs, the gap between them is sustainable.

The overall impact of the ten projects is illustrated in figure 15. From 1994 to 2008, the annual present value of benefits grows continuously from below €20 million in 1994 to about €200 million in 2004 and estimated €400 million in 2008. The associated costs stay broadly stable after the initial planning and implementation phases, and do not reach beyond €10 million per year.

The study also looked at the distribution of benefits: just over half the total benefit accrued to health provider organisations (HPO) and most of the rest directly to citizens (figure 16).

In Education, a number of studies provide evidence on the return on investment of ICT in schools in terms of pupil performance[40]:

- Schools with higher levels of e-maturity demonstrate a more rapid increase in performance scores than those with lower levels;
- A UK study found evidence for a causal link between an increase in ICT investment and a rise in educational performance in primary schools in particular in English and Science;
- The 2006 OECD study[41] identified an association between the length of time students have been using computers and their performance in mathematics.

Another important educational impact of ICT is on perception:

- 'e-learning Nordic 2006' shows that pupils, teachers and parents consider that ICT has a positive impact on learning, and allows for programmes tailored to individual pupils' needs.
- The Dutch Government noted teachers becoming more and more convinced of improved educational achievements through the use of ICT.[42]
- In a Commission study of teachers in spring 2006, teachers using ICT had positive attitudes to their impacts on students, particularly for collaborative work and for being more attentive while in class.

The positive messages from these studies are, however, countered by indications that the majority of teachers have not yet embraced new pedagogical practices. The foundations for more profound changes have been laid, but more time is needed to achieve wider impact on teaching methodologies.

40 *Is ICT living up to its full potential in schools? A review of ICT impact studies in Europe,* European Schoolnet, 2006:These include different studies conducted between 2002-6 by the British Educational Communication and Technology Agency (BECTA), and the elearning Nordic study (Ramboll Management, 2006)

41 *Are pupils ready for a technology-rich world?: what PISA studies tell us,* OECD 2006

42 *Eight Years of ICT in Schools,* Ministry of Education Culture and Science, Netherlands

5 Inclusion

This section looks at inclusion policies at national and European level. All Member States have inclusion policies (see 5.1) and there is a broad consensus in their objectives. While they set different priorities, they converge around certain important themes notably, the geographical digital divide, digital literacy, eAccessibility and online public services. The communality in strategies led to a Ministerial Declaration in Riga setting broad policy areas for action and fixing a target to reduce by half the gap in Internet usage for groups at risk of exclusion. The Riga Declaration is outlined in section 5.2 along with an analysis of the Community survey of households and individuals to establish the base line of usage disparities between different groups within the population.

5.1. Inclusion at the national level

In 2006, the Commission reviewed eInclusion policies at European and National level and concluded that eInclusion policies and actions have made significant progress in implementing the goal of an inclusive knowledge-based society.[43] It focused on three facets of eInclusion: the access divide (or 'early digital divide') which considers the gap between those with and those without access; the usage divide ('primary digital divide') concentrating on those who have access but are non-users; and, the divide stemming from quality of use ('secondary digital divide') focusing on differentials in participation rates of those people who have access and are users. This review showed an important consensus: all Member States and associated countries have introduced eInclusion policies whatever their level of ICT saturation.

The analysis of eInclusion policies following the three digital divides showed that EU countries are placing emphasis mainly on fighting the usage divide.

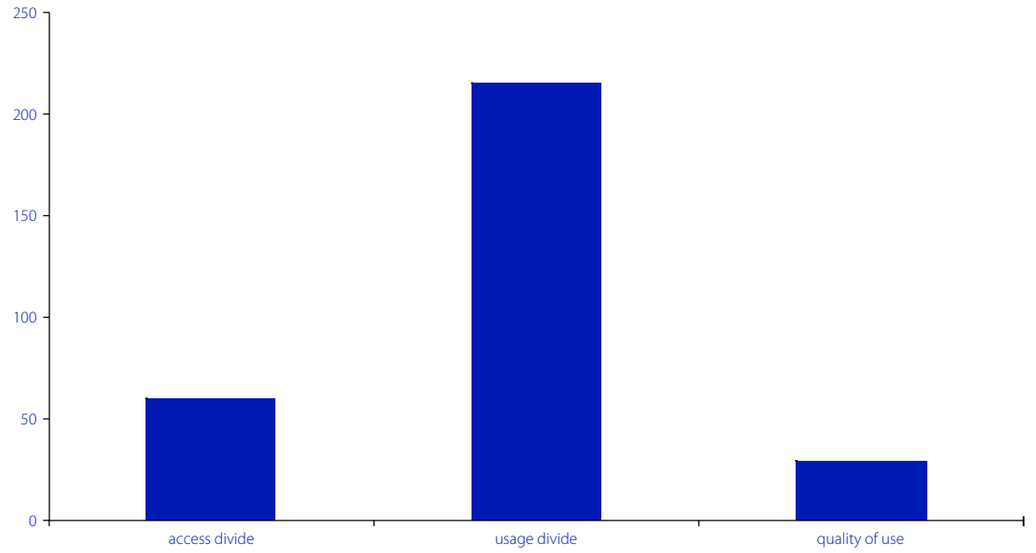
However, the review also showed that activities addressing the access divide are still very much a feature in national policies though their relative importance differs greatly between countries. In general, the more sophisticated a national ICT infrastructure and the greater the 'hardware saturation', the more likely a country is to tailor access activities to exclusion factors and to explore the viability of extending new technological modes of access.

The broad conclusions on national eInclusion policies are as follows:

- **Access divide:** Growing diversification of technological choices for high-speed Internet access (in particular efforts to use digital television or electricity network) is reducing the importance of factors such as geography and income. However, quality and speed of provision remain an issue in isolated and remote areas without sufficient aggregate demand to justify the operation of commercial markets. Speed disparities can affect both use and quality of use, including the potential to take-up advanced online services. Thus, though access may be a diminishing problem it is unlikely to disappear

43 *Status on e-Inclusion Measurement, Analysis And Approaches For Improvement,* Commission Services (2006) http://ec.europa.eu/information_society/eeurope/i2010/studies/index_en.htm.

Figure 17 **National Inclusion Policies**
(main focus on projects)



Notes: the study considered 188 enclusion programmes, initiatives and projects initiated in the Member States at national and regional level between 1999 and 2006. Source: Commission Services

and the continuing roll out of new technologies will pose new questions of who has access and who has not.

- **Usage divide**: as seen in section 4.2, Member States have been investing in the provision of public content and services and also in providing basic ICT user skills to citizens. In general, the priority target group for accessibility policies has been people with disabilities, and less consideration has been given to the elderly. In the case of training and skills, there has been a focus on the unemployed and the successes of this policy are demonstrated in the Community Survey of Households which shows relatively high skill levels of the unemployed (see table 8). As yet, there is little attention paid to the needs of ethnic minorities.
- **Quality of use**: disparities in quality of use are, as yet, only addressed in the policies of those Member States most advanced in the adoption and usage of ICT. This is likely to change as more countries advance to higher levels and new divides become apparent. Some of the issues already being addressed concern digital 'demotivation' e.g. participation in eDemocracy.

Member State policies show the multi-dimensional nature of the eInclusion and this contradicts commonly held view that Member States can easily be positioned on a continuum – from 'infrastructure' through 'usage' to 'quality'. No Member State is adopting just one approach in its fight against digital exclusion. On the contrary, they are using a wide range of platforms in order to reach out and engage at-risk groups.

This review shows that the aims and objectives of eInclusion policies in Member States are aligned with those at EU level, albeit at varying degrees. The vision of eInclusion as articulated at EU level encompasses a wide range of issues which themselves have been the subject of specific national policies e.g. geographical digital divide, digital literacy, eAccessibility, online public services. Policies are not only closely aligned but financially supported by EU Structural Funds and many countries feel there should now be greater EU involvement in monitoring and quantification of eInclusion.

A first step in realising co-ordinated action on inclusion was made at the Riga conference in June 2006 and this is discussed in the following section.

5.2. The Riga Declaration

The Riga Declaration was supported by Ministers and representatives from 34 countries. It specifies 6 broad policy areas for action in 2008:

(1) older workers and elderly people;

(2) the geographical digital divides;
(3) eAccessibility and usability;
(4) digital literacy;
(5) cultural diversity in relation to inclusion;
(6) inclusive eGovernment.

The commentary below focuses on the first four action areas; actions in relation to eGovernment have already been considered (see 4.2) and the issues of cultural diversity and inclusion will be considered in future Annual Reports as no data is available at present. The Declaration also defines specific benchmarks to monitor progress in its implementation and the most important for this discussion is the target to reduce by half the gap in Internet usage for groups at risk of exclusion.

Internet usage disparities

The 2006 Community Household Survey showed that 47% of individuals living in the EU regularly use the Internet (at least once a week). It found sharp deviations in the proportion of regular users, in particular by:

- **Age**: 73 % of those aged 16-24 but only 10% of those aged over 64;
- Level of **education**: 77% with high education, 25% of those with low education level;
- **Employment** status: 38% of unemployed and 17% of economically inactive persons compared to 60% of those employed, and 84% students.

Table 7 **Regular Internet use (% of population) in EU25 in 2006**

	Education attainment			
age	average	low	Medium	high
average	47	25	53	77
Persons aged 16-24	73	67	76	90
Persons aged 25-54	54	25	56	83
Persons aged 55-74	20	7	27	53

Source: Eurostat, Community Survey on ICT use in households and by Individuals, 2006

This is consistent with what was been found in previous years[44], age and to a lesser extent education, are by far the main sources of exclusion from the Information Society (Table 7). However, there is one interesting exception to the correlation between usage and education, lower education attainment is not an obstacle to a high use of Internet among the young people (16-24 years old). In this age group, 67% of those with low education level are regular users but this drops to 25% of those with the same education level aged 25-54 and 7% of for those aged 55-74.

Address the needs of older workers and elderly people

Older users are not a homogenous group and amongst them differences by age, gender, education level and economic status tend to be more acute than for younger age bands. Overall, 29% of those aged 55-64 and 10% of those aged over 65-74 are regular users. Although these rates are still considerably lower than the EU average rate (47% in 2006), there has been some improvement in the relative position of those groups since 2005 but only in the working age groups and not for the retired. Usage rates are particularly low amongst women in these older age groups. This relates to the fact that they are more likely to be economically inactive: either not in the labour force or in post-retirement age. These figures underline the difficulty in meeting the Riga target to halve Internet usage disparities for the elderly by 2010.

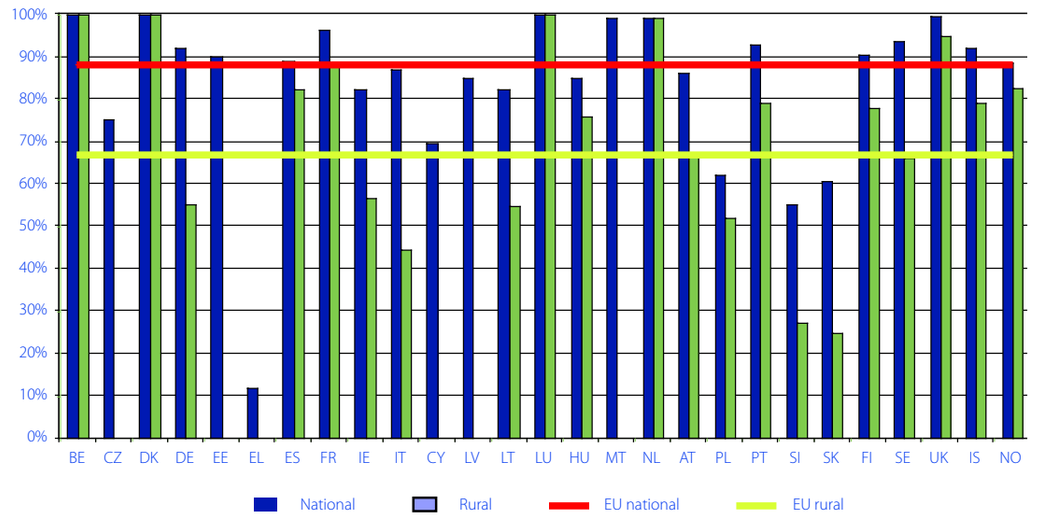
In addition, a large proportion of the disabled and chronically ill fall in the older age groups and policies to improve accessibility are also very relevant to them. The Community Household Survey does not collect data on the relationship between age, disability and ICT use; there is evidence from various surveys and projects[45] that around 40% of people older than 50 have some degree of activity limitation due to health problems and almost 50% report that they have some long-term health problems[46]. The elderly and in particular the very elderly are also the fastest growing age segment of the European population.

The geographical digital divide

In the Riga Declaration, Member States agreed to significantly reduce regional disparities in Internet access across the EU by increasing broadband coverage in under-served locations.

44 See *i2010 First Annual Report on the Information Society*, COM(2006) 215 and *Information Society Benchmarking report,* European Commission (2005)
45 such as SHARE (Survey of Health, Ageing and Retirement in Europe) and ESAW (European Study of Adult Well-Being'), and SeniorWatch surveys.
46 *ICT, Ageing and Independent Living.* Commission Services ftp://ftp.jrc.es/pub/EURdoc/22352-ExeSumm.pdf
47 Coverage measurements do not include those consumers that cannot benefit from DSL access because of the long distance between their residence and the switch.
48 *Broadband Coverage in Europe,* Commission Services (2006, data as of 31.12.2005)

Figure 18 **DSL national and rural coverage (January 2006)**



Source: Commission Services based on COCOM and IDATE data. Note: no data on rural coverage available for CZ, EE and LV. MT: No distinction between rural and urban.

The commitment is to increase broadband coverage in Europe to at least 90% of the population by 2010. In January 2006 DSL reached 87% of EU25 population[47]. Coverage of rural areas, however, was 65.9%, with lower download speeds available than in urban areas and less competition between alternative providers[48].

In countries with the highest broadband penetration levels, already 90-100% of the population can have a broadband access (i.e. the Riga target is already met). However in countries where the penetration level is below 10% of the population, the picture is more diverse, with some countries enjoying around 80% coverage, while in the less developed ones this figure goes to 70-60%.

eAccessibility and usability

The Riga Declaration sets three targets for accessibility:

- By 2007, make recommendations on accessibility standards and common approaches, which could become mandatory in public procurement by 2010;
- Assess the necessity for legislative measures in the field of eAccessibility, and take account of accessibility requirements in the review of the electronic communications regulatory framework beginning in June 2006;
- Ensure that all public websites are accessible to all by 2010.

The latest measurements show that only 3%[49] of public web sites comply with the minimum web accessibility standards and guidelines and suggest that the Riga target is very ambitious.

Digital literacy and competences

In the Riga Declaration, Member States committed to halve the current gaps in digital literacy and competence between disadvantaged groups and the average population by 2010. Progress on this target will be measured on the basis of available indicators and further work in the context of i2010. In 2006, the indicators for computer and Internet skills have shown that the groups with the lowest computer and Internet skill levels are the less educated, older people and the economically inactive. The level of non-users (those who have never used either a computer or the Internet) is also higher in these groups and over 40% of the EU 25 average. The unemployed, though slightly below the EU average, have better computer and Internet skills levels than the other 3 groups.

This first overview of eInclusion indicators confirms that the Riga Declaration priorities are relevant at the EU

49 Web accessibility figure coming from the study for the 2005 UK Presidency *'eAccessibility of public sector services in the EU'.*

50 The importance of digital literacy and competences not just to inclusion but to the competitiveness of 'businesses of all sectors and sizes' was stressed by the ICT Task Force.

Table 8

Internet User Skills						
Internet user skill level	**EU25 average**	**Low educated**	**Aged 55-64**	**Aged 65-74**	**Retired/ inactive**	**unemployed**
Never used	43	67	65	85	76	48
Low	31	17	26	12	17	27
Medium	20	12	8	3	6	19
High	6	4	1	0	1	6
Computer User Skills						
Computer user skill level	**EU25 average**	**Low educated**	**Aged 55-64**	**Aged 65-74**	**Retired/ inactive**	**unemployed**
Never used	41	65	61	83	73	44
Low	13	10	13	7	11	14
Medium	24	15	16	7	11	23
High	22	10	10	3	5	19

Notes
1. Figures are the percentage of the population in the particular group
2. Low educational level applies to those with no formal education, primary or lower secondary education (corresponding to UNESCO's ISCED classification levels 0, 1 or 2)

Source: Eurostat, Community Survey on ICT use in Households and by Individuals, 2006

level and the required policy efforts needed to reach the targets are substantial given the initial conditions[50]. Current measurements suggest wide differences in ambition of these targets: that on broadband coverage might be met before 2010 whereas that on eAccessibility will require a major push at EU level given the current low accessibility level of public sites. In relation to the groups at risk of exclusion, major efforts will have to be placed on increasing the Internet user rate and digital literacy amongst the elderly and the low educated; another important group to focus policy efforts in coming years are the non-users. In 2006, over 40% of EU citizens have never used either a computer or the Internet (table 8). This situation varies from country to country and efforts will have to focus on different targets accordingly.

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European Commission
Information Society and Media

i2010 - List of actions

June 2005 to March 2007[1]

0 – 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 set 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 ICT 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 ICT; and 3. Fostering inclusion, better public services and quality of life through the use of ICT.
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 until 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 ICT.
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 launched actions 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 focus on interoperability, developing digital and entrepreneurial skills, strengthening the internal market, reducing patent costs, 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 the users.

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 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 the latest market developments 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, forward-looking policy discussion on this theme continues 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 on spectrum management and to reduce resources associated with the reviews of relevant markets by streamlining the procedures. Other changes proposed would strengthen the internal market, reinforce consumers' 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 incurred by domestic mobile phone use. The proposed regulation also enhances price transparency.

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 towards 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 a 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' – used 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	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; 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 will not need to worry whether a wireless product bought in one Member State might not work in another. One of these harmonisation measures covers RFIDs in the IHF band and the other addresses certain equipment categories of relevance today, but also has a built-in mechanism to extend it to new devices.
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 to facilitate introduction of new and innovative Mobile Satellite Service systems providing services such as satellite data casting / multimedia broadcasting (including mobile TV) via a coordinated EU approach.
Commission Decision on allowing the use of the radio spectrum for equipment using ultra-wideband technology in a harmonised manner in the Community, 21.02.2007	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, while ensuring no interference takes place 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, 15.3.2007	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 outlines identified RFID-related issues of high importance for Europe, and a plan of future actions at the European level.
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 between 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. The proposal is on a good track for adoption by the European Parliament and the Council.
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 a wider re-use of its 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 broader circulation of European works to other countries in Europe and worldwide. MEDIA 2007 provides easier access to finance and increases the 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), 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 launches a major new drive to adapt core EU consumer rules to the challenges of the fast-changing digital world. The paper identifies a number of problems with the current legislation in the area of consumer protection, presents main options for reform and initiates a public consultation.

1.2 - Increasing security of networks

Action 4: Strategy for a secure European Information Society - increasing trust and confidence

Report on operation of the Directive on electronic signatures, COM(2006) 120, 15.03.2006	The report reviews the operation of Directive on electronic signatures. Most of the applications can be found in the framework of e-banking and e-government 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 synergies among the various policy initiatives related to 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 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 efforts made so far to fight these threats and identifies further actions 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 foreseen by the Programme. For actions on fighting illegal content and awareness raising 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 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 adopted a Decision reserving the 116000 telephone number in all Member States as a hotline for reporting missing children. Calling 116 000 will be free of charge and the number should be operational throughout Europe by the summer of 2007. 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.

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 launched 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 playing a crucial role in reaching the goals of growth, competitiveness and employment. The broad objectives of FP7 have been 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 FP7 Specific Programme 'Cooperation' defines the priorities and criteria for the calls for proposals to be launched in 2007. It is divided into 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), as well as research into 'future and emerging technologies' and support for horizontal actions, such as international cooperation. Furthermore, research e-Infrastructures will be supported through the Research Infrastructures Work Programme of the 'Capacities' programme.

Action 6: Making innovation and research policies more efficient

Action Plan for European Standardisation, April 2006	This four-year rolling action plan outlines the most important actions to be implemented, including the area of ICT, and defines a timeframe for carrying out those 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 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 establishment of European leadership in future strategic technologies, forging stronger links between universities, research and business, as well as improving 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) will support the aims of the i2010 strategy, building on the previous e-TEN, Modinis and e-Content programmes. In 2007 the programme will focus on three main themes: efficient and interoperable eGovernment services; ICT for accessibility, ageing and social integration; and ICT for sustainable and interoperable health services.
2.2 - Promoting ICT innovation and adoption for competitiveness and employment	
Action 7: Promoting eBusiness solutions	
Establishment of Enterprise Interoperability Centre (EIC), April 2006	The EIC provides a platform for companies to discuss interoperability issues in their business relationships, with 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 takeup 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 the EU level to address this and proposes two main strands of action: the strengthening of national broadband strategies that should 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 to address the needs of older people, reduce geographical digital divides, enhance eAccessibility, improve digital literacy and promote 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 that provides a European reference tool on key competences, including digital competence, and on access to them through lifelong learning.

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.
Communication on interoperability for pan-European eGovernment services, COM(2006) 45, 13.02.2006	Interoperability in eGovernment requires that the multiple government layers at the 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 reach 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.
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

Action 10: Ageing Well in the Information Society – *flagship initiative in preparation*

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 do not crash any more and traffic congestion is reduced. The Communication presents a policy framework for action, which comprises 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 restart moves to roll-out emergency call (eCall) technology for cars in Europe has been proposed by the Commission. Member States have been given clear actions 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 the installation of these systems safer.

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 as well as digital preservation. The aim is to make two million books, films, photographs, manuscripts, and other cultural works, accessible through the European Digital Library by 2008. This figure will 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 in the area of management of copyright addresses practical problems of dealing with orphan and out of print works and digital preservation.
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 will be 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.

Action 13: ICT for sustainable growth – *flagship initiative in preparation*

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European Commission
Information Society and Media

ICT country profiles

This Commission Staff Working Document is presented as background to the i2010 Annual Information Society Report for 2007 and contains profiles of each Member State and the other countries associated with the i2010 initiative. It complements the analysis and policy proposals of the i2010 Communication and the 2005 Annual Report for 2006. It provides a summary of the latest information society statistics with a view to assisting National policy makers and other stakeholders in monitoring development and identifying strengths and weaknesses. Statistical data is placed in context with a brief summary of ICT priorities in the National Reform Programmes submitted as part of the Lisbon Strategy[51]. (See the i2010 Annual Information Society Report 2007 for a longer discussion of the contribution of ICT to the Lisbon Process).

The main sources of data are the Eurostat Community Surveys of Households and Individuals, and of Enterprises. These were carried out by National Statistical Institutes in the first quarter of 2006. Note that the EU at that time consisted of 25 Member States and reference to the EU in these tables is EU25. Where data is available for EU27 this is specified explicitly. The official statistics from Eurostat are complemented by reports from a series of studies financed by the MODINIS programme. All such reports are available from the i2010 website (http://ec.europa.eu/i2010). A full list of the indicators used and their sources is given below.

Definition of indicators

EU25: Data for EU25 (all variables) refer to 2006 or last available year.

Broadband

Total DSL coverage: the percentage of the total population depending on a Local Exchange equipped with a DSLAM (Digital Subscriber Line Access Multiplexer). Source: *Broadband coverage in Europe* Commission Services[52], (December 2005).

DSL coverage in rural areas: in those areas with a population density lower than 100 inhabitants/km² - Source: *Broadband coverage in Europe* Commission Services[2], (December 2005).

Broadband penetration: total number of broadband subscriptions on 1 October 2006 by platform (DSL, all others) divided by the number of inhabitants. All subscriptions included whether to households, enterprises or public sector; 3G subscriptions are not included. Source: Communications Committee (COCOM) (October 2006).

Predominant speed – The most widely used download rate in each Member State. Source: *Broadband coverage in Europe* Commission Services[52], (December 2005).

Number of 3G subscribers per 100 inhabitants - Source: *Broadband coverage in Europe* Commission Services[52], (January 2006).

Households having broadband as % of all households having access to the Internet - Source: Eurostat, Community Survey of ICT use in households and by individuals, 2006[53].

% of enterprises with broadband access - Source: Eurostat, Community Survey on the ICT use in enterprises[53].

Households with digital Television (free and pay) as a percentage of all television households – Source*: Interactive content and convergence: Implications for the Information Society* Commission Services (2006).[52]

Music: number of single downloads per 100 inhabitants – Source: *Interactive content and convergence: Implications for the Information Society,* Commission Services, (2006).[52]

Internet usage

% of population who are regular Internet users - Regular use is at least once per week. Source: Eurostat, Community Survey of ICT use in households and by individuals, 2006.[53]

% of population using the Internet for specific activities - Activities: sending emails, looking for information about goods and services, Internet phoning/videoconferencing, etc. Source: Eurostat, Community Survey of ICT use in households and by individuals, 2006.[53]

Places of Access

% of individuals who have accessed the Internet in the last three months, by place of access (multiple answers allowed) – At home, at work, at educational place and PIAP. As % of total population 16-74 years old. Source: Eurostat, Community Survey of ICT use in households and by individuals, 2006.[53]

eGovernment indicators

% of basic services fully available online (for households and enterprises) – 'Basic' covers the 20 public services most frequently used by households/citizens (12) and enterprises (8). A service is considered fully online when the publicly accessible website offers the possibility to completely treat the service via the website, including decision and delivery. No other formal procedure is necessary for the applicant via 'paperwork'. Source: *Online Availability of Public Services: How is Europe Progressing?* Commission Services (2006).[52]

% of population using eGovernment services (in the last three months) – Source: Eurostat, Community Survey of ICT use in households and by individuals, 2006.[53]

% of population using eGovernment services for sending filled forms (in the last three months) – Source: Eurostat, Community Survey of ICT use in households and by individuals, 2006.[53]

% of enterprises using eGovernment services (in the last year) – Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[53]

% of enterprises using eGovernment services for sending filled forms (in the last year) – Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[53]

ICT in schools

Number of computers connected per 100 pupils -. Only includes computers at schools available to students for educational purposes. Source*: Benchmarking Access and Use of ICT in European Schools* (*Head teacher Survey*), Commission Services, (2006).[52]

% of schools with broadband access - Source*: Benchmarking Access and Use of ICT in European Schools (Head teacher Survey),* Commission Services, (2006).[52]

51 The European Council of March 2005 re-launched the Lisbon Strategy by focusing on jobs and growth in Europe. Member States outlined their contribution to the strategy with a summary of their economic reform efforts in National Reform Programmes (autumn 2005) which have been updated in Implementation Reports (autumn 2006) and Progress Reports (December 2006), (All are available from: http://ec.europa.eu/growthandjobs/index_en.htm)

52 All Commission Services Reports are available from http://ec.europa.eu/i2010

53 Eurostat surveys available from http://ec.europa.eu/eurostat

% of teachers having used the computer in class during the last 12 months - Source: *Benchmarking Access and Use of ICT in European Schools,* (*Classroom teacher Survey),* Commission Services, (2006). [2]

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. Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[3]

% of enterprises receiving orders/purchasing on the Internet - % of enterprises receiving orders/purchasing on the Internet. Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[3]

eBusiness

% of enterprises with integrated internal business processes – % of enterprises having software applications for managing orders linked to other internal IT application. Source: Eurostat survey on the ICT use by enterprises. Source: Eurostat, Community Survey on the ICT use in enterprises, 2006. [3]

% of enterprises with integrated external business processes – % of enterprises having software applications for managing orders linked to IT systems of customers/suppliers. Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[3]

% of enterprises with secure servers - % of enterprises using a secure protocol, such as SSL (Secure Socket Layer) and TLS (Transport Layer Security), for the reception of orders via Internet. Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[3]

% of enterprises using digital signature for authentication - % of enterprises using a digital signature in any message sent, i.e. using encryption methods that assure the authenticity and integrity of the message. Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[3]

Employment and Skills

% of employees using computers connected to the internet - in their normal work routine, at least once per week – Source: Eurostat, Community Survey on the ICT use in enterprises, 2006.[3]

% of persons employed with ICT user skills - Based on the OECD definition of ICT user (basic + advanced) skills. Source: Commission Services estimation from the Eurostat Labour Force Survey.

% of persons employed with ICT specialist skills - Based on the OECD definition of ICT specialist skills. Source: Commission Services estimation from the Eurostat Labour Force Survey. Skill definitions used:

- *ICT specialists:* they have the ability to develop, operate and maintain ICT systems. ICT 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. ICT 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, ICT are a tool, not the main job.

Indicators on the growth of ICT sector and R&D

Growth of the value added by the ICT producing sector, in real terms (at constant prices) – ICT sector including Postal services. EU-15 instead of EU-25 (not available) Source: Commission Services estimation from the University of Groningen 60 industry database.

ICT sector share on total employment and value added – ICT sector including Postal services. EU-15 instead of EU-25 (not available) Source: Commission Services estimation from the University of Groningen 60 industry database.

Share of ICT related R&D performed by the business sector as % of GDP – DE: not including NACE 64.2 (electronic communication services). DK, FR, PL and UK: 2002 data. Source: Commission Services estimation from the Eurostat/OECD Survey on R&D.

ICT country profiles

1. Austria

ICT on the ground

Austria is close to the EU average for most i2010 indicators.

Broadband take-up among households has caught up, and is now around EU average as is the level of conversion from broadband to narrowband and rural broadband coverage is slightly higher than average. Usage of basic online services is above average with the exception of a very low take-up of multimedia services. Despite average broadband penetration and widespread Internet usage, Austrians consume far less audiovisual online content than the average European.

eGovernment is one of Austria's strengths and the number of public services online is very near to full availability for enterprise services. Usage both among enterprises and citizens does not match supply levels. Broadband connections in schools are slightly above average and the number of connected computers available to students is well above average; teachers are very active users of ICT for teaching purposes.

ICT Skill levels, use of eBusiness and eCommerce applications and Austrian ICT share of GDP and employment is right around the European middle values. The only exception to this pattern is the relatively low use of eSignatures.

ICT policies in the National Reform Programme

There are three priorities related to ICT: further roll out of eGovernment; promotion of eInclusion; and, improvement of broadband infrastructure and penetration. In addition, ICT were a integral to the 2005 health care reform programme:

- **eGovernment:** In 2006, Austria rose from second to first place in the Commission's ranking of member states. Established structures were modified (e.g. IKT-Bund) and new coordination platforms created (e.g. Plattform Digitales Österreich).
- **eGovernment:** In this field, Austria has risen in 2006 from the second to first place in the Commission's ranking of member states. Established structures were modified (e.g. IKT-Bund) and new co-ordination platforms created (e.g. Plattform Digitales Österreich).
- **eInclusion**: Initiatives in this field include programmes for lifelong learning and funding for IT training for seniors.
- **Broadband:** Broadband take-up among households has caught up, and is now around EU average as is the level of conversion from narrowband to broadband and rural broadband coverage is slightly higher than average.
- **eHealth:** The increased use of ICT in health care and health administration was an integral part of the 2005 health care reform programme; a key element was the distribution of an insurance card with an embedded chip. A research programme on assistive technologies to improve the quality of life for the elderly, the disabled and persons in need of care is in an advanced planning phase.

Austria

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	86,2	86	86		87,4	17
DSL coverage in rural areas (as % of total population)			67		65,9	13
Broadband penetration (as % of population)	6,9	9,4	12,4	15,8	15,7	11
DSL penetration (as % of population)	3,0	4,7	7,0	9,5	12,8	12
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)	27,5	35,7	49,6	63,3	62,1	15
% of enterprises with broadband access	48,1	54,8	60,7	69,5	74,5	16
Number of 3G subscribers per 100 inhabitants			7,0		5,0	6
Digital Television in households			15,4		30,6	12
Music: number of single downloads per 100 inhabitants			16,9			
Internet Usage						
% population who are regular internet users	36,3	46,1	48,5	55,0	46,7	12
Take up of internet services (as % of population)						
sending emails	36,1	45,3	47,8	52,6	43,8	11
looking for information about goods and services	26,7	35,7	41,5	47,4	42,9	11
Internet telephoning or videoconferencing	2,8	1,8	3,6	7,4	7,1	16
playing/downloading games and music	11,9	9,9	13,7	15,4	18,2	22
listening to the web radio/watching web tv	4,1	3,2	5,3	6,7	11,8	24
reading online newspapers/magazines	16,1	16,1	20,8	26,4	19,0	11
internet banking	12,5	18,3	22,0	27,2	22,0	12
Places of access						
% at home	30,4	37,2	41,0	46,8	42,6	11
% at work	19,3	24,4	24,7	29,2	23,1	9
% at educational place	4,9	5,3	4,9	6,4	8,0	21
% at PIAP	6,1	4,6	1,6	3,0	6,8	24
eGovernment Indicators						
% basic public services for citizens fully available online	54,5	60,0		70,0	36,8	3
% basic public services for enterprises fully available online	87,5	87,5		100,0	67,8	1,5
% of population using e-Government services	19,5	21,4	29,2	33,0	23,8	7
of which for returning filled in forms	5,4	8,1	12,3	12,1	8,1	9
% of enterprises using e-Government services	81,1	74,3	75,2	81,3	63,7	8
of which for returning filled in forms	42,3	46,5	41,5	53,7	44,8	11
ICT in schools						
Number of computers connected per 100 pupils				14,2	9,9	9
% of schools with broadband access				68,0	67,0	18
% of teachers having used the computer in class during the last 12 months				87,9	74,3	6
e-Commerce						
e-commerce as % of total turnover of enterprises	6,3	6,8	7,0	9,9	11,7	9
% enterprises receiving internet orders	9,0	14,5	13,0	17,6	13,9	9
% enterprises purchasing on the internet		38,4	38,9	51,5	37,9	9
e-business. % enterprises:						
with integrated internal business processes	33,6	32,8	35,1	37,1	37,3	12
with integrated external business processes	13,5	14,8	15,4	17,3	13,5	4
Security: % enterprises using Secure servers	30,4	26,1	27,2	43,2	41,0	9
% using digital signatures for authentication	3,0	2,7	5,8	9,1	14,3	22
Employment and Skills						
% employees using Internet at work	30,5	32,5	35,0	37,7	36,1	10
% of persons employed with ICT user skills.	13,3	19,6	17,9	18,3	18,5	17
% of persons employed with ICT specialist skills	3,8	2,9	3,0	3,0	3,1	12
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	5,2				5,5	12
ICT sector share of total employment	3,7				4,0	14
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

2. Belgium

ICT on the ground

Belgium has maintained its position as one of the best broadband-connected country in Europe, has not matched this with equally high levels of service, usage and skills.

Belgium has almost completed the transition from narrowband to broadband in households, and benefits from competition between infrastructure platforms. Its lead in connectivity is not reflected in high levels of use of online services which is only slightly above the EU average and take-up of other digital media is also slow. Digital television is rare and 3G virtually non-existent. On the positive side, the online music market is dynamic, sales comparably high and prices are low.

For eGovernment services, demand and supply show contrasting tendencies. Good progress has been made in services for enterprises, bringing Belgium up to the European top level, whereas citizen services are less developed. In contrast, use by citizens of available services seems good but enterprise use is below average. ICT-use in schools is about average but slightly below for use by teachers.

Skill levels are on EU average for user level skills but at the bottom end of the scale for ICT specialists. The share of R&D investment in ICT-related R&D is above average.

The use of online services in enterprises is more diverse. Belgian businesses show solid and progressing performance in some areas, like using fully integrated eBusiness systems. However Belgium continues to perform less well in other activities, especially those involving commercial transactions online.

ICT policies in the National Reform Programme

The NRP focuses on stimulating citizens' use of ICT through measures to enhance trust and security and to bridge the digital divide. Recent measures include:

- **eGovernment:** An eID card and corresponding infrastructure were introduced with standards for exchange of information between administrations. Businesses can now be registered electronically through notary offices.

- **eTrust:** An educational website on spam was launched and an online complaint desk for cyber crimes set up. Legislation to create a legal framework for trusted third party services was drafted and a national platform to resolve eCommerce disputes and an educational website are planned.

- **ICT-related R&D**: In the Brussels Region ICT is one of the three focal sectors for R&D support, the Walloon region launched a support programme for ICT in 2006 and Flanders continues support for its strategic research centre for broadband technologies and strives for international excellence in this field.

- **eInclusion:** Adopted measures include an information campaign and website to promote Internet use, a low-price 'Internet for all'-package and a national action plan to bridge the digital divide.

Belgium

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	100	100	100		87,4	2
DSL coverage in rural areas (as % of total population)			100		65,9	2
Broadband penetration (as % of population)	11,0	14,6	18,0	21,8	15,7	5
DSL penetration (as % of population)	6,6	9,0	11,2	13,6	12,8	9
Predominant download speed				2-8Mpbs		1
Households having broadband (as % of those having access to the internet at home)			80,9	89,1	62,1	1
% of enterprises with broadband access	49,4	69,9	77,9	84,5	74,5	7
Number of 3G subscribers per 100 inhabitants			0,1		5,0	17
Digital Television in households			7,3		30,6	18
Music: number of single downloads per 100 inhabitants			33,6			
Internet Usage						
% population who are regular internet users			52,8	58,3	46,7	9
Take up of internet services (as % of population)						
sending emails			48,7	54,4	43,8	9
looking for information about goods and services			43,1	50,6	42,9	10
Internet telephoning or videoconferencing				7,9	7,1	14
playing/downloading games and music			16,8	20,0	18,2	15
listening to the web radio/watching web tv				10,9	11,8	15
reading online newspapers/magazines			12,9	15,8	19,0	22
internet banking			23,4	28,4	22,0	10
Places of access						
% at home			46,8	53,1	42,6	10
% at work			17,6	21,4	23,1	17
% at educational place			4,8	6,3	8,0	22
% at PIAP			3,0	3,0	6,8	25
eGovernment Indicators						
% basic public services for citizens fully available online	16,7	16,7		18,2	36,8	21
% basic public services for enterprises fully available online	62,5	62,5		87,5	67,8	6
% of population using e-Government services			18,2	30,2	23,8	11
of which for returning filled in forms			4,4	7,4	8,1	12
% of enterprises using e-Government services		60,0	61,5	59,3	63,7	20
of which for returning filled in forms	24,7	26,1	33,4	36,6	44,8	21
ICT in schools						
Number of computers connected per 100 pupils				7,7	9,9	17,5
% of schools with broadband access				74,0	67,0	15
% of teachers having used the computer in class during the last 12 months				69,0	74,3	18
e-Commerce						
e-commerce as % of total turnover of enterprises	7,0	6,5	8,8	7,9	11,7	13
% enterprises receiving internet orders	15,5	14,8	11,9	14,6	13,9	12
% enterprises purchasing on the internet		38,7	52,2	43,8	37,9	11
e-business. % enterprises:						
with integrated internal business processes	45,7	50,1	47,4	44,3	37,3	7
with integrated external business processes	12,0	13,8	14,5	17,3	13,5	3
Security: % enterprises using Secure servers	25,8	18,7	29,1	32,7	41,0	15
% using digital signatures for authentication	10,4	16,2	14,6	17,1	14,3	5
Employment and Skills						
% employees using Internet at work	38,7	43,2	45,0	41,1	36,1	8
% of persons employed with ICT user skills.	17,2	17,9	18,9	18,5	18,5	16
% of persons employed with ICT specialist skills	2,1	2,7	2,5	2,4	3,1	23
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	6,7				5,5	6
ICT sector share of total employment	4,4				4,0	9
ICT sector growth (constant prices).	3,0				3,6	8
R&D expenditure in ICT (by the business sector), as % of GDP	0,3				0,3	9
=== as % of total R&D expenditure	22,8				25,7	9

3. Bulgaria

ICT on the ground

Although data on Bulgaria is incomplete, it is clear that it is at a relatively early stage in the development of the information society. However, there are some strengths and signs that Bulgaria is leapfrogging outdated technologies to catch up with its new partners in the EU.

The percentage of population regularly using the Internet in Bulgaria is currently the second lowest in Europe. Current growth levels continue to be amongst the lowest, but prospects are good with the entry of new providers offering broadband through different technologies. Around two thirds of homes with Internet access have broadband, a figure close to the EU average. Usage of Internet services is low, except for online broadcasting, video and telephony services, where levels are closer to EU25 average.

Enterprise use of Internet services is in general at the same low levels as households. User ICT skills among employees and employee use of Internet is very low but the number of ICT specialist-level employees is close to the EU average, although a slight decrease in 2006.

Bulgaria

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)					87,4	
DSL coverage in rural areas (as % of total population)					65,9	
Broadband penetration (as % of population)					15,7	
DSL penetration (as % of population)					12,8	
Predominant download speed						
Households having broadband (as % of those having access to the internet at home)		38,8		59,4	62,1	19
% of enterprises with broadband access		28,4	32,4	56,5	74,5	25
Number of 3G subscribers per 100 inhabitants					5,0	
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users		13,5		21,8	46,7	28
Take up of internet services (as % of population)						
sending emails		13,6		19,4	43,8	27
looking for information about goods and services		8,0		13,5	42,9	28
Internet telephoning or videoconferencing		1,9		7,1	7,1	17
playing/downloading games and music		8,0		11,7	18,2	24
listening to the web radio/watching web tv		6,1		10,6	11,8	17
reading online newspapers/magazines		7,4		11,5	19,0	25
internet banking		0,6		1,3	22,0	28
Places of access						
% at home		6,6		13,6	42,6	28
% at work		6,3		10,1	23,1	28
% at educational place		2,3		3,0	8,0	29
% at PIAP		7,7		5,8	6,8	13
eGovernment Indicators						
% basic public services for citizens fully available online					36,8	
% basic public services for enterprises fully available online					67,8	
% of population using e-Government services		5,4		8,4	23,8	24
of which for returning filled in forms		2,6		2,4	8,1	23
% of enterprises using e-Government services		37,7	32,4	45,9	63,7	24
of which for returning filled in forms		8,7	10,8	22,9	44,8	25
ICT in schools						
Number of computers connected per 100 pupils					9,9	
% of schools with broadband access					67,0	
% of teachers having used the computer in class during the last 12 months					74,3	
e-Commerce						
e-commerce as % of total turnover of enterprises		3,6		0,1	11,7	23
% enterprises receiving internet orders		2,7	2,9	3,5	13,9	23
% enterprises purchasing on the internet		7,3	7,0	6,3	37,9	25
e-business. % enterprises:						
with integrated internal business processes		6,1		6,4	37,3	26
with integrated external business processes		2,1		2,7	13,5	25
Security: % enterprises using Secure servers		11,3	9,1	9,4	41,0	25
% using digital signatures for authentication		5,2	7,4	20,2	14,3	3
Employment and Skills						
% employees using Internet at work		8,8	9,1	14,5	36,1	27
% of persons employed with ICT user skills.	11,3	11,7	11,6	11,5	18,5	26
% of persons employed with ICT specialist skills	2,6	2,7	3,1	2,9	3,1	13
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

4. Cyprus

ICT on the ground

Cyprus has been one of the lowest placed in the ranking of most information society indicators but has recently had growth in connectivity which may be laying the foundations for further development.

Broadband connectivity is DSL-based and is among the lowest in Europe both for enterprises and citizens. However, citizen connectivity has more than doubled in the last year and there has also been an extension of enterprise connectivity and Cyprus is moving up the rankings. Use of services and media by citizen shows a similar development, with entertainment being slightly better performing than basic utility uses. The commercial content market online is undeveloped. 3G and digital TV were not developed at the time of measurement.

Online availability of public services lags behind the rest of the EU. The use of these services by businesses and citizens is also among the lowest in Europe, and especially low for enterprises. Schools have low broadband connectivity but computer use in class by teachers and the number of connected computers available to students is close to EU average. This suggests that in schools availability of broadband might be a more critical issue than the readiness to use ICT in general.

Basic ICT skill levels among employees in Cyprus are around average and slowly improving but expert level skills are among the lowest in Europe. Enterprise use of eBusiness and eCommerce-services is also generally low. However, Cyprus performs closer to EU average in the use of internal business integration systems.

ICT policies in the National Reform Programme

The Progress Report 2006 reports extensively on ICT programmes and notes visible progress in some areas.

- **Infrastructure**: Digital Terrestrial Television is being launched and projects for Fixed Wireless Access and Terrestrial Trunked Radio (TETRA) Networks are under way.

- **eGovernment:** A Government Portal opened in September 2006 and websites for all Ministries and other Offices have been created, 85% of which are available to the public. A web-enabled system for the social insurance has been upgraded.

- **Digital Literacy:** The ICT infrastructure in schools has been improved and teachers are being trained in ICT technologies. The educational curriculum is being reformed to include the use of ICT tools and civil servants are getting ICT training.

A review of the National Information Society Strategy is under way and a policy paper on Network and Information Security has already been prepared. An Action Plan for the deployment of eCommerce is being prepared with special regard to SMEs and recently entrepreneurship incubators were set up to support SMEs.

Cyprus

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)			69,7		87,4	23
DSL coverage in rural areas (as % of total population)			0		65,9	23
Broadband penetration (as % of population)		0,9	3,9	7,4	15,7	22
DSL penetration (as % of population)		0,9	3,8	7,3	12,8	18
Predominant download speed				LE 512kbps		20
Households having broadband (as % of those having access to the internet at home)		4,5	14,2	34,0	62,1	27
% of enterprises with broadband access		35,4	40,0	54,6	74,5	26
Number of 3G subscribers per 100 inhabitants			0,0		5,0	24,5
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants			0,0			
Internet Usage						
% population who are regular internet users		27,7	26,2	29,2	46,7	26
Take up of internet services (as % of population)						
sending emails		24,1	23,3	24,6	43,8	26
looking for information about goods and services		21,4	24,4	26,8	42,9	23
Internet telephoning or videoconferencing		2,8	2,3	4,6	7,1	24
playing/downloading games and music		17,6	15,4	17,3	18,2	18
listening to the web radio/watching web tv		11,5	8,7	9,0	11,8	22
reading online newspapers/magazines		17,2	15,0	19,9	19,0	16
internet banking		4,1	5,7	6,1	22,0	26
Places of access						
% at home		22,2	21,8	23,6	42,6	24
% at work		14,4	14,0	17,2	23,1	22
% at educational place		5,6	4,7	5,3	8,0	24
% at PIAP		6,6	2,5	3,2	6,8	23
eGovernment Indicators						
% basic public services for citizens fully available online		16,7		25,0	36,8	19,5
% basic public services for enterprises fully available online		37,5		50,0	67,8	22
% of population using e-Government services		10,8	11,4	12,7	23,8	22
of which for returning filled in forms		1,4	1,7	3,4	8,1	21
% of enterprises using e-Government services		35,3	39,5	44,3	63,7	26
of which for returning filled in forms		11,0	9,0	8,3	44,8	27
ICT in schools						
Number of computers connected per 100 pupils				8,9	9,9	11,5
% of schools with broadband access				31,0	67,0	25
% of teachers having used the computer in class during the last 12 months				75,0	74,3	12
e-Commerce						
e-commerce as % of total turnover of enterprises			0,2	1,6	11,7	21
% enterprises receiving internet orders		7,1	4,3	6,0	13,9	21
% enterprises purchasing on the internet		26,7	26,7	21,2	37,9	19
e-business. % enterprises:						
with integrated internal business processes		34,8	31,2	40,1	37,3	10
with integrated external business processes		14,9	4,8	10,0	13,5	16
Security: % enterprises using Secure servers		22,8	20,3	17,5	41,0	21
% using digital signatures for authentication		5,2	4,2	3,2	14,3	27
Employment and Skills						
% employees using Internet at work		32,5	30,8	30,6	36,1	17
% of persons employed with ICT user skills.	18,5	17,7	17,7	18,9	18,5	12
% of persons employed with ICT specialist skills	2,6	2,6	2,4	2,4	3,1	22
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

5. The Czech Republic

ICT on the ground

The Czech Republic presents a somewhat divided image of development with above average enterprise connectivity but largely unconnected citizens. However, there are signs that this may be evening out with citizen connectivity growing more rapidly than in comparative countries and enterprise connectivity moving slightly down the rankings.

Broadband penetration in households is among the lowest in Europe but the Czech Republic did jump several places up in the ranking last year with a doubling of connections. The majority of the connections are non-DSL and growth in the different platforms roughly equal. A large element of growth is conversion from narrowband but the latter still makes up more than 40% of connections. If this high conversion rate continues, future broadband growth soon will depend on an increase of the low overall base of Internet users. Use of online services by citizens is low with the exception of. Internet telephony and videoconferencing. Uncertainty over return on investment seems to be the main obstacle to the exploitation and development of audiovisual content online. 3G and Digital TV are beginning to be rolled out.

eGovernment services are less widely available than the EU average with citizen service levels particularly low. Nonetheless, citizens' demand for the basic services available has increased rapidly although still in the lower half of the scale. eGovernment services for enterprises have been given higher priority and availability is higher than for citizen services but still somewhat below EU average. Use of basic public services among enterprises is now well above EU average but use of advanced services is low. Despite low broadband connectivity in schools, use by teachers is good and in the EU top ten. The ratio of computers to pupils is below EU average.

ICT expert skills among employees are close to top European levels but basic ICT skills are somewhat lower than average. Enterprises are significantly more advanced with over half now having broadband connections. Enterprise use is higher than citizen use, and the proportion of enterprises carrying out eCommerce is only marginally less than the EU average. Use of other eBusiness-tools and integration is however low.

ICT policies in the National Reform Programme

- **Broadband:** Broadband and Public Internet Access Points are being set up with the support of EU structural funds. National funding includes 1% of the revenues from the privatisation of Cesky Telecom, the telecom incumbent.

- **eGovernment:** The Public Administration Portal was upgraded, an eHealth project in the Prague region has been launched, and the pilot project 'Tax Portal', enabling online contacts with tax authorities became operational. Work on the electronic single economic register started. A new Act allowing electronic public procurement came into force. The legislative process on the act on data sharing between governmental entities stalled, delaying the development of a fully enabling legal environment for eGovernment.

- **eTrust:** A National Information Security Strategy was adopted in October 2005 and a corresponding implementation Plan submitted to the government, but not yet adopted.

- **Digital Literacy:** The National Computer Literacy Programme is being implemented: financial grants are offered to citizens following courses in the use of computers; schools and libraries are supplied with appropriate equipment.

The Czech Republic

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)			75		87,4	22
DSL coverage in rural areas (as % of total population)					65,9	
Broadband penetration (as % of population)		1,7	5,5	9,6	15,7	18
DSL penetration (as % of population)		0,6	2,5	4,3	12,8	21
Predominant download speed						
Households having broadband (as % of those having access to the internet at home)	10,0	23,0	26,6	56,7	62,1	20
% of enterprises with broadband access	20,1	38,0	52,1	69,3	74,5	17
Number of 3G subscribers per 100 inhabitants			0,0		5,0	21
Digital Television in households			5,2		30,6	21
Music: number of single downloads per 100 inhabitants			0,0			
Internet Usage						
% population who are regular internet users	19,9	24,5	25,7	35,8	46,7	22
Take up of internet services (as % of population)						
sending emails	22,7	27,0	27,0	37,2	43,8	17
looking for information about goods and services	15,3	17,3	19,7	31,7	42,9	20
Internet telephoning or videoconferencing	2,4	5,4	5,5	8,8	7,1	11
playing/downloading games and music	8,6	9,1	8,9	12,5	18,2	23
listening to the web radio/watching web tv	2,5	3,0	2,8	6,5	11,8	25
reading online newspapers/magazines	8,9	10,1	11,6	19,0	19,0	17
internet banking	3,4	4,9	5,2	9,7	22,0	22
Places of access						
% at home	17,0	19,9	19,7	30,9	42,6	19
% at work	12,5	14,2	14,0	19,8	23,1	18
% at educational place	7,1	7,6	6,9	8,6	8,0	15
% at PIAP	4,9	2,8	2,2	3,5	6,8	22
eGovernment Indicators						
% basic public services for citizens fully available online		16,7		8,3	36,8	25
% basic public services for enterprises fully available online		50,0		62,5	67,8	17
% of population using e-Government services		6,7	4,6	17,4	23,8	16
of which for returning filled in forms	0,4	1,4	1,4	3,0	8,1	22
% of enterprises using e-Government services		74,7	78,9	75,6	63,7	12
of which for returning filled in forms	21,8	23,7	31,6	32,4	44,8	22
ICT in schools						
Number of computers connected per 100 pupils				8,2	9,9	16
% of schools with broadband access				63,0	67,0	21,5
% of teachers having used the computer in class during the last 12 months				78,3	74,3	10
e-Commerce						
e-commerce as % of total turnover of enterprises	5,7	5,9	8,4	7,1	11,7	14
% enterprises receiving internet orders	17,4	13,2	15,4	9,0	13,9	17
% enterprises purchasing on the internet		31,2	37,4	26,9	37,9	13
e-business. % enterprises:						
with integrated internal business processes			18,4	27,5	37,3	18
with integrated external business processes			4,2	10,3	13,5	14
Security: % enterprises using Secure servers					41,0	
% using digital signatures for authentication			1,1	9,8	14,3	18
Employment and Skills						
% employees using Internet at work	19,3	23,0	26,4	28,6	36,1	18
% of persons employed with ICT user skills.	15,6	16,5	16,9	17,3	18,5	18
% of persons employed with ICT specialist skills	3,8	3,9	3,9	4,1	3,1	5
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	9,8				5,5	3
ICT sector share of total employment	4,2				4,0	10
ICT sector growth (constant prices).	-0,2				3,6	17
R&D expenditure in ICT (by the business sector), as % of GDP	0,1				0,3	12
=== as % of total R&D expenditure	14,2				25,7	14

6. Germany

ICT on the ground

Germany is a middle-of-the road performer on most information society indicators. Citizens and especially enterprises are active and often advanced users, but factors like slow conversion from dial-up to broadband limit an otherwise high-potential base of users.

Broadband take-up in Germany is around the EU25 average, both for households and enterprises and the market is largely DSL-based. Growth in broadband is good without being exceptional but half of Internet users still have narrowband connections and this must restrict advanced use in an otherwise active user base. Nevertheless, usage of online services is well above EU average but focussed on lower bandwidth and utility services. Media and content use have risen to average levels and the online music market is now the second largest in Europe. Commerce and financial use is doing especially well. Digital TV use is average, while 3G-take up is only beginning.

Formerly, availability of public services was higher than the EU average but progress has been slow and services to citizens now lag behind. Citizens use eGovernment services more than average but enterprise use of these services is low, strikingly so when compared to usage level of other types of electronic services. ICT use in schools is close to the European average but connectivity is low, towards the lower end of the EU ranking. The high levels of ICT used in teaching but low connectivity again suggest willingness to use outstrips infrastructure.

ICT skills levels in Germany are close to EU average. Overall, the share of R&D devoted to ICT is quite low, leaving the ICT-related R&D only at average EU levels. Enterprise use of ICT is where Germany performs best, especially for eCommerce activities. It is behind the top group of countries and last year showed signs of stagnation.

ICT policies in the National Reform Programme

The German NRP focuses on the furthering of eGovernment in order to cut red tape and to make Government more flexible. All NRP-programmes are being implemented.

- **iD 2010:** This programme, initiated in late 2006, combines measures to increase the innovative capacity and competitiveness of the German ICT sector with strategies for e-Government, e-Security, e-Inclusion and the promotion of ICT use in the population.

- **eGovernment**: The 'Deutschland Online' action plan was passed in June 2006 to establish a integrated communications infrastructure to ensure the electronic information exchange between administrations at all levels of Government. The introduction of digital identity cards and digital signatures and the development of e-Identity concepts until 2008 have been announced.

- **ICT-related research**: The federal research programme IKT 2020, which is currently drawn up for implementation from March 2007, aims to further co-operative research among institutions and to better co-ordination in ICT research.

- **Security** related measures in iD 2010 include an implementation programme for the protection of critical IT infrastructure, 'UP KRITIS', to be drafted in early 2007 and plans for an early warning system for ICT- related threats.

- **Regulation:** A law passed in December 2006, which exempts new markets – particularly for advanced broadband infrastructure like VDSL – for an unspecified period from regulation raised regulatory concerns.

Germany

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	86,13	90,66	92		87,4	10,5
DSL coverage in rural areas (as % of total population)			55		65,9	16
Broadband penetration (as % of population)	5,2	7,1	11,5	16,4	15,7	10
DSL penetration (as % of population)	5,1	7,0	11,1	15,7	12,8	7
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)	17,3	30,0	37,7	50,0	62,1	23
% of enterprises with broadband access	41,9	53,6	62,4	73,1	74,5	14
Number of 3G subscribers per 100 inhabitants			2,4		5,0	10
Digital Television in households			28,9		30,6	7
Music: number of single downloads per 100 inhabitants			25,5			
Internet Usage						
% population who are regular internet users	43,9	49,7	54,3	59,3	46,7	8
Take up of internet services (as % of population)						
sending emails	44,3	50,8		60,2	43,8	8
looking for information about goods and services	45,5	52,2		59,9	42,9	8
Internet telephoning or videoconferencing	1,3	2,4		10,4	7,1	9
playing/downloading games and music	12,1	14,6		18,3	18,2	17
listening to the web radio/watching web tv	4,4	7,7		11,8	11,8	14
reading online newspapers/magazines	14,7	14,9		18,9	19,0	18
internet banking	20,7	26,4		31,7	22,0	9
Places of access						
% at home	45,2	52,3	56,9	60,6	42,6	8
% at work	16,1	18,4	20,2	27,3	23,1	12
% at educational place	7,2	8,6	9,0	8,2	8,0	16
% at PIAP	10,8	16,2	5,4	6,3	6,8	12
eGovernment Indicators						
% basic public services for citizens fully available online	16,7	27,3		27,3	36,8	18
% basic public services for enterprises fully available online	75,0	75,0		75,0	67,8	12
% of population using e-Government services	26,3	33,4		32,3	23,8	8
of which for returning filled in forms	6,7	6,9		9,4	8,1	11
% of enterprises using e-Government services	35,4	36,3	43,6	49,0	63,7	23
of which for returning filled in forms	13,9	16,8	24,4	37,1	44,8	20
ICT in schools						
Number of computers connected per 100 pupils				7,7	9,9	17,5
% of schools with broadband access				63,0	67,0	21,5
% of teachers having used the computer in class during the last 12 months				78,0	74,3	11
e-Commerce						
e-commerce as % of total turnover of enterprises		11,3	13,0	13,9	11,7	7
% enterprises receiving internet orders	7,5	16,3	16,7	18,9	13,9	7
% enterprises purchasing on the internet		50,7	53,7	54,1	37,9	8
e-business. % enterprises:						
with integrated internal business processes		38,4	42,8	43,7	37,3	8
with integrated external business processes		13,9	16,3	16,8	13,5	5
Security: % enterprises using Secure servers	47,3	44,8	41,8	44,8	41,0	7
% using digital signatures for authentication	10,7	13,5	10,2	13,5	14,3	8
Employment and Skills						
% employees using Internet at work	29,3	29,0	39,8	39,1	36,1	9
% of persons employed with ICT user skills.	18,8	18,7	19,1	18,8	18,5	15
% of persons employed with ICT specialist skills	3,1	3,0	3,2	3,4	3,1	7
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	5,2				5,5	13
ICT sector share of total employment	4,0				4,0	12
ICT sector growth (constant prices).	2,3				3,6	13
R&D expenditure in ICT (by the business sector), as % of GDP	0,3				0,3	7
=== as % of total R&D expenditure	18,2				25,7	11

7. Denmark

ICT on the ground

Denmark is among the top nations in most i2010 indicators and is a clear leader in developing the information society. However, other countries have been catching up in several areas.

There is continued rapid growth in broadband and Denmark is currently one of the most connected countries in the EU. One fifth of the households are still on narrowband which may limit future growth from conversions. DSL is less dominant than in the rest of the EU. Enterprise connectivity is not fully on par with household levels, but still solid. Danish citizens are also among the most active users in the EU of online services. Use of online media has grown from last year's EU average figures towards the leading group of nations. The commercial market for online content does not fully reflect the very high broadband penetration and high consumption of audiovisual online content.

eGovernment is on a high level both for supply and demand, but other countries have improved more during the last year, pushing Denmark out of the absolute top league of countries. The exception to this is enterprise usage, which remains very high. ICT-deployment in schools is the highest in the Europe, both in connectivity and usage.

The Danish work force is among the most skilled in Europe and is given freedom to use flexible work forms through ICT tools. Danish businesses are overall the most advanced Internet and eBusiness users in the EU, but growth is slowing. R&D-levels are in the top bracket but significantly behind Sweden and Finland. Focus on IT within R&D is among the highest in Europe.

ICT policies in the National Reform Programme

The Progress Report emphasises the need to move from basic to advanced use of ICT and stresses four areas of activities:

- **eGovernment:** the overriding goal is to ensure interoperability of ICT systems. An advanced Internet portal has been introduced as well as web-based guides for consumers. In government, a new model for the management of ICT is being introduced, common standards for data exchange and interfaces are being developed, and digitisation of working procedures continues. Municipal reform is conducted in connection to the reform of ICT systems.

- **ICT market:** the aim is to increase its efficiency through market mechanisms. The review of the EU regulatory framework for electronic communications will contribute to this and Denmark has conducted a survey of its own market players. Other measures include: modernisation of spectrum rules, the creation of a new national software knowledge centre and the establishment of framework conditions for digital TV and digital content.

- **eInclusion** is promoted through several initiatives: easier access to public digital services due to wider use of electronic signature, various eLearning projects, an awareness campaign on IT security, etc.

- **Innovation through ICT** is to be achieved through easier access to expert knowledge regarding eBusiness for enterprises, increased cooperation between enterprises and knowledge institutions through the Danish Regional ICT Initiative and increased efforts in ICT research.

Denmark

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	95	100	100		87,4	2
DSL coverage in rural areas (as % of total population)			100		65,9	2
Broadband penetration (as % of population)	11,2	16,3	22,5	29,4	15,7	2
DSL penetration (as % of population)	7,8	11,0	14,2	18,1	12,8	3
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)	39,1	51,6	68,3	80,3	62,1	6
% of enterprises with broadband access	69,0	79,8	82,5	82,7	74,5	8
Number of 3G subscribers per 100 inhabitants			28,4		5,0	1
Digital Television in households			18,6		30,6	11
Music: number of single downloads per 100 inhabitants			17,6			
Internet Usage						
% population who are regular internet users	64,0	69,6	73,2	78,1	46,7	3
Take up of internet services (as % of population)						
sending emails	60,8	64,8	69,3	74,2	43,8	3
looking for information about goods and services	53,3	58,9	62,6	67,8	42,9	5
Internet telephoning or videoconferencing	3,9	5,7	8,8	13,1	7,1	7
playing/downloading games and music	16,7	18,6	20,9	26,3	18,2	8
listening to the web radio/watching web tv	12,0	16,1	19,1	27,0	11,8	5
reading online newspapers/magazines	32,1	35,7	38,4	46,4	19,0	4
internet banking	37,5	44,9	48,7	57,2	22,0	5
Places of access						
% at home	62,6	67,8	71,9	77,1	42,6	3
% at work	35,0	41,1	37,3	46,5	23,1	3
% at educational place	10,6	11,9	11,0	14,3	8,0	3
% at PIAP	9,9	13,1	5,7	8,8	6,8	8
eGovernment Indicators						
% basic public services for citizens fully available online	54,5	33,3		41,7	36,8	11,5
% basic public services for enterprises fully available online	87,5	87,5		87,5	67,8	6
% of population using e-Government services	40,1	43,8		43,2	23,8	6
of which for returning filled in forms	13,7	13,9		16,9	8,1	6
% of enterprises using e-Government services	74,7	84,6	86,9	87,3	63,7	3
of which for returning filled in forms	34,9		56,4	55,1	44,8	9
ICT in schools						
Number of computers connected per 100 pupils				26,3	9,9	1
% of schools with broadband access				95,0	67,0	2
% of teachers having used the computer in class during the last 12 months				94,6	74,3	2
e-Commerce						
e-commerce as % of total turnover of enterprises	7,5	12,2		17,5	11,7	1
% enterprises receiving internet orders	13,2	26,5	34,7	35,1	13,9	1
% enterprises purchasing on the internet		57,8	63,8	59,3	37,9	5
e-business. % enterprises:						
with integrated internal business processes	35,4	35,8	62,2	63,4	37,3	1
with integrated external business processes	11,8	10,5	22,6	24,0	13,5	1
Security: % enterprises using Secure servers	29,0	32,2	54,7	58,9	41,0	3
% using digital signatures for authentication	12,5		10,0	12,5	14,3	10
Employment and Skills						
% employees using Internet at work	55,8	53,4	54,0	61,4	36,1	1
% of persons employed with ICT user skills.	22,9	22,6	23,2	23,0	18,5	2
% of persons employed with ICT specialist skills	4,2	4,0	3,5	3,9	3,1	6
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	4,8				5,5	16
ICT sector share of total employment	4,4				4,0	8
ICT sector growth (constant prices).	3,6				3,6	5
R&D expenditure in ICT (by the business sector), as % of GDP	0,5				0,3	3
=== as % of total R&D expenditure	31,5				25,7	5

8. Estonia

ICT on the ground

Estonia has well advanced infrastructures and usage and in many respects is at the top level in the EU ranking. It does have some weaknesses but it is by far the most advanced of all new Member States from the enlargements of 2004 and 2007.

The number of households and enterprises with broadband access is above EU average and while others have overtaken it in the past year, its growth is still relatively high. The broadband-to-narrowband ratio is high with significant competition between alternative platforms. Use of Internet services among the citizens is above EU average, and for content, media, reading online newspapers and Internet phone services they are amongst the highest in Europe. The country's above average broadband penetration and the citizens' strong usage of audiovisual content online do not however seem to translate into a local commercial market for digital content – possibly due to the market's limited size. 3G and digital TV have not yet developed.

eGovernment has developed very quickly in Estonia, both in terms of supply and use. The government reached full saturation for enterprises with all services available for full transactions and is high for citizen services. On overall usage by citizens and enterprises, some countries have developed faster than Estonia during the last year, pushing its levels closer to the average. For advanced usage Estonian is still close to the top European league. Schools are top performing for broadband connectivity but the number of PCs per student and use of computers in class are lacking.

Skill levels have dropped from slightly above to slightly below EU average levels, perhaps reflecting work migration patterns. ICT-use among enterprises is behind citizen usage, and below EU average. However, there is now progress for enterprise use on several areas.

ICT policies in the National Reform Programme

The Estonian NRP singles out the formation of a knowledge society as one of its strategic goals. Special emphasis is put on the widespread attainment of ICT-skills and 2006 saw the successful implementation of measures in this and other fields:

- **ICT-Skills and eLearning**: the E-learning Development Plan for General Education 2006-2009 was approved and is being implemented. The objective is to strengthen ICT skills in general education and vocational training.

- **eGovernment:** Great attention is devoted to improving conditions for businesses through ICT: business registration and notary services are electronic. Citizens also profit from an expanding range of online government services: in 2006 Estonians could vote electronically for the first time in local elections, in 2007 electronic voting will be used for the general elections.

- The newly formulated **Estonian Information Society Development Plan 2007-2014** is focused on three goals: Economic growth should be ICT-driven, all citizens should have access to ICT and ICT should be used to increase the efficiency of the public sector.

Estonia

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)			90		87,4	13
DSL coverage in rural areas (as % of total population)					65,9	
Broadband penetration (as % of population)		8,6	12,1	17,2	15,7	9
DSL penetration (as % of population)		4,2	5,8	8,4	12,8	15
Predominant download speed						
Households having broadband (as % of those having access to the internet at home)		66,0	76,8	80,3	62,1	7
% of enterprises with broadband access		67,7	66,6	75,7	74,5	12
Number of 3G subscribers per 100 inhabitants			0,1		5,0	18
Digital Television in households			8,5		30,6	16
Music: number of single downloads per 100 inhabitants			0,0			
Internet Usage						
% population who are regular internet users		44,7	53,6	56,3	46,7	11
Take up of internet services (as % of population)						
sending emails		38,8	48,8	49,4	43,8	12
looking for information about goods and services		32,3	41,1	44,3	42,9	12
Internet telephoning or videoconferencing			10,2	14,3	7,1	3
playing/downloading games and music		19,6	24,5	27,9	18,2	6
listening to the web radio/watching web tv		13,3	15,0	16,5	11,8	10
reading online newspapers/magazines		37,9	45,6	50,3	19,0	3
internet banking		35,0	44,6	48,2	22,0	7
Places of access						
% at home		32,2	40,3	46,0	42,6	12
% at work		20,5	19,7	27,6	23,1	11
% at educational place		12,4	7,5	11,3	8,0	9
% at PIAP		14,5	3,2	3,7	6,8	20
eGovernment Indicators						
% basic public services for citizens fully available online		36,4		63,6	36,8	4,5
% basic public services for enterprises fully available online		100,0		100,0	67,8	1,5
% of population using e-Government services		20,3	31,1	28,6	23,8	12
of which for returning filled in forms		13,1	16,6	17,1	8,1	5
% of enterprises using e-Government services		83,9	69,9	69,1	63,7	16
of which for returning filled in forms		54,3	49,9	54,4	44,8	10
ICT in schools						
Number of computers connected per 100 pupils				7,2	9,9	20
% of schools with broadband access				95,0	67,0	2
% of teachers having used the computer in class during the last 12 months				59,7	74,3	23
e-Commerce						
e-commerce as % of total turnover of enterprises		2,8	2,0		11,7	
% enterprises receiving internet orders		8,7	7,2	14,4	13,9	13
% enterprises purchasing on the internet		31,0	23,3	25,0	37,9	15
e-business. % enterprises:						
with integrated internal business processes		27,7	24,6	23,8	37,3	19
with integrated external business processes		4,9	4,5	8,9	13,5	19
Security: % enterprises using Secure servers		14,5	20,5	22,7	41,0	18
% using digital signatures for authentication		5,3	9,0	10,9	14,3	13
Employment and Skills						
% employees using Internet at work		26,9	38,4	33,3	36,1	15
% of persons employed with ICT user skills.	17,0	17,2	19,4	17,1	18,5	19
% of persons employed with ICT specialist skills	2,3	2,4	2,6	2,6	3,1	20
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

9. Ireland

ICT on the ground

Ireland provides a mixed image of its information society development, showing first-class commercial use despite a general low level of connectivity. It is in a small group of countries which use Internet well for business without having a highly developed citizen base.

The citizen and enterprise uptake of broadband used to be low, but is now improving but broadband take-up is still well below EU average and connectivity is still highly focussed on narrowband. Online service use among citizens in Ireland reflects the slow connection rates: Use of basic service is on average levels while use of more bandwidth-requiring services is low. Despite this, Irish citizens are very active consumers of online commercial music.

eGovernment availability is around the EU average and better for enterprise services. Citizen use has grown well, and for advanced services it is on a quite high level. Enterprise use is now close to the top five in Europe. Access to ICT in school is average, whereas actual use of ICT in class for teaching is good, although not up to the level of the very best countries.

User skill levels among employees are close to EU average, but lower than average for expert skills. R&D-spending in Ireland is low but it is very ICT-dominated: Ireland belongs to the upper European league of ICT-related R&D measured as a percentage of GDP, although still spending less than half of top-performers Finland and Sweden. Enterprise use of Internet services is good. General use of eBusiness tools is close to EU average, whereas the level of commercial transactions online is among the highest in Europe. Percentage of enterprise income coming from eCommerce is one of the highest in Europe and Irish companies are amongst the highest for online purchases as well as sales.

ICT policies in the National Reform Programme

The Progress Report gives account on a number of ICT measures being implemented and their results.

- **eInclusion:** Ireland implemented a set of measures supporting late adopters of ICT with a budget of €1.5 million. In 2005, 49 projects targeting older people and the disabled were conducted. In 2006, 76 projects were approved for funding under the Access, Skills and Content Initiative from a total fund of €1.45 million.
- **Digital Skills:** A joint Government/industry initiative to provide broadband Internet access to schools is being implemented.
- **eBusiness:** The implementation measures of the National eBusiness strategy were approved in April 2006.
- **Broadband penetration** rates almost doubled in 2005 thanks to increasing connectivity among households and SMEs. The policy in this area aims at increasing competition and freedom of choice for consumers by addressing market failures through regulatory and investments interventions. A regional programme that addresses infrastructure deficits by building high-speed open access networks is being implemented in co-operation with local and regional authorities: 27 Metropolitan Area Networks have been completed and 90 towns will be covered during the second phase. In addition, the 'Group Broadband Scheme' targets small towns and rural communities of less than 1500 people. The Group Broadband Scheme is being superseded by the National Broadband Scheme which, when fully implemented, will ensure that all reasonable requests for broadband from houses and premises in rural areas are met.

Ireland was also preparing a Knowledge Society Action Plan to be published in mid-2007. This plan is in line with the i2010 strategy and aims at promoting the use of ICT by government, businesses, citizens and the non-profit sector.

Ireland

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)			82,3		87,4	20
DSL coverage in rural areas (as % of total population)			56,5		65,9	15
Broadband penetration (as % of population)	0,5	2,5	5,3	10,3	15,7	17
DSL penetration (as % of population)	0,3	2,1	4,1	7,6	12,8	17
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)	1,7	7,3	15,7	26,2	62,1	28
% of enterprises with broadband access	18,9	31,5	47,6	60,7	74,5	21
Number of 3G subscribers per 100 inhabitants			5,9		5,0	8
Digital Television in households			54,8		30,6	2
Music: number of single downloads per 100 inhabitants			23,0			
Internet Usage						
% population who are regular internet users	24,8	27,3	30,8	43,6	46,7	15
Take up of internet services (as % of population)						
sending emails	25,1	27,3	31,0	44,7	43,8	13
looking for information about goods and services	21,1	22,0	29,1	42,1	42,9	13
Internet telephoning or videoconferencing	2,1	2,0	2,9	5,8	7,1	21
playing/downloading games and music	4,3	4,8	6,2	11,2	18,2	25
listening to the web radio/watching web tv	2,5	2,6	4,0	9,1	11,8	21
reading online newspapers/magazines	4,9	5,3	4,1	7,7	19,0	27
internet banking	8,1	10,5	12,7	20,6	22,0	14
Places of access						
% at home	20,7	22,5	25,7	35,8	42,6	14
% at work	13,0	14,6	17,1	22,9	23,1	14
% at educational place	3,8	4,8	3,9	7,3	8,0	19
% at PIAP	3,4	2,7	2,9	3,6	6,8	21
eGovernment Indicators						
% basic public services for citizens fully available online	50,0	30,0		30,0	36,8	17
% basic public services for enterprises fully available online	62,5	75,0		75,0	67,8	12
% of population using e-Government services		14,1	17,6	25,7	23,8	13
of which for returning filled in forms	4,9	6,3	9,2	14,3	8,1	8
% of enterprises using e-Government services		69,3	76,1	84,4	63,7	6
of which for returning filled in forms	24,5	32,4	41,6	56,5	44,8	6
ICT in schools						
Number of computers connected per 100 pupils				8,7	9,9	13
% of schools with broadband access				66,0	67,0	20
% of teachers having used the computer in class during the last 12 months				81,7	74,3	8
e-Commerce						
e-commerce as % of total turnover of enterprises	16,6	18,3	20,2	16,7	11,7	4
% enterprises receiving internet orders	11,0	21,8	22,2	23,4	13,9	6
% enterprises purchasing on the internet		47,5	53,2	56,1	37,9	6
e-business. % enterprises:						
with integrated internal business processes	32,0	28,7	29,9	35,3	37,3	13
with integrated external business processes	16,7	13,8	13,2	14,4	13,5	9
Security: % enterprises using Secure servers	32,4	35,5	42,5	59,3	41,0	1
% using digital signatures for authentication		8,5	9,5	12,2	14,3	11
Employment and Skills						
% employees using Internet at work	24,1	31,1	34,6	36,6	36,1	11
% of persons employed with ICT user skills.	18,0	19,4	18,8	18,9	18,5	14
% of persons employed with ICT specialist skills	2,9	2,8	2,6	2,5	3,1	21
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	12,4				5,5	1
ICT sector share of total employment	6,2				4,0	1
ICT sector growth (constant prices).	12,6				3,6	1
R&D expenditure in ICT (by the business sector), as % of GDP	0,4				0,3	5
=== as % of total R&D expenditure	47,6				25,7	2

10. Greece

ICT on the ground

Information society in Greece is still developing slowly and on most indicators Greece is close to the bottom of the EU ranking. There are signs of increasing gaps compared to other EU countries.

Broadband take-up is among the lowest of the measured countries, and the slight growth last year is not enough to compensate for an increasing gap. Narrowband is more common but still not widespread. Use of Internet among citizens is accordingly among the lowest in Europe in most regards, although not always as far behind average as connection levels. 3G and digital TV are still in infancy, and although still well behind average levels, they are the areas where Greece shows the best progress.

eGovernment service availability is below the European average and has not improved, leading to an even lower ranking than in earlier years. eGovernment use is very low among citizens. Broadband access in schools is by far the lowest in Europe, teachers use computers very little for teaching. The number of connected PCs in schools is very low.

ICT skill levels among employees in Greece are among the lowest in Europe.

ICT policies in the National Reform Programme

Acknowledging the gaps in information society, the Greek authorities made the Knowledge Society a priority in the 2005–2008 National Reform Programme. The implementation report marks progress towards the development of the knowledge society. While most of the announced measures are being implemented, many are still at a relatively early stage. Key measures in 2006 included:

- **New Digital Strategy:** A comprehensive strategy to spread the use of ICT and broadband - areas, where Greece lags behind was launched at the end of 2005. Its first results seem positive and include a narrowing of the broadband gap with the objectives of increasing take-up to achieve 7% of population by 2007 and the development of eGovernment services.
- **Regulation:** The transposition of the regulatory framework for electronic communications into national law has been completed, but secondary legislation still needs to be adopted.
- **Education:** Programmes to train all teachers in ICT and to establish distance learning programmes are under way.

Greece

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	2	9	12		87,4	27
DSL coverage in rural areas (as % of total population)			0		65,9	23
Broadband penetration (as % of population)	0,1	0,3	1,0	3,3	15,7	25
DSL penetration (as % of population)	0,0	0,3	1,0	3,3	12,8	24
Predominant download speed				LE 512kbps		20
Households having broadband (as % of those having access to the internet at home)	3,6	1,4	2,9	16,6	62,1	29
% of enterprises with broadband access	13,0	20,6	44,3	57,7	74,5	23
Number of 3G subscribers per 100 inhabitants			1,0		5,0	16
Digital Television in households			10,8		30,6	15
Music: number of single downloads per 100 inhabitants			2,0			
Internet Usage						
% population who are regular internet users	14,3	17,3	18,3	22,7	46,7	27
Take up of internet services (as % of population)						
sending emails	12,4	15,4	13,9	16,9	43,8	28
looking for information about goods and services	11,4	13,6	16,7	22,8	42,9	27
Internet telephoning or videoconferencing	1,1	1,1	0,7	1,8	7,1	29
playing/downloading games and music	7,2	10,9	8,5	11,2	18,2	26
listening to the web radio/watching web tv	3,0	4,3	3,8	5,4	11,8	26
reading online newspapers/magazines	8,9	11,3	9,0	13,9	19,0	23
internet banking	1,3	1,3	1,4	2,5	22,0	27
Places of access						
% at home	10,3	11,8	14,3	18,0	42,6	27
% at work	7,2	8,9	9,8	12,2	23,1	27
% at educational place	3,2	4,2	3,7	4,2	8,0	27
% at PIAP	3,3	2,7	2,6	4,3	6,8	19
eGovernment Indicators						
% basic public services for citizens fully available online	18,2	18,2		16,7	36,8	22
% basic public services for enterprises fully available online	50,0	50,0		50,0	67,8	22
% of population using e-Government services		8,0	7,1	8,6	23,8	23
of which for returning filled in forms	2,8	2,4	3,2	2,1	8,1	24
% of enterprises using e-Government services		77,2	81,3	84,5	63,7	5
of which for returning filled in forms	56,6	44,9	55,7	76,3	44,8	3
ICT in schools						
Number of computers connected per 100 pupils				5,9	9,9	22
% of schools with broadband access				13,0	67,0	27
% of teachers having used the computer in class during the last 12 months				35,6	74,3	26
e-Commerce						
e-commerce as % of total turnover of enterprises	0,9	1,6	2,1	2,8	11,7	19
% enterprises receiving internet orders	6,3	5,4	6,1	7,7	13,9	19
% enterprises purchasing on the internet		13,4	13,9	14,3	37,9	22
e-business. % enterprises:						
with integrated internal business processes	42,1	39,1	49,8	56,7	37,3	3
with integrated external business processes	12,4	9,0	19,2	15,4	13,5	7
Security: % enterprises using Secure servers	46,8	43,6	43,8	35,8	41,0	14
% using digital signatures for authentication	5,9	4,0	7,4	8,8	14,3	23
Employment and Skills						
% employees using Internet at work	28,4	21,2	25,8	25,6	36,1	22
% of persons employed with ICT user skills.	11,7	12,1	12,1	12,9	18,5	24
% of persons employed with ICT specialist skills	2,2	2,4	2,2	2,1	3,1	26
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	3,4				5,5	19
ICT sector share of total employment	1,7				4,0	18
ICT sector growth (constant prices).	5,3				3,6	3
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

11. Spain

ICT on the ground

Spain in general performs slightly below European average, and is progressing slowly towards the information society. It is being outpaced in several areas but also has some strong points, notably in business connectivity and take-up.

Broadband is widely available and coverage of rural areas well above average but the number of households taking up broadband is slightly below EU average. DSL is the dominant platform. The proportion of narrowband users is quite low, and the rate for conversion into broadband is well above EU average. Citizen usage of online services is below the EU average but a little lower than might be expected from connectivity levels. The exception is in content use with high popularity of music and games downloads, nonetheless the market for digital content has not yet lived up to its potential. Growth in Spain is steady, but other countries are growing faster, lowering Spain's relative rank in several indicators. Spanish citizens are still among the most active users of Internet outside their own home or work place, especially at public access points. Spain does well in uptake of digital television and 3G though the latter is still in its infancy.

eGovernment is an area where Spain has performed well, but is now being outpaced: Supply of enterprise services is only just behind the leading countries, but supply of citizen services has now fallen below average. Usage of eGovernment services has also grown slower than in many other countries, and is now slightly below average. Schools are widely connected to broadband but the number of computers available to students and actual use for teaching are not on the same levels.

ICT skill levels among employees are below EU average. ICT-related R&D as a proportion of GDP is only a third of EU average and the share of ICT-related R&D is low. Enterprises are mostly connected and Spain is close to the top level on broadband take-up for enterprises. In eCommerce and eBusiness usage Spanish enterprises are below the EU25 average and particularly low for online commerce-related activities. However, growth in enterprise usage of ICT has improved Spain's general position.

ICT policies in the National Reform Programme

To spur developments in Information Society, Spain is implementing the 'Plan Avanz@'. The Progress Report highlights a number of actions:

- **eGovernment:** Programmes being implemented include one-stop shops for enterprises and citizens, the introduction of an electronic identity card and an 'eHealth' programme for the National Health Care System.
- **Significant legislation** includes laws that enable public procurement of advanced technologies, issuing of electronic invoices by public administrations and the exchange of research personnel between Universities and industry over a five year period.
- **Digital skills** are fostered through the 'organic law for education'. Its actions include promoting Internet access in the classrooms and giving ICT training to up to 5 million pupils.
- **Broadband gap**: The Government aims to provide all population centres of more than 250 people with broadband access by the end of 2007 also through EU Structural Funds.
- **Innovation in the economy** is supported through funds from 'Plan Avanz@' for ICT adoption by SMEs, evaluation and monitoring systems to support participation in the 7th Framework Programme for Research and funds for research and cooperation in research.
- **Coordination:** all actions foresee extensive coordination with the autonomous regions through a number of territorial agreements made with the respective administrations. A number of helpdesks provide assistance to enterprises and government bodies.

Spain

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	85	87	89		87,4	14
DSL coverage in rural areas (as % of total population)			82		65,9	8
Broadband penetration (as % of population)	4,6	7,0	10,5	13,9	15,7	12
DSL penetration (as % of population)	3,4	5,3	8,1	11,0	12,8	11
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)		44,7	58,4	75,0	62,1	9
% of enterprises with broadband access	50,7	71,6	76,2	87,1	74,5	4
Number of 3G subscribers per 100 inhabitants			2,3		5,0	12
Digital Television in households			27,8		30,6	8
Music: number of single downloads per 100 inhabitants			7,0			
Internet Usage						
% population who are regular internet users	29,5	31,4	35,1	39,5	46,7	18
Take up of internet services (as % of population)						
sending emails	29,1	30,6	33,8	36,7	43,8	19
looking for information about goods and services	30,0	29,7	33,1	37,9	42,9	15
Internet telephoning or videoconferencing	3,0	2,9	3,6	6,3	7,1	20
playing/downloading games and music	17,5	19,4	20,4	23,0	18,2	12
listening to the web radio/watching web tv			24,3		11,8	
reading online newspapers/magazines	18,4	21,1			19,0	
internet banking	9,9	12,0	13,6	15,1	22,0	18
Places of access						
% at home	22,0	25,6	28,2	32,6	42,6	16
% at work	15,5	17,9	20,3	22,0	23,1	15
% at educational place	7,2	7,6	8,3	7,0	8,0	20
% at PIAP	10,4	8,2	10,6	10,1	6,8	5
eGovernment Indicators						
% basic public services for citizens fully available online	33,3	33,3		33,3	36,8	16
% basic public services for enterprises fully available online	75,0	87,5		87,5	67,8	6
% of population using e-Government services				24,7	23,8	15
of which for returning filled in forms	5,7	6,7	6,0	7,0	8,1	14
% of enterprises using e-Government services	43,5	50,4	55,2	58,1	63,7	21
of which for returning filled in forms	25,5	32,3	34,7	38,0	44,8	18
ICT in schools						
Number of computers connected per 100 pupils				8,5	9,9	15
% of schools with broadband access				81,0	67,0	10
% of teachers having used the computer in class during the last 12 months				68,2	74,3	19
e-Commerce						
e-commerce as % of total turnover of enterprises	2,1	2,9	2,7	6,9	11,7	16
% enterprises receiving internet orders	0,8	1,7	2,0	8,0	13,9	18
% enterprises purchasing on the internet		8,9	9,9	16,1	37,9	21
e-business. % enterprises:						
with integrated internal business processes	36,0	13,5	25,5	32,0	37,3	15
with integrated external business processes	8,4	5,0	7,8	12,5	13,5	12
Security: % enterprises using Secure servers	20,2	46,2	32,9	40,7	41,0	11
% using digital signatures for authentication	20,9	24,6	19,2	10,6	14,3	15
Employment and Skills						
% employees using Internet at work	27,3	29,0	33,5	35,3	36,1	13
% of persons employed with ICT user skills.	15,3	15,7	15,6	15,7	18,5	21
% of persons employed with ICT specialist skills	2,4	2,7	2,6	2,7	3,1	16
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	4,5				5,5	17
ICT sector share of total employment	2,3				4,0	17
ICT sector growth (constant prices).	3,3				3,6	7
R&D expenditure in ICT (by the business sector), as % of GDP	0,1				0,3	13
=== as % of total R&D expenditure	14,1				25,7	15

12. Finland

ICT on the ground

Finland is among the top nations for most i2010 indicators and is among the leading information society countries in Europe.

In connectivity, Finland shows continued growth and is now among the top three EU countries. Reflecting an overall high Internet usage, conversion from slower lines is still continuing. DSL dominates the market. Notably, Finland sports Europe's highest usage of public access points, reflecting a trend that the countries with the most citizens online in general are also the most active users of public access points. Finnish citizens are active users of online services. Perhaps reflecting increased take-up of broadband, multimedia and content use has also increased and Finland now performs better here than in utility use. Very high broadband penetration furthermore supports a competitive market for online music with very high usage and very low prices – despite the market's limited size and the absence of a major music industry. Commercial music downloads have the highest measured level in Europe. Digital television is well developed, whereas 3G is still in infancy.

eGovernment service levels for enterprises have fallen significantly behind the best performing countries, but enterprise use is now the second highest in the EU. Both citizen service levels and use among citizens are high compared with other countries. ICT availability and use in schools are very good, without reaching the absolute top European league.

The Finnish work force is among the most skilled in Europe, both at user and expert level. Finland's investments in ICT-related R&D measured against GDP are unrivalled in Europe, and ICTs' share of overall R&D investments is also the highest. Enterprise connectivity is the second highest in Europe, and eBusiness and eCommerce use is good without being exceptional. Note that some of this year's business figures for Finland are not directly comparable to previous years' figures.

ICT policies in the National Reform Programme

ICT are an important part of the Finnish National Reform Programme, whose implementation in 2006 has born positive results:

- **Infrastructure:** Preparations for the digital switchover is in a very advanced stage and in 2007 Finland will fully switch to digital television. The broadband strategy has yielded results in the form of high penetration rates, intensive network competition, wide services availability and comparatively low prices

- **IT-Security**: An IT security strategy is being implemented with the objective to bolster confidence in electronic services among the citizens and businesses. The regulator's resources for promoting data security would be doubled in 2007.

- **Research and Skills**: In June 2006 a national strategy on technology clusters of excellence was adopted, with one cluster dedicated to ICT industries and services. To promote digital skills IT training for adults with basic-level education is organized within the 'Noste' programme.

Finland

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	87,6	89,35	90,4		87,4	12
DSL coverage in rural areas (as % of total population)			78		65,9	11
Broadband penetration (as % of population)	6,4	12,4	20,3	26,0	15,7	3
DSL penetration (as % of population)	5,2	9,0	16,0	21,1	12,8	1
Predominant download speed				LE 512kbps		20
Households having broadband (as % of those having access to the internet at home)	26,1	41,8	66,7	81,7	62,1	5
% of enterprises with broadband access	65,2	70,9	81,1	88,9	74,5	2
Number of 3G subscribers per 100 inhabitants			1,5		5,0	13
Digital Television in households			42,9		30,6	4
Music: number of single downloads per 100 inhabitants			48,4			
Internet Usage						
% population who are regular internet users	58,1	63,2	62,2	71,2	46,7	6
Take up of internet services (as % of population)						
sending emails	54,8	61,9	62,7	67,4	43,8	6
looking for information about goods and services	53,1	58,8	62,5	67,2	42,9	6
Internet telephoning or videoconferencing	2,3	5,3	9,7	14,2	7,1	4
playing/downloading games and music	25,0	37,9	22,2	33,5	18,2	5
listening to the web radio/watching web tv	9,6	11,9	16,7	20,2	11,8	7
reading online newspapers/magazines	32,2	36,6	40,8	46,3	19,0	5
internet banking	43,4	50,3	56,3	62,6	22,0	3
Places of access						
% at home	45,0	49,3	56,3	65,5	42,6	6
% at work	35,2	37,3	37,8	38,6	23,1	5
% at educational place	15,8	15,8		18,0	8,0	2
% at PIAP	21,5	23,4		15,7	6,8	1
eGovernment Indicators						
% basic public services for citizens fully available online	50,0	60,0		60,0	36,8	6,5
% basic public services for enterprises fully available online	75,0	75,0		62,5	67,8	17
% of population using e-Government services	40,1	45,3	47,3	46,9	23,8	4
of which for returning filled in forms	8,8	9,9	11,2	14,9	8,1	7
% of enterprises using e-Government services	88,9	90,8	91,3	92,8	63,7	2
of which for returning filled in forms	55,0	60,9	71,5	77,9	44,8	2
ICT in schools						
Number of computers connected per 100 pupils				16,2	9,9	7
% of schools with broadband access				90,0	67,0	6
% of teachers having used the computer in class during the last 12 months				85,1	74,3	7
e-Commerce						
e-commerce as % of total turnover of enterprises	10,6	12,7	14,2	14,3	11,7	5
% enterprises receiving internet orders	13,7	19,3	18,4	12,3	13,9	14
% enterprises purchasing on the internet		70,8	75,4	55,8	37,9	7
e-business. % enterprises:						
with integrated internal business processes	63,1	60,7	59,6	50,5	37,3	5
with integrated external business processes	17,2	16,0	17,3	12,9	13,5	11
Security: % enterprises using Secure servers	36,9	40,9	34,5	43,4	41,0	8
% using digital signatures for authentication	2,9	2,5	4,4	6,4	14,3	26
Employment and Skills						
% employees using Internet at work	52,5	53,2	56,0	58,9	36,1	2
% of persons employed with ICT user skills.	19,0	19,8	19,9	20,5	18,5	4
% of persons employed with ICT specialist skills	4,2	4,0	4,3	4,3	3,1	3
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	10,0				5,5	2
ICT sector share of total employment	5,4				4,0	3
ICT sector growth (constant prices).	2,6				3,6	11
R&D expenditure in ICT (by the business sector), as % of GDP	1,6				0,3	1
=== as % of total R&D expenditure	64,3				25,7	1

13. France

ICT on the ground

France shows a mixed picture in information society development with strengths in business use and connectivity but weaknesses in usage among citizens, which lag a long way behind. Assessment is hindered by lack of data before 2006.

Broadband penetration has grown rapidly and coverage is widespread and this puts France just behind the group of highest-performing countries. Broadband is dominated by DSL. Actual usage is however below the EU average and less than might be expected from the high connectivity. The country's sizeable record industry has not been able to harness the above average broadband penetration for online sales. Online media usage, except online broadcasting, is currently among the lowest in Europe.

The proportion of basic public services available online is higher than the EU average but still well below the best performing countries. Enterprise use of eGovernment is close to average. Although schools have more broadband in schools than average, the availability of computers to students and use for teaching is not that well developed, although still close to mid-levels for Europe.

Skill levels in ICT among employees are somewhat below EU average. The share of ICT in R&D is fairly high, above 30%. Enterprise use of ICT is also good, French enterprises are using both eBusiness and eCommerce tools well above the average, and is currently the leading country in use of eSignatures by enterprises.

ICT policies in the National Reform Programme

ICT is considered to be a national policy priority. Measures taken have started to yield benefits, most visibly in the broadband market, where penetration is growing rapidly and prices are among the lowest in the EU. The 2006 Progress Report confirms the priorities of the NRP, specifically the ambitious targets for infrastructure development, as well as network security and the development of ICT-skills among young people.

- **ICT infrastructure:** coverage of mobile telephony, broadband and digital TV has spread thanks to regulatory and financial action as well as to a significant increase in competition.
- **Regional focus:** The Government has started to include ICT in plans for regional development to substantially increase the share of ICT-related expenditures in the forthcoming structural funds programmes.
- **ICT-Research:** Research investment by the Government has been raised considerably, particularly through the newly established Agency for Industrial Innovation and its ICT research projects.
- **Trust and security:** on the basis of a report by the Parliament, 12 recommendations are being implemented with concrete initiatives for spam and protection of minors.

France

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	79,260	90,8	96,397		87,4	7
DSL coverage in rural areas (as % of total population)			87,851		65,9	6
Broadband penetration (as % of population)	4,8	9,5	14,7	19,0	15,7	8
DSL penetration (as % of population)	4,3	8,8	13,9	17,9	12,8	4
Predominant download speed				LE 512kbps		20
Households having broadband (as % of those having access to the internet at home)				73,9	62,1	10
% of enterprises with broadband access	49,1			86,5	74,5	5
Number of 3G subscribers per 100 inhabitants			2,4		5,0	11
Digital Television in households			34,7		30,6	6
Music: number of single downloads per 100 inhabitants			13,7			
Internet Usage						
% population who are regular internet users				39,3	46,7	19
Take up of internet services (as % of population)						
sending emails				34,2	43,8	20
looking for information about goods and services				36,0	42,9	17
Internet telephoning or videoconferencing				4,9	7,1	23
playing/downloading games and music				9,3	18,2	29
listening to the web radio/watching web tv				10,3	11,8	18
reading online newspapers/magazines				9,5	19,0	26
internet banking				18,1	22,0	15
Places of access						
% at home				34,6	42,6	15
% at work				18,2	23,1	20
% at educational place				6,3	8,0	23
% at PIAP				4,6	6,8	18
eGovernment Indicators						
% basic public services for citizens fully available online	33,3	41,7		58,3	36,8	8,5
% basic public services for enterprises fully available online	62,5	62,5		75,0	67,8	12
% of population using e-Government services					23,8	
of which for returning filled in forms					8,1	
% of enterprises using e-Government services				65,8	63,7	17
of which for returning filled in forms				51,3	44,8	14
ICT in schools						
Number of computers connected per 100 pupils				8,9	9,9	11,5
% of schools with broadband access				75,0	67,0	13,5
% of teachers having used the computer in class during the last 12 months				65,5	74,3	21
e-Commerce						
e-commerce as % of total turnover of enterprises				16,7	11,7	3
% enterprises receiving internet orders				16,2	13,9	10
% enterprises purchasing on the internet				26,0	37,9	14
e-business. % enterprises:						
with integrated internal business processes				53,3	37,3	4
with integrated external business processes				16,2	13,5	6
Security: % enterprises using Secure servers				52,3	41,0	5
% using digital signatures for authentication				32,9	14,3	1
Employment and Skills						
% employees using Internet at work	26,8			33,5	36,1	14
% of persons employed with ICT user skills.	17,1	16,8	16,6	16,3	18,5	20
% of persons employed with ICT specialist skills	2,9	3,1	2,9	2,9	3,1	14
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	5,6				5,5	10
ICT sector share of total employment	4,8				4,0	5
ICT sector growth (constant prices).	1,2				3,6	16
R&D expenditure in ICT (by the business sector), as % of GDP	0,4				0,3	4
=== as % of total R&D expenditure	30,6				25,7	6

14. Hungary

ICT on the ground

Hungary performs in the middle low end for most aspects of information society development. In general, citizens are more active than enterprises, notably in media use which is far higher than might be expected from connectivity levels. The indicators suggest a country with advanced interest and user skills but hindered by lack of connectivity from fulfilling the industrial and social potential.

Broadband connectivity and Internet access are below average and growth rates have been insufficient to avoid Hungary being overtaken and falling down the ranking. The broadband to narrowband ratio is above average suggesting users are going directly to broadband. About two thirds of connections are DSL. Usage of advanced Internet services among citizens is higher than average, with the exception of banking, and quite significantly higher than what might be expected from connectivity rates. In the absence of high broadband penetration, the widespread consumption of audiovisual online content has not translated into a commercial market for online content. 3G and digital television are still in their infancy.

Availability of public online services for citizens is about average while service supply for enterprises is low. Usage of eGovernment services is below average for citizens and very low for enterprises. Hungary has a relatively high number of broadband connected schools, but the number of computers per pupils is low, and the actual use by teachers in class is amongst the lowest in Europe.

Enterprise connectivity is low and the use of eBusiness and online services is one of Hungary's weakest points. The performance in eCommerce is somewhat better, but still below average. This is despite Hungary having a fairly large ICT sector share of GDP and employment and solid basic skill ratios.

ICT policies in the National Reform Programme

ICT are one of the priorities in three microeconomic pillars of the Hungarian Progress Report 2006: R&D and innovation, business environment and infrastructure.

- **Fostering ICT use:** a number of projects have been set up to support business and household use of ICT. On-line access to government services, particularly in the field of taxation has been enhanced. One-stop shops for businesses and the healthcare administration are based on electronic means.
- **R&D:** Research in ICT is included in the programme, **Asboth Oszkar**, aimed at fostering advanced technologies.
- **Content**: The Digital National Library programme aims to digitise and make accessible national content resources.
- **Infrastructure:** Measures include projects in broadband, network security and interoperability. ICT in environmental protection is also highlighted.

Hungary

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	58	70	85		87,4	18,5
DSL coverage in rural areas (as % of total population)			76		65,9	12
Broadband penetration (as % of population)		2,9	5,1	8,6	15,7	21
DSL penetration (as % of population)		1,9	3,3	5,3	12,8	19
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)		40,9	49,5	68,2	62,1	13
% of enterprises with broadband access				61,3	74,5	19
Number of 3G subscribers per 100 inhabitants			0,0		5,0	20
Digital Television in households			8,4		30,6	17
Music: number of single downloads per 100 inhabitants			0,0			
Internet Usage						
% population who are regular internet users		21,3	33,6	41,7	46,7	17
Take up of internet services (as % of population)						
sending emails		20,4	31,4	36,9	43,8	18
looking for information about goods and services		19,5	25,2	34,7	42,9	18
Internet telephoning or videoconferencing		2,1	4,1	7,8	7,1	15
playing/downloading games and music		11,8	16,9	22,4	18,2	13
listening to the web radio/watching web tv		3,3	7,2	12,1	11,8	13
reading online newspapers/magazines		14,2	18,3	24,9	19,0	13
internet banking		2,7	5,8	8,0	22,0	25
Places of access						
% at home		14,3	20,7	28,8	42,6	21
% at work		10,0	16,8	18,7	23,1	19
% at educational place		6,7	7,2	11,7	8,0	6
% at PIAP		9,7	5,7	6,8	6,8	10
eGovernment Indicators						
% basic public services for citizens fully available online		8,3		50,0	36,8	10
% basic public services for enterprises fully available online		25,0		50,0	67,8	22
% of population using e-Government services		16,1	17,9	16,8	23,8	17
of which for returning filled in forms		4,0	7,3	5,3	8,1	18
% of enterprises using e-Government services		34,7		44,9	63,7	25
of which for returning filled in forms		23,2		27,7	44,8	24
ICT in schools						
Number of computers connected per 100 pupils				8,6	9,9	14
% of schools with broadband access				77,0	67,0	11,5
% of teachers having used the computer in class during the last 12 months				42,8	74,3	25
e-Commerce						
e-commerce as % of total turnover of enterprises				7,0	11,7	15
% enterprises receiving internet orders		5,7		10,7	13,9	16
% enterprises purchasing on the internet		13,9		12,2	37,9	24
e-business. % enterprises:						
with integrated internal business processes		33,9		4,5	37,3	27
with integrated external business processes		5,2		5,4	13,5	22
Security: % enterprises using Secure servers		26,6		19,4	41,0	20
% using digital signatures for authentication		13,3		7,4	14,3	25
Employment and Skills						
% employees using Internet at work		26,3		20,6	36,1	25
% of persons employed with ICT user skills.	19,5	19,9	20,0	20,1	18,5	5
% of persons employed with ICT specialist skills	3,2	2,9	2,6	2,9	3,1	15
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	6,4				5,5	7
ICT sector share of total employment	4,9				4,0	4
ICT sector growth (constant prices).	2,4				3,6	12
R&D expenditure in ICT (by the business sector), as % of GDP	0,1				0,3	15
=== as % of total R&D expenditure	14,2				25,7	13

15. Italy

ICT on the ground

Italy conveys a mixed picture of its Information Society development. It is the leading country in 3G and fibre development, scores well on a few other indicators, while it falls behind severely in citizen use of Internet services.

Broadband penetration is rising only slightly slower than EU average, leaving Italy as a somewhat sluggish middle-of-the-road performer for both enterprise and citizen connectivity. With no cable TV available, almost all subscriptions are DSL-based. However, Italy is a leading country in terms of 3G take-up and for fibre with 270,000 connections, more than a third of the EU total. The percentage of regular Internet users is falling severely behind EU average and similar negative gaps can be observed for the adoption of all the Internet services, regardless of their degree of complexity. While consumption of online content is low across the board, a thriving market for mobile content has developed, particularly for music downloads to handsets. In this regard, there might be signs of a country progressing towards convergence through mobile connectivity.

eGovernment supply in Italy is healthy, and for enterprises well above EU average. Use among enterprises is also good for basic services and above average for more advanced types of interactions. When it comes to citizen use, other countries have shown stronger growth, leaving Italian citizen use well below average. Use of ICT in education is mixed: While the number of connected PCs is low, the access to broadband and use in teaching is close to mid-level.

ICT skills among employees, both specialist and user skills, are close to EU average, but slightly lower for advanced skills. While the share of ICT-related investments in total R&D is just slightly behind EU average, overall investments is less than half of average. The picture for actual use of ICT in enterprises is more unclear, partly due to indicators which are not fully comparable with other countries.

ICT policies in the National Reform Programme

Italy has a new government and the NPR has been revised according to the new objectives: eGovernment, innovation, take-up by SMEs and digital divide.

- **Electronic communications:** In the area of broadband, Italy aims to reduce the digital divide through public investment in disadvantaged areas with the objective of bringing fixed and wireless connectivity to 80% of population in the South.

- **eGovernment:** Fiscal incentives have been introduced to stimulate ICT-uptake by enterprises. 134 regional and local projects have been co-financed to improve levels and quality of eGovernment services. A new service for 'electronic tax returns' enables businesses to access the database operated by the income tax authorities for purposes connected with filing their tax returns. Similar activities can be carried out by citizens on the web.

- **R&D and innovation:** Specific measures are taken to stimulate investment by the ICT sector through the setup of technological districts and platforms.

- **Cultural heritage:** Actions are based on the use of innovative methods and technologies that are strategic for purposes of integrating and spreading knowledge; preservation and sustainable use and exploitation of the country's cultural resources; growth of businesses linked to creative industries.

Italy

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	82,033	85,012	86,997		87,4	16
DSL coverage in rural areas (as % of total population)			44,586		65,9	19
Broadband penetration (as % of population)	3,2	6,7	10,0	13,6	15,7	13
DSL penetration (as % of population)	2,8	6,2	9,4	13,1	12,8	10
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)			33,6	40,5	62,1	25
% of enterprises with broadband access	31,2	23,3	56,7	69,6	74,5	15
Number of 3G subscribers per 100 inhabitants			15,3		5,0	2
Digital Television in households			38,7		30,6	5
Music: number of single downloads per 100 inhabitants			5,5			
Internet Usage						
% population who are regular internet users	24,9	25,7	28,3	30,8	46,7	25
Take up of internet services (as % of population)						
sending emails			26,5	29,1	43,8	23
looking for information about goods and services			21,2	23,2	42,9	26
Internet telephoning or videoconferencing			2,2	3,3	7,1	27
playing/downloading games and music			10,4	10,5	18,2	28
listening to the web radio/watching web tv			4,6	5,3	11,8	27
reading online newspapers/magazines			12,8	12,8	19,0	24
internet banking			7,6	8,9	22,0	24
Places of access						
% at home	22,7	21,3	24,2	26,6	42,6	22
% at work	13,6	14,6	15,9	16,7	23,1	23
% at educational place	1,8	4,0	3,8	4,9	8,0	25
% at PIAP	0,7	6,0	3,7	4,9	6,8	16
eGovernment Indicators						
% basic public services for citizens fully available online	25,0	27,3		36,4	36,8	14
% basic public services for enterprises fully available online	75,0	87,5		87,5	67,8	6
% of population using e-Government services			14,1	16,1	23,8	20
of which for returning filled in forms			3,6	5,0	8,1	19
% of enterprises using e-Government services		65,0	72,6	86,5	63,7	4
of which for returning filled in forms	34,5	35,4	28,9	49,4	44,8	15
ICT in schools						
Number of computers connected per 100 pupils				6,5	9,9	21
% of schools with broadband access				69,0	67,0	17
% of teachers having used the computer in class during the last 12 months				72,4	74,3	14
e-Commerce						
e-commerce as % of total turnover of enterprises	1,9	3,4	2,1	2,0	11,7	20
% enterprises receiving internet orders	1,8	8,7	3,3	3,3	13,9	24
% enterprises purchasing on the internet		13,8	19,2	27,1	37,9	12
e-business. % enterprises:						
with integrated internal business processes	11,6	33,1	47,7	46,5	37,3	6
with integrated external business processes					13,5	
Security: % enterprises using Secure servers	34,7	54,7	30,3	39,3	41,0	13
% using digital signatures for authentication	4,3	10,5	8,8	11,5	14,3	12
Employment and Skills						
% employees using Internet at work	24,3	21,5	24,8	28,2	36,1	20
% of persons employed with ICT user skills.	22,9	17,6	17,6	19,0	18,5	11
% of persons employed with ICT specialist skills	2,8	2,8	2,9	2,7	3,1	18
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	4,8				5,5	15
ICT sector share of total employment	3,6				4,0	15
ICT sector growth (constant prices).	1,3				3,6	15
R&D expenditure in ICT (by the business sector), as % of GDP	0,1				0,3	11
=== as % of total R&D expenditure	22,9				25,7	8

16. Lithuania

ICT on the ground

Coming from a low-performance background, Lithuania has moved into being a mid-level performer in some regards, but is still in the low end in most indicators. Development does not seem to have continued at the same speed as earlier years. However, coming to ICT skills, overall increase of Internet take-up and use of media services, Lithuania is performing well.

Broadband take-up in the Lithuanian population is still slow. However, the broadband take-up has been complemented by increased narrowband take-up, an unusual development, although natural given the low overall connectivity. Overall connectivity growth is therefore better than only broadband figures show. Broadband is available through alternative access platforms, and DSL represents a little less than half of the market. Use of Internet and usage of online services are among the lowest in the EU for basic and utility services. However, media downloading, videoconferencing and reading are all areas where Lithuania performs well above average, an interesting split in usage that can be seen in a handful of countries with less mature overall development and most likely reflecting general societal circumstances. Despite the popularity of digital audiovisual content a sizable commercial market for online content has not developed so far – possibly due to the limited size of the market and the low broadband penetration.

The supply of public services fully online in Lithuania has fallen below EU average since last year; however their use by Lithuanian enterprises is still solid. Citizen use of eGovernment services is low, in accordance with the low connectivity rates. Use of ICT in schools is among the lowest in Europe.

Basic ICT skills in the work force are above EU average, but for specialist skills Lithuania has the lowest performance of the measured countries. Enterprise take-up of broadband has not grown, and is now below EU average. Use of ICT tools and online services among enterprises is mixed: While selling online is above average and eCommerce in general growing, the other eBusiness indicators show low performance with the exception of eSignature use.

ICT policies in the National Reform Programme

The Lithuanian Progress Report 2006 announced the implementation of several programmes in ICT:

- **Broadband:** Within the Rural Broadband Network of Information Technologies scheme the deployment of broadband has been supported and access has been provided for public authorities, hospitals, schools and museums as well as for citizens and businesses in rural areas.

- **eGovernment:** Within the eGovernment Implementation Plan twenty basic public services are being put online until 2008. The electronic tax declaration system for taxpayers has been implemented and ICT are also harnessed by the employment services. Additionally, an eGovernment portal is being developed. The legal framework for the use of electronic communications within the administration was also created.

- To promote **Digital Literacy**, the General Computer Literacy Programme and the Programme of Social Integration of the Disabled People have been implemented, while schools are being provided with computers.

- **ICT use** is being fostered through the programme 'Development of Rural Internet Access Points.' This Programme has been completed in 2006, but the Progress Report foresees its follow-up in the subsequent period 2006-2008.

Lithuania

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)			82,230		87,4	21
DSL coverage in rural areas (as % of total population)			54,6		65,9	17
Broadband penetration (as % of population)		3,1	5,8	9,3	15,7	20
DSL penetration (as % of population)		1,2	2,5	4,6	12,8	20
Predominant download speed				LE 512kbps		20
Households having broadband (as % of those having access to the internet at home)	27,5	31,7	73,4	56,2	62,1	21
% of enterprises with broadband access		50,1	57,5	57,1	74,5	24
Number of 3G subscribers per 100 inhabitants			0,0		5,0	24,5
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users	20,2	25,8	29,8	37,7	46,7	20
Take up of internet services (as % of population)						
sending emails	17,0	22,6	25,6	32,4	43,8	21
looking for information about goods and services	10,0	15,3	21,5	29,6	42,9	22
Internet telephoning or videoconferencing	1,1	1,9	4,4	11,3	7,1	8
playing/downloading games and music	11,9	15,3	17,5	24,4	18,2	10
listening to the web radio/watching web tv	6,8	8,3	10,9	16,9	11,8	9
reading online newspapers/magazines	14,8	21,0	24,2	30,3	19,0	8
internet banking	3,5	6,7	10,3	14,7	22,0	19
Places of access						
% at home	6,9	10,9	15,7	29,5	42,6	20
% at work	9,6	12,3	15,4	17,3	23,1	21
% at educational place	9,2	11,2	10,8	11,4	8,0	7
% at PIAP	6,2	11,2	5,8	6,7	6,8	11
eGovernment Indicators						
% basic public services for citizens fully available online		25,0		25,0	36,8	19,5
% basic public services for enterprises fully available online		62,5		62,5	67,8	17
% of population using e-Government services	6,7	9,8	12,1	12,7	23,8	21
of which for returning filled in forms	3,0	5,5	5,6	6,1	8,1	16
% of enterprises using e-Government services		64,7	71,8	76,1	63,7	11
of which for returning filled in forms		30,1	51,5	55,6	44,8	8
ICT in schools						
Number of computers connected per 100 pupils				5,2	9,9	26
% of schools with broadband access				33,0	67,0	24
% of teachers having used the computer in class during the last 12 months				59,3	74,3	24
e-Commerce						
e-commerce as % of total turnover of enterprises		1,8	2,3	5,1	11,7	18
% enterprises receiving internet orders		4,8	6,2	14,7	13,9	11
% enterprises purchasing on the internet		12,9	15,3	21,9	37,9	18
e-business. % enterprises:						
with integrated internal business processes		19,3	17,9	18,5	37,3	23
with integrated external business processes		6,6	6,2	9,1	13,5	18
Security: % enterprises using Secure servers		22,6	18,8	24,7	41,0	16
% using digital signatures for authentication		16,0	22,8	26,8	14,3	2
Employment and Skills						
% employees using Internet at work		17,8	20,2	23,4	36,1	24
% of persons employed with ICT user skills.	16,1	17,5	18,3	19,6	18,5	7
% of persons employed with ICT specialist skills	1,6	2,0	1,5	1,6	3,1	27
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

17. Luxembourg

ICT on the ground

Luxembourg scores very high on most i2010 household indicators, while enterprise level performance is more average and with less growth.

Broadband take-up was high and Luxembourg keeps its position somewhat below the group of best performers. With more than a third of all connected households still relying on slower connection types, Luxembourg seems to be in good position for further rapid growth in broadband. Broadband connections are largely DSL-based. Citizen use of the Internet in Luxembourg is generally high, without being exceptional. Internet telephony use is especially high. Luxembourg's Internet users are avid consumers of audiovisual digital content, but this popularity has not been harnessed commercially yet – possibly due to the market's limited size. 3G is present, and within the top ten countries of take-up.

Despite a very low supply of eGovernment services, use of these services among citizens is reported to be high. Business use is also reported high for basic eGovernment services, but low for advanced services. These scores might reflect the focus of the few services available, but still underline a need to improve supply levels. The number of connected computers in schools is high, but both actual teacher use and access to broadband is more average.

The work force is skilled in ICT, and performs above EU average both on user and expert skill levels. However, enterprise use of broadband is only close to the EU average and the growth among enterprises is slower. Enterprise use of eBusiness and eCommerce tools is not on level with general citizen usage, and in some cases now even below EU average.

ICT policies in the National Reform Programme

Luxembourg's NRP emphasises the promotion of Luxembourg as a location for eCommerce, the construction of advanced infrastructure and the promotion of ICT take-up among enterprises and individuals.

- **eTrust and eCommcerce**: A public-private partnership was set up to issue advanced digital security certificates and a consortium was chosen to install a public key infrastructure. Measures to address online security issues and to raise awareness about them included an online education platform, an IT threat observatory and a publicly funded research programme.
- **Infrastructure:** An organisation was set up to construct, manage and market an advanced fibre optic infrastructure and connections with international backbones. A fourth 3G-license was issued and the transition to digital TV is almost completed.
- **eGovernment:** One-stop-shops for enterprises and citizens are being rolled out until 2010 and a digital assistant for enterprises is to go online in 2007.
- **eInclusion:** A convention on the legal status of teleworking was signed and ICT will be employed in initial and ongoing education, particularly for long distance learning.

Luxembourg

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	100	100	100		87,4	2
DSL coverage in rural areas (as % of total population)			100		65,9	2
Broadband penetration (as % of population)	2,8	7,1	13,4	19,7	15,7	7
DSL penetration (as % of population)	2,4	6,2	12,0	17,9	12,8	5
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)	16,2	27,7	51,7	62,8	62,1	16
% of enterprises with broadband access	39,1	48,0	64,2	76,0	74,5	11
Number of 3G subscribers per 100 inhabitants			6,1		5,0	7
Digital Television in households			6,7		30,6	20
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users	48,1	58,9	63,4	65,2	46,7	7
Take up of internet services (as % of population)						
sending emails	47,5	59,2	62,6	64,8	43,8	7
looking for information about goods and services	46,5	52,8	60,7	63,7	42,9	7
Internet telephoning or videoconferencing	4,6	5,9	10,9	16,3	7,1	2
playing/downloading games and music	17,3	29,0	29,8	26,4	18,2	7
listening to the web radio/watching web tv	8,9	14,9	19,1	21,6	11,8	6
reading online newspapers/magazines	22,4	27,8	29,4	29,1	19,0	9
internet banking	23,3	34,6	37,1	40,8	22,0	8
Places of access						
% at home	43,2	58,6	64,7	65,1	42,6	7
% at work	25,8	26,5	26,3	31,7	23,1	7
% at educational place	10,2	7,1	9,6	7,7	8,0	18
% at PIAP	14,4	7,8	2,9	1,9	6,8	28
eGovernment Indicators						
% basic public services for citizens fully available online	8,3	8,3		8,3	36,8	25
% basic public services for enterprises fully available online	25,0	37,5		37,5	67,8	25
% of population using e-Government services	28,1	44,8	46,0	45,8	23,8	5
of which for returning filled in forms	10,9	21,2	18,7	17,3	8,1	4
% of enterprises using e-Government services	64,8	71,5		82,7	63,7	7
of which for returning filled in forms	25,0	25,6		32,3	44,8	23
ICT in schools						
Number of computers connected per 100 pupils				18,3	9,9	5
% of schools with broadband access				77,0	67,0	11,5
% of teachers having used the computer in class during the last 12 months				70,2	74,3	16
e-Commerce						
e-commerce as % of total turnover of enterprises					11,7	
% enterprises receiving internet orders	9,1	10,9			13,9	
% enterprises purchasing on the internet		32,8	40,0		37,9	
e-business. % enterprises:						
with integrated internal business processes	40,2	35,8	44,7	39,8	37,3	11
with integrated external business processes	15,3	15,9	16,1	13,7	13,5	10
Security: % enterprises using Secure servers	57,4	53,2	57,7		41,0	
% using digital signatures for authentication	14,3	12,8		10,2	14,3	17
Employment and Skills						
% employees using Internet at work	32,7	35,5	32,9	32,2	36,1	16
% of persons employed with ICT user skills.	23,9	26,9	27,3		18,5	
% of persons employed with ICT specialist skills	3,1	3,6	3,6		3,1	
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	5,0				5,5	14
ICT sector share of total employment	3,8				4,0	13
ICT sector growth (constant prices).	3,6				3,6	6
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

18. Latvia

ICT on the ground

Latvia shows an uneven performance in the information society indicators. Enterprise use and government service levels are among the lowest in Europe, whereas certain types of connectivity and citizen use are above EU average.

The percentage of broadband subscriptions in the Latvian population remains less than half of EU average. DSL accounts for about half of all connections. The country still has a base of nearly 50% narrowband users, and DSL coverage is high, which could mean faster broadband growth is possible in the future. Latvian citizens use the basic and utility online services at average levels, despite of low connectivity. Furthermore, media services and Internet telephony are considerably more popular, much like in its Baltic neighbours. The above average consumption of audiovisual digital content has not been harnessed commercially – possibly due to the market's limited size and low broadband connectivity – both hindering factors in the roll out of high quality offerings.

The availability of public services continues to be among the lowest in Europe, and use among enterprises is the lowest or close to lowest in Europe in most regards. Citizen use has increased and is now above average with the few services available, although advanced use is naturally less common. Broadband connectivity in school is low, and the actual use of ICT and computer availability the lowest of the measured countries.

Skills levels in the work force are about average, with a slight decrease for specialist levels, possible due to work force developments. However, enterprise and work force use of Internet is not on the same levels, and in several aspects among the lowest in Europe.

ICT policies in the National Reform Programme

The Latvian NRP stresses three ICT-related priorities: eGovernment, network security and improvement of broadband coverage.

- **eTrust:** The introduction of a safe electronic signature and certifications are in the implementation phase and smart card-based solutions are issued since September 2006.

- **eGovernment:** Enabling legislation was passed in 2005 and 2006 and a coordination unit has been set up. Measures to date include: the implementation of an integrated register of state information systems until 2009, the installation of an Intranet-based accounting systems until the end of 2009, the installation of an electronic procurement agency and an electronic document circulation system within the national government. National unified information systems for libraries, state archives and museum inventory are being implemented. A unified web portal was launched. State information systems are developed and improved, schools, libraries and local governments are equipped with Internet access and public Internet access points are being set up.

- **Broadband**: Two programmes are under way to develop broadband in rural areas until 2008.

- **eInclusion**: ICT are already used to train groups at risk of social exclusion. Telework for disabled persons and distance learning are in an early planning stage.

Latvia

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)			85		87,4	18,5
DSL coverage in rural areas (as % of total population)					65,9	
Broadband penetration (as % of population)		2,4	4,5	9,3	15,7	19
DSL penetration (as % of population)		1,4	2,6	4,0	12,8	22
Predominant download speed				LE 512kbps		20
Households having broadband (as % of those having access to the internet at home)		36,6	45,7	53,3	62,1	22
% of enterprises with broadband access		44,8	48,1	58,9	74,5	22
Number of 3G subscribers per 100 inhabitants			0,0		5,0	24,5
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users		27,3	36,3	46,0	46,7	14
Take up of internet services (as % of population)						
sending emails		24,6	33,1	40,5	43,8	16
looking for information about goods and services		18,8	27,2	36,2	42,9	16
Internet telephoning or videoconferencing		2,9	8,3	14,0	7,1	5
playing/downloading games and music		15,5	20,6	23,9	18,2	11
listening to the web radio/watching web tv		9,5	11,5	17,0	11,8	8
reading online newspapers/magazines		19,2	23,8	26,7	19,0	10
internet banking		11,7	15,6	22,1	22,0	13
Places of access						
% at home		10,9	20,7	31,4	42,6	18
% at work		17,2	18,2	21,6	23,1	16
% at educational place		6,8	7,0	9,2	8,0	14
% at PIAP		11,6	8,2	8,8	6,8	7
eGovernment Indicators						
% basic public services for citizens fully available online		8,3		8,3	36,8	25
% basic public services for enterprises fully available online		0,0		12,5	67,8	27
% of population using e-Government services		13,4	13,4	25,0	23,8	14
of which for returning filled in forms		3,6	5,0	6,1	8,1	17
% of enterprises using e-Government services		40,5	35,2	39,9	63,7	27
of which for returning filled in forms		14,6	15,2	20,6	44,8	26
ICT in schools						
Number of computers connected per 100 pupils				5,1	9,9	27
% of schools with broadband access				67,0	67,0	19
% of teachers having used the computer in class during the last 12 months				34,9	74,3	27
e-Commerce						
e-commerce as % of total turnover of enterprises			0,7	1,3	11,7	22
% enterprises receiving internet orders			1,8	3,0	13,9	25
% enterprises purchasing on the internet			7,3	12,9	37,9	23
e-business. % enterprises:						
with integrated internal business processes		14,9	17,4	14,6	37,3	25
with integrated external business processes		4,0	3,6	5,1	13,5	23
Security: % enterprises using Secure servers		13,8	12,2	15,4	41,0	22
% using digital signatures for authentication		6,7	7,3	9,3	14,3	21
Employment and Skills						
% employees using Internet at work		17,3	16,5	19,1	36,1	26
% of persons employed with ICT user skills.	17,3	17,0	17,1	18,9	18,5	13
% of persons employed with ICT specialist skills	3,0	3,3	3,3	3,1	3,1	11
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

19. Malta

ICT on the ground

Although data are incomplete, Malta shows a mixed performance in the few available indicators for information society development.

The percentage of broadband subscriptions is just below EU average and has shown slow growth compared to previous years. DSL accounts for more than half of all broadband connections. Despite broadband penetration only slightly below average, a market for paid audiovisual online content has not materialized so far, possibly due to the market's limited size and average broadband speeds.

eGovernment supply for citizens is measured as the highest in Europe, whereas enterprise supply is slightly below normal. The number of enterprises interacting online with public authorities in was higher in 2005 than the EU average of 2006. Schools are very well connected, scoring second in Europe, but the availability of computers and teacher use in classroom is only average.

User skills levels in ICT in the work force are among the highest in the EU. Expert level skills are however now below average. Enterprise connectivity and technology use was in 2005 generally already above the EU average of 2006, so it seems safe to assume that Malta here performs above average.

ICT policies in the National Reform Programme

The ICT sector in Malta is well-developed and the government aims at attracting more ICT companies: a National ICT Framework aims to make Malta a better place to invest and various measures are improving digital skills among workers.

- The **SmartCity@Malta initative** aims to attract 'knowledge-based activities by leading global players in the field'. The project has attracted foreign direct investment and is expected to create over 5000 mostly ICT-related jobs.

- **Digital Skills:** A number of initiatives that address employment in the ICT sector and general ICT competencies are being implemented. They include an eWork Framework, a National ICT Skills Framework, ICT certifications for students and the unemployed, fiscal incentives to encourage education in ICT and science, an ICT student placement programme, and academic initiatives developed in partnership with Microsoft, Cisco, SAP and IBM.

Malta

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	95	95	99		87,4	5,5
DSL coverage in rural areas (as % of total population)			0		65,9	23
Broadband penetration (as % of population)		3,8	11,1	13,2	15,7	15
DSL penetration (as % of population)		3,2	6,5	8,1	12,8	16
Predominant download speed				1-2Mpbs		4
Households having broadband (as % of those having access to the internet at home)				76,7	62,1	8
% of enterprises with broadband access	62,3		77,7		74,5	
Number of 3G subscribers per 100 inhabitants			0,0		5,0	24,5
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants			0,0			
Internet Usage						
% population who are regular internet users				36,0	46,7	21
Take up of internet services (as % of population)						
sending emails				31,3	43,8	22
looking for information about goods and services				25,6	42,9	24
Internet telephoning or videoconferencing				4,1	7,1	26
playing/downloading games and music				16,6	18,2	19
listening to the web radio/watching web tv				9,9	11,8	19
reading online newspapers/magazines				16,6	19,0	19
internet banking				16,0	22,0	17
Places of access						
% at home				32,2	42,6	17
% at work				14,0	23,1	25
% at educational place				3,8	8,0	28
% at PIAP				1,8	6,8	29
eGovernment Indicators						
% basic public services for citizens fully available online		33,3		83,3	36,8	1
% basic public services for enterprises fully available online		50,0		62,5	67,8	17
% of population using e-Government services				16,2	23,8	19
of which for returning filled in forms				3,4	8,1	20
% of enterprises using e-Government services			68,3		63,7	
of which for returning filled in forms	35,5		45,4		44,8	
ICT in schools						
Number of computers connected per 100 pupils				10,2	9,9	10
% of schools with broadband access				95,0	67,0	2
% of teachers having used the computer in class during the last 12 months				74,5	74,3	13
e-Commerce						
e-commerce as % of total turnover of enterprises					11,7	
% enterprises receiving internet orders	20,6		14,3		13,9	
% enterprises purchasing on the internet			46,8		37,9	
e-business. % enterprises:						
with integrated internal business processes			43,4		37,3	
with integrated external business processes			18,9		13,5	
Security: % enterprises using Secure servers	38,0		41,2		41,0	
% using digital signatures for authentication	2,9		10,7		14,3	
Employment and Skills						
% employees using Internet at work	29,2				36,1	
% of persons employed with ICT user skills.	19,9	20,5	20,4	20,8	18,5	3
% of persons employed with ICT specialist skills	3,1	4,1	3,3	2,4	3,1	24
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

20. The Netherlands

ICT on the ground

The Netherlands are one of the best performing countries in Europe and lead the way in information society development. The only exceptions are in levels of eGovernment supply and 3G take-up.

Broadband take-up is the highest in the EU and the conversion from narrowband has been rapid. Further growth will need to come from increased overall Internet use. DSL is the most popular broadband technology, but still almost half the market is connected through other means like cable TV. Citizen use of online services is very high and in general among the highest in the EU. High broadband penetration and widespread consumption of audiovisual online content support a sizable market for online content and relatively high usage of commercial download services. 3G is still in infancy.

The Netherlands is close to the EU average in overall supply of eGovernment services, but is still only a mid-level performer. However, citizen usage is very high, and the highest in Europe for some advanced services. For enterprises, advanced use is very high, while overall use is more average. ICT use in schools is very high, both for usage, connectivity and availability.

The level of ICT skills in the work force is high in all aspects and the fourth highest in the EU for specialist skills. The proportion of R&D investments going to ICT-related research is the third highest in the EU. The proportion of enterprises with a broadband connection is above the EU average, although a bit behind the leading countries. Use of advanced business integration is on European top levels, while commercial activities have improved somewhat since last years, without reaching top levels.

ICT policies in the National Reform Programme

ICT programmes in The Netherlands are being consistently implemented.

- **eGovernment:** At the beginning of 2006 approximately 55% of government services were available online (up from 50% in 2005). The goal to raise this number up to 65% has been uphold. The roll-out of the authentication facility DigiD made it easier for the citizens to exploit benefits of these services.

- **Fostering ICT use**: Among the several programmes to increase the use of ICT, two important ones are under way: Connecting the Dots (closer integration of local initiatives) and the new ICTRegie (strengthening and focusing ICT research). A new Social Sectors & ICT Action Programme, which was enacted in 2005 aims to employ ICT in order to improve mobility in urban areas, to increase the attractiveness and quality of education and to improve public safety. Increased use of ICT by SMEs is targeted by other ongoing initiatives: Netherlands goes Digital, Netherlands Digital: Groundbreaking with ICT and Widescreen Television throughout the Netherlands.

- **Spectrum Policy:** In late 2005 the Radio Spectrum Policy Memorandum was approved by the government.

- **ICT security:** Actions were undertaken to combat spam (an opt-out regime for businesses) and to raise digital security awareness (a declaration of the business community).

The Netherlands

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	94	99	99		87,4	5,5
DSL coverage in rural areas (as % of total population)			99		65,9	4
Broadband penetration (as % of population)	10,7	16,4	23,8	29,8	15,7	1
DSL penetration (as % of population)	5,2	10,3	14,4	18,3	12,8	2
Predominant download speed				1-2Mpbs		4
Households having broadband (as % of those having access to the internet at home)	33,0		68,8	82,4	62,1	4
% of enterprises with broadband access	36,6	53,7	71,3	81,7	74,5	9
Number of 3G subscribers per 100 inhabitants			1,4		5,0	14
Digital Television in households			11,4		30,6	14
Music: number of single downloads per 100 inhabitants			26,7			
Internet Usage						
% population who are regular internet users			73,5	76,4	46,7	5
Take up of internet services (as % of population)						
sending emails	52,5		73,1	75,9	43,8	2
looking for information about goods and services	28,6		70,0	73,0	42,9	4
Internet telephoning or videoconferencing			5,0	10,1	7,1	10
playing/downloading games and music	15,7		36,8	41,6	18,2	1
listening to the web radio/watching web tv			19,8	27,9	11,8	4
reading online newspapers/magazines	24,6		29,4	36,4	19,0	7
internet banking			49,6	58,7	22,0	4
Places of access						
% at home	55,9		73,7	76,7	42,6	4
% at work	30,5		36,3	38,9	23,1	4
% at educational place	6,9		8,4	9,2	8,0	13
% at PIAP	11,9		3,0	2,8	6,8	26
eGovernment Indicators						
% basic public services for citizens fully available online	18,2	18,2		36,4	36,8	14
% basic public services for enterprises fully available online	37,5	50,0		75,0	67,8	12
% of population using e-Government services			45,6	51,8	23,8	3
of which for returning filled in forms			20,4	29,7	8,1	1
% of enterprises using e-Government services	41,0	46,7	56,9	69,7	63,7	15
of which for returning filled in forms	23,1	27,1	43,6	61,0	44,8	5
ICT in schools						
Number of computers connected per 100 pupils				20,0	9,9	3
% of schools with broadband access				92,0	67,0	4,5
% of teachers having used the computer in class during the last 12 months				90,0	74,3	4
e-Commerce						
e-commerce as % of total turnover of enterprises					11,7	
% enterprises receiving internet orders	16,6	18,6	21,4	27,9	13,9	3
% enterprises purchasing on the internet		28,7	35,3	45,3	37,9	10
e-business. % enterprises:						
with integrated internal business processes	60,0	58,9	60,9	61,7	37,3	2
with integrated external business processes	17,2	20,5	18,3	18,0	13,5	2
Security: % enterprises using Secure servers	53,4	59,9	34,5	43,1	41,0	10
% using digital signatures for authentication	10,2	12,8	13,1	15,4	14,3	6
Employment and Skills						
% employees using Internet at work	35,1	36,8	42,2	44,8	36,1	6
% of persons employed with ICT user skills.	22,5	20,5	19,6	19,7	18,5	6
% of persons employed with ICT specialist skills	4,5	4,2	4,3	4,1	3,1	4
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	5,6				5,5	9
ICT sector share of total employment	4,0				4,0	11
ICT sector growth (constant prices).	1,9				3,6	14
R&D expenditure in ICT (by the business sector), as % of GDP	0,4				0,3	6
=== as % of total R&D expenditure	35,3				25,7	3

21. Poland

ICT on the ground

Poland performs at the bottom end of the scale for most information society benchmarks and improvement seems slow. Enterprise usage is slightly better than citizen usage. Like in a few other countries, Internet telephony and online media use is relatively higher than other indicators would normally imply.

Broadband take-up among citizens is among the lowest in Europe. Only about one third of citizens use the Internet regularly, and more than half of all online households now use broadband. DSL connections make for about two thirds of the market. Use of basic and utility services are among the lowest in Europe, but use for downloading media is closer to average, and Internet telephony actually above average. Digital television adoption is an area where Poland moves into top ten figures. Poland's market for digital content currently suffers not only from low broadband penetration but also from a lack of necessary legislation in fields such as copyrights, broadcasting and other media rights.

eGovernment supply is close to the lowest in Europe. Citizen use of eGovernment services is very low. However, enterprise usage is close to average, even well above when it comes to returning filled-in forms online, indicating that the will to use services is somewhat higher than the available connectivity and service levels provide for. ICT availability and use in schools are very low.

Skill levels among employees are below the EU average, but not dramatically so. Investments in ICT-related R&D as well as the share of R&D going to ICT-related activities are the lowest among the measured countries. Polish enterprises now have the lowest take-up rate of broadband in Europe. Enterprise use is higher than citizen use, although generally well below average, with the exception of eSignatures. Growth in enterprise use is currently slow.

ICT policies in the National Reform Programme

The Polish Progress Report lists measures in several key areas:

- **eGovernment:** Several long term programmes have been started: the 'teleinformatisation' of the Network for the Public Administration (STAP); an overhaul of Public registers (PESEL 2); an electronic platform of public administration services (ePUAP); a central portal for the ministry of justice (ePortal); an electronic system for tax declarations; an integrated system for medical information in health services; and, the modernisation of the electronic system for monitoring public aid (SHRIMP).

- **Legislation:** The report summarises legislative work on the implementation of the EU directive on electronic commerce and on the amendment of the bill on electronic signature. The compulsory acceptance of electronic signature by public authorities has been postponed by two years.

- **EU regional policy funds** are used to finance projects focusing on ICT use in the administration and by businesses as well as on the development of broadband infrastructure.

Poland

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)		55,2	62,3		87,4	24
DSL coverage in rural areas (as % of total population)			51,9		65,9	18
Broadband penetration (as % of population)		0,6	1,7	4,5	15,7	23
DSL penetration (as % of population)		0,3	1,2	3,4	12,8	23
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)		31,8	51,2	60,2	62,1	18
% of enterprises with broadband access		27,8	42,7	46,4	74,5	27
Number of 3G subscribers per 100 inhabitants			0,0		5,0	19
Digital Television in households			19,2		30,6	10
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users		22,4	29,3	34,4	46,7	23
Take up of internet services (as % of population)						
sending emails		19,3	24,1	27,2	43,8	25
looking for information about goods and services		14,7	18,0	24,7	42,9	25
Internet telephoning or videoconferencing		3,5	4,5	8,0	7,1	13
playing/downloading games and music		14,0	12,0	16,2	18,2	20
listening to the web radio/watching web tv		5,6	5,7	9,8	11,8	20
reading online newspapers/magazines		13,6	12,5	16,1	19,0	20
internet banking		4,0	5,9	9,1	22,0	23
Places of access						
% at home		15,0	20,4	26,4	42,6	23
% at work		8,8	11,1	13,1	23,1	26
% at educational place		7,8	10,0	9,9	8,0	10
% at PIAP		11,4	6,0	5,5	6,8	14
eGovernment Indicators						
% basic public services for citizens fully available online		0,0		8,3	36,8	25
% basic public services for enterprises fully available online		25,0		37,5	67,8	25
% of population using e-Government services		12,6	12,5	5,8	23,8	25
of which for returning filled in forms		3,5	2,6	2,0	8,1	25
% of enterprises using e-Government services		73,8	64,1	60,9	63,7	18
of which for returning filled in forms		67,5	60,2	56,3	44,8	7
ICT in schools						
Number of computers connected per 100 pupils				5,6	9,9	24
% of schools with broadband access				28,0	67,0	26
% of teachers having used the computer in class during the last 12 months				61,4	74,3	22
e-Commerce						
e-commerce as % of total turnover of enterprises		2,8	4,4	5,9	11,7	17
% enterprises receiving internet orders		3,8	4,2	7,1	13,9	20
% enterprises purchasing on the internet		9,7	17,2	22,7	37,9	16
e-business. % enterprises:						
with integrated internal business processes		15,5	18,0	19,5	37,3	22
with integrated external business processes		10,4	5,6	4,7	13,5	24
Security: % enterprises using Secure servers		8,7	12,0	14,4	41,0	24
% using digital signatures for authentication		19,4	13,6	13,3	14,3	9
Employment and Skills						
% employees using Internet at work		21,5	27,1	27,8	36,1	21
% of persons employed with ICT user skills.	14,6	15,1	14,8	15,2	18,5	23
% of persons employed with ICT specialist skills	2,7	2,8	2,7	2,7	3,1	17
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	5,5				5,5	11
ICT sector share of total employment	2,6				4,0	16
ICT sector growth (constant prices).	5,0				3,6	4
R&D expenditure in ICT (by the business sector), as % of GDP	0,0				0,3	16
=== as % of total R&D expenditure	12,1				25,7	16

22. Portugal

ICT on the ground

Portugal has had a lower than average development in most information society indicators, but performs notably well in 3G adoption and eGovernment and better in online media than other forms for usage.

Conversion to broadband in Portugal was relatively good the last year but overall Internet use is low and broadband connection rates are still a bit below EU average. The increase in broadband take-up is slightly slower than average. DSL accounts for more than half of broadband connections. Usage of online services among citizens is somewhat lower than connectivity levels would imply and, with exception of online media use, in the lowest part of the scale. The market for audiovisual content online is relatively limited and does not live up to the country's potential. 3G adoption is one of the highest in Europe, and digital television is in the top ten.

The availability of eGovernment is very good for enterprise services and above average for citizens. Use of these citizens and enterprises services is slightly below average but those who use them tend to be more advanced users, for example, the proportion return completed forms online is above average. Growth rates in service usage are around the average. A higher than average number of schools have broadband connections, and a fair number of teachers use computers in the class for teaching, but the number of available computers for students is still low.

Skill levels in the work force are low, but both the use of Internet at work and the number of employed persons with ICT specialist skill is improving. The overall picture for enterprise use is more complex. Growth in enterprise connectivity last year has not kept up with other countries after a couple of years of good growth.

ICT policies in the National Reform Programme

Within the NRP, ICT issues are treated mostly in the Ligar Portugal action plan, and the progress report for 2006 lists several measures undertaken.

- **eGovernment:** Enabling legislation for a public key infrastructure and the digitalisation of the Portuguese official journal was passed in May 2006. One-stop-shop electronic kiosks for company registration have been in use since July 2005 and work is underway for online equivalents. A newly established eGovernment portal for companies already offers advanced applications like online company registration through lawyers and notaries. Electronic invoicing was to be used by public authorities from 2007. The first pilot project for an integrated eID card is to start in early 2007.

- **Promotion of ICT use:** Since December 2005 the purchase of computers has been supported through tax rebates for families with students. Additional projects with a total budget of 200 million Euros are underway to promote ICT take-up, use and ICT industries in the regions.

- **Infrastructure:** In 2005 the bandwidth of the connections of the Portuguese fibre optic grid to international backbones was doubled and Spain and Portugal agreed to link their fibre optic networks to the same effect.

- **Digital Skills:** Measures included the training of teachers in basic and secondary education in ICT and the integration of ICT in their curricula. In 2005 all public schools were connected to broadband.

Portugal

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	84	92	92,6		87,4	9
DSL coverage in rural areas (as % of total population)			79		65,9	9,5
Broadband penetration (as % of population)	4,1	7,2	10,8	13,5	15,7	14
DSL penetration (as % of population)	1,4	3,3	6,1	8,4	12,8	14
Predominant download speed				1-2Mpbs		4
Households having broadband (as % of those having access to the internet at home)	36,3	47,0	62,7	68,3	62,1	12
% of enterprises with broadband access	31,0	48,6	62,8	65,9	74,5	18
Number of 3G subscribers per 100 inhabitants			9,0		5,0	3
Digital Television in households			20,2		30,6	9
Music: number of single downloads per 100 inhabitants			6,9			
Internet Usage						
% population who are regular internet users	21,9	25,1	27,8	31,4	46,7	24
Take up of internet services (as % of population)						
sending emails	19,9	23,7	25,8	28,8	43,8	24
looking for information about goods and services	21,0	23,2	25,9	29,8	42,9	21
Internet telephoning or videoconferencing	2,5	3,1	3,2	5,5	7,1	22
playing/downloading games and music	11,1	13,3	14,1	16,2	18,2	21
listening to the web radio/watching web tv	5,9	8,1	9,0	10,7	11,8	16
reading online newspapers/magazines	12,7	14,7	16,4	15,8	19,0	21
internet banking	6,1	7,6	8,4	9,8	22,0	21
Places of access						
% at home	14,6	17,1	19,5	23,2	42,6	26
% at work	12,5	14,6	15,5	16,3	23,1	24
% at educational place	6,6	7,2	7,8	8,0	8,0	17
% at PIAP	7,2	8,4	4,7	5,4	6,8	15
eGovernment Indicators						
% basic public services for citizens fully available online	18,2	25,0		41,7	36,8	11,5
% basic public services for enterprises fully available online	62,5	62,5		87,5	67,8	6
% of population using e-Government services		12,5	14,0	16,5	23,8	18
of which for returning filled in forms	5,2	7,6	9,0	11,5	8,1	10
% of enterprises using e-Government services		57,2	57,9	60,3	63,7	19
of which for returning filled in forms	42,5	50,1	52,5	53,7	44,8	12
ICT in schools						
Number of computers connected per 100 pupils				5,4	9,9	25
% of schools with broadband access				73,0	67,0	16
% of teachers having used the computer in class during the last 12 months				69,5	74,3	17
e-Commerce						
e-commerce as % of total turnover of enterprises	1,6	4,9		8,2	11,7	11
% enterprises receiving internet orders	2,1	6,0	6,3	5,4	13,9	22
% enterprises purchasing on the internet		16,1	19,4	19,6	37,9	20
e-business. % enterprises:						
with integrated internal business processes	21,3	33,1	36,7	28,1	37,3	16
with integrated external business processes					13,5	
Security: % enterprises using Secure servers	34,8	28,8	18,4	21,5	41,0	19
% using digital signatures for authentication	7,6	5,4	9,3	9,7	14,3	19
Employment and Skills						
% employees using Internet at work	17,8	18,8	21,4	24,5	36,1	23
% of persons employed with ICT user skills.	12,1	13,4	12,4	12,3	18,5	25
% of persons employed with ICT specialist skills	2,2	2,1	2,2	2,7	3,1	19
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	4,5				5,5	18
ICT sector share of total employment	1,7				4,0	19
ICT sector growth (constant prices).	2,7				3,6	10
R&D expenditure in ICT (by the business sector), as % of GDP	0,1				0,3	14
=== as % of total R&D expenditure	21,5				25,7	10

23. Romania

ICT on the ground

Although data on Romania is incomplete, it is clear that it is at a relatively early stage in the development of the information society.

The percentage of population regularly using the Internet in Romania is currently the lowest in Europe. Around one third of homes with Internet access have broadband, a figure well below EU average. Usage of Internet services is among the lowest in Europe in all measured services, including eGovernment services. The low level of fixed telephone network penetration in Romania is clearly one of the main obstacles for the development of broadband and internet usage.

Both user and specialist ICT skills among employees and employee use of Internet are very low. While the number of employees with user skills is increasing, specialist skill levels have shown a slight decrease lately.

Romania

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)					87,4	
DSL coverage in rural areas (as % of total population)					65,9	
Broadband penetration (as % of population)					15,7	
DSL penetration (as % of population)					12,8	
Predominant download speed						
Households having broadband (as % of those having access to the internet at home)				36,6	62,1	26
% of enterprises with broadband access		7,0			74,5	
Number of 3G subscribers per 100 inhabitants					5,0	
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users		9,9		18,4	46,7	29
Take up of internet services (as % of population)						
sending emails		9,7		16,3	43,8	29
looking for information about goods and services		4,9		10,0	42,9	29
Internet telephoning or videoconferencing		0,6		2,5	7,1	28
playing/downloading games and music		5,0		10,7	18,2	27
listening to the web radio/watching web tv		1,6		4,5	11,8	28
reading online newspapers/magazines		3,0		6,8	19,0	28
internet banking		0,4		0,6	22,0	29
Places of access						
% at home		4,9		11,0	42,6	29
% at work		4,3		7,4	23,1	29
% at educational place		2,2		4,3	8,0	26
% at PIAP				2,5	6,8	27
eGovernment Indicators						
% basic public services for citizens fully available online					36,8	
% basic public services for enterprises fully available online					67,8	
% of population using e-Government services				2,9	23,8	26
of which for returning filled in forms		1,1		0,6	8,1	26
% of enterprises using e-Government services		30,9			63,7	
of which for returning filled in forms		11,6			44,8	
ICT in schools						
Number of computers connected per 100 pupils					9,9	
% of schools with broadband access					67,0	
% of teachers having used the computer in class during the last 12 months					74,3	
e-Commerce						
e-commerce as % of total turnover of enterprises					11,7	
% enterprises receiving internet orders		2,2			13,9	
% enterprises purchasing on the internet		1,9			37,9	
e-business. % enterprises:						
with integrated internal business processes		49,8			37,3	
with integrated external business processes		36,3			13,5	
Security: % enterprises using Secure servers		10,8			41,0	
% using digital signatures for authentication		3,5			14,3	
Employment and Skills						
% employees using Internet at work		7,2			36,1	
% of persons employed with ICT user skills.			8,4	9,1	18,5	27
% of persons employed with ICT specialist skills			2,4	2,3	3,1	25
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

24. Sweden

ICT on the ground

Sweden is placed among the top nations in most i2010 indicators and is firmly within the group of leading countries in European information society development. However, there are signs that aside from a group of very advanced enterprise users, there is still a sizeable group not using eBusiness tools at a level matching the overall development in Sweden.

Sweden has the 4th highest number of broadband connections at home in the EU. About two thirds of connections are DSL-based but there are also around 300,000 fibre connections, the highest number in Europe. Swedish citizens are among the most active users of Internet in the EU in every regard except Internet telephony. High broadband penetration translates into a vibrant and competitive market for music downloads with very high usage and very low prices. Sweden is one of few countries with significant 3G usage and is highly developed in digital television.

eGovernment levels are generally high. Enterprises use of public services is above average but below the top performing countries. ICT availability in schools is high, and use by teachers in class is especially widespread.

Basic ICT skills within the work force are above EU average and specialist skill levels are the highest in Europe. Investment in ICT-related R&D is the second highest in Europe and comprises around one third of total R&D. The enterprise broadband connectivity rate is over 80% but businesses do not have the same level of usage as the citizens: While eCommerce use is high in Sweden, only a quarter of businesses are using fully integrated business processes, well below the EU average. This divide in usage levels is a trait shared with a handful of other countries, like Ireland, Norway and the UK.

ICT policies in the National Reform Programme

The Swedish ICT policy aims to create a sustainable information society for all through the achievement of three sub-goals: quality, sustainable growth and accessibility.

- **Quality:** In January 2006 the Swedish Administrative Development Agency was established to further develop the public administration with particular emphasis on the development of an electronic administration. A new strategy for electronic management in the central Government was decided including targets for public procurement, electronic purchasing and e-mail handling. Similar measures are taken at the level of municipalities, counties and regions. Efforts are underway to unify the IT infrastructure for the public sector. Another focus is on actions for more coordination in the development of IT standards and increased use of open source software at all levels of Government.

- **Sustainable Growth:** The Swedish National Agency for School Improvement is to promote the development of ICT in preschools, schools and adult education. The Swedish Business Development Agency is examining opportunities for telework in sparsely populated areas. In 2006 a three-year programme aimed at stimulating the use of eID was initiated. Various measures address gender equality in the IT sector.

- **Availability:** The 'broadband support' initiative to expand IT infrastructure with high transfer capacity in sparsely populated areas has been prolonged until end-2007. Plans are underway to ensure that the SITIC (the national centre for IT disruption) can handle future challenges related to IT disruptions.

Sweden

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	95	96	93,489		87,4	8
DSL coverage in rural areas (as % of total population)			66		65,9	14
Broadband penetration (as % of population)	10,2	13,6	19,3	24,5	15,7	4
DSL penetration (as % of population)	5,9	8,4	12,5	16,0	12,8	6
Predominant download speed				1-2Mpbs		4
Households having broadband (as % of those having access to the internet at home)			55,4	65,9	62,1	14
% of enterprises with broadband access	62,2		82,5	88,9	74,5	3
Number of 3G subscribers per 100 inhabitants			8,3		5,0	5
Digital Television in households			44,3		30,6	3
Music: number of single downloads per 100 inhabitants			44,4			
Internet Usage						
% population who are regular internet users	69,3	75,3	75,9	79,8	46,7	2
Take up of internet services (as % of population)						
sending emails	66,2	63,6	67,4	73,6	43,8	4
looking for information about goods and services	64,1	59,3	69,8	74,0	42,9	2
Internet telephoning or videoconferencing	3,3	3,8	4,5	8,6	7,1	12
playing/downloading games and music	26,8	23,1	31,4	33,8	18,2	4
listening to the web radio/watching web tv	14,7	12,7	20,5	28,5	11,8	3
reading online newspapers/magazines	30,0	28,0	39,1	41,3	19,0	6
internet banking	38,3	40,3	50,7	56,9	22,0	6
Places of access						
% at home	65,3	69,3	70,7	77,1	42,6	2
% at work	35,7	36,9	39,7	38,4	23,1	6
% at educational place	12,7	11,4	11,8	11,8	8,0	5
% at PIAP	7,6	8,2	5,1	4,8	6,8	17
eGovernment Indicators						
% basic public services for citizens fully available online	54,5	63,6		63,6	36,8	4,5
% basic public services for enterprises fully available online	85,7	87,5		87,5	67,8	6
% of population using e-Government services	44,0	38,6	51,7		23,8	
of which for returning filled in forms	11,5	11,3	21,4		8,1	
% of enterprises using e-Government services		91,8	79,6	80,1	63,7	9
of which for returning filled in forms	40,3	52,6	47,8	52,8	44,8	13
ICT in schools						
Number of computers connected per 100 pupils				16,5	9,9	6
% of schools with broadband access				89,0	67,0	7,5
% of teachers having used the computer in class during the last 12 months				90,9	74,3	3
e-Commerce						
e-commerce as % of total turnover of enterprises	12,3			13,6	11,7	8
% enterprises receiving internet orders	8,9	19,4	22,4	23,4	13,9	5
% enterprises purchasing on the internet		68,4	66,7	70,0	37,9	1
e-business. % enterprises:						
with integrated internal business processes	23,2	24,9	25,3	28,0	37,3	17
with integrated external business processes	6,5	8,9	8,3	8,8	13,5	20
Security: % enterprises using Secure servers	42,9	49,1	53,7	57,9	41,0	4
% using digital signatures for authentication	13,7	15,2	16,1	17,5	14,3	4
Employment and Skills						
% employees using Internet at work	50,1	52,1	53,3	52,9	36,1	3
% of persons employed with ICT user skills.	19,3	20,0	18,9	19,4	18,5	9
% of persons employed with ICT specialist skills	4,7	4,4	4,9	4,9	3,1	1
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	6,3				5,5	8
ICT sector share of total employment	5,5				4,0	2
ICT sector growth (constant prices).	3,0				3,6	9
R&D expenditure in ICT (by the business sector), as % of GDP	1,0				0,3	2
=== as % of total R&D expenditure	32,8				25,7	4

25. Slovakia

ICT on the ground

Slovakia has an overall low level of connectivity, but Slovakian citizens are active Internet users within the limits set by the infrastructure.

Household take-up of broadband and overall Internet connectivity are among the lowest in Europe. Growth in broadband has tripled from a very low starting point but there has been little increase in overall number of Internet users. DSL accounts for a bit more than half of all connections. Usage levels are higher than the connectivity would imply, and not far from EU average. Reading news and magazines online is particularly popular. This can partly be explained with the high frequency of Internet use outside the homes, at Public Internet Access Places, in schools and at work. Despite the popularity of music and games downloads, the low broadband penetration does not permit the development of a commercial market for online content. Digital television is still in its infancy.

eGovernment services are not yet widely available online in Slovakia but citizens and enterprises use of basic services is above the EU average and close to average for advanced services. Enterprise service use has grown especially fast. Availability of broadband and computers in school are low but teachers use computers for teaching more than availability would imply.

ICT skill levels among employees are unequal: For expert skills, Slovakia is above EU average whereas basic user skill levels are among the lowest in Europe. Connectivity among enterprises is slightly better than in households but at the low end of the European scale. Enterprise use of eBusiness applications and eCommerce is low, with the exception of eSignatures.

ICT policies in the National Reform Programme

The development of the Information Society is one of the policy priorities of Slovakia.

- **eGovernment:** The Central Public Administration Portal was put into limited operation; electronic procurement systems and electronic signature projects have been furthered; several studies on future ICT measures have been prepared (including a system for electronic data exchange among registers, a personal embedded chip ID cards and free access to the land register).

- **Digital Literacy:** ICT issues are being included in the curricula at all levels of education, teachers have been given training on the use of ICT in the educational process and schools were provided with some necessary infrastructure. To promote digital literacy the 'Stur's Movement' project has funded ICT training for local communities.

- **eBusiness:** some legislative actions were undertaken to support electronic commerce and developments in electronic communications.

Slovakia

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	18,3	44	60,742		87,4	25
DSL coverage in rural areas (as % of total population)			24,993		65,9	21
Broadband penetration (as % of population)		0,6	1,8	4,3	15,7	24
DSL penetration (as % of population)		0,5	1,5	2,9	12,8	25
Predominant download speed				LE 512kbps		20
Households having broadband (as % of those having access to the internet at home)		15,2	31,0	43,0	62,1	24
% of enterprises with broadband access		24,8	47,6	60,8	74,5	20
Number of 3G subscribers per 100 inhabitants			0,0		5,0	24,5
Digital Television in households			12,7		30,6	13
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users		39,8	42,8	43,1	46,7	16
Take up of internet services (as % of population)						
sending emails		37,7	42,4	41,6	43,8	15
looking for information about goods and services		26,6	30,1	33,5	42,9	19
Internet telephoning or videoconferencing		4,5	3,6	7,0	7,1	18
playing/downloading games and music		18,5	16,1	18,5	18,2	16
listening to the web radio/watching web tv		6,0	5,5	8,2	11,8	23
reading online newspapers/magazines		22,6	23,2	25,4	19,0	12
internet banking		10,1	10,1	12,6	22,0	20
Places of access						
% at home		22,4	20,1	23,6	42,6	25
% at work		26,0	27,0	25,7	23,1	13
% at educational place		10,5	11,0	11,4	8,0	8
% at PIAP		18,6	11,7	7,2	6,8	9
eGovernment Indicators						
% basic public services for citizens fully available online		8,3		8,3	36,8	25
% basic public services for enterprises fully available online		25,0		37,5	67,8	25
% of population using e-Government services		25,4	26,6	32,2	23,8	9
of which for returning filled in forms		4,9	6,5	7,2	8,1	13
% of enterprises using e-Government services		47,1	56,6	77,2	63,7	10
of which for returning filled in forms		18,2	16,3	44,6	44,8	17
ICT in schools						
Number of computers connected per 100 pupils				5,8	9,9	23
% of schools with broadband access				40,0	67,0	23
% of teachers having used the computer in class during the last 12 months				70,3	74,3	15
e-Commerce						
e-commerce as % of total turnover of enterprises			0,0	0,0	11,7	24
% enterprises receiving internet orders		6,5	6,5		13,9	
% enterprises purchasing on the internet		16,3	22,4		37,9	
e-business. % enterprises:						
with integrated internal business processes		21,2	25,5	22,2	37,3	20
with integrated external business processes		7,1	9,2	9,8	13,5	17
Security: % enterprises using Secure servers		13,2	20,9	15,2	41,0	23
% using digital signatures for authentication		5,6	10,4	14,6	14,3	7
Employment and Skills						
% employees using Internet at work		19,4	25,5	28,6	36,1	19
% of persons employed with ICT user skills.	15,0	15,7	15,4	15,3	18,5	22
% of persons employed with ICT specialist skills	2,7	3,0	3,2	3,3	3,1	8
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	7,1				5,5	4
ICT sector share of total employment	4,4				4,0	7
ICT sector growth (constant prices).	-2,0				3,6	18
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

26. Slovenia

ICT on the ground

Slovenia shows good development in the information society indicators, although it is generally just behind EU averages.

Broadband take up among households is just below EU average and is growing at similar rates as Europe as a whole. Overall Internet usage is also on EU average, and the same applies to the share of household connections that are broadband. DSL is the dominant platform.

Citizens are using Internet and online services at normal rates to the connection level. Usage is close to EU average for utility services, and above EU average for media use.

The number of eGovernment services fully online is above the EU average, and especially good for citizen services. The number of individuals interacting with public authorities has grown fast to well above average levels, but advances service use still lags behind for citizens. Enterprise use of eGovernment is above European average on both basic and advanced levels. Whereas the number of broadband connected schools is fairly high, the number of computers and the actual use by teachers lags behind.

ICT skills levels in the work force are slightly above average both for user-level and specialist skills and the number of specialists employed shows continued improvement. Investment in R&D is lower than average as is the relative share of ICT-related R&D activities. Enterprise connectivity levels have not grown significantly the last year and are now just above the EU average. Use of eBusiness applications is lagging behind and eCommerce growth has been slower than the EU average.

ICT policies in the National Reform Programme

The Progress Report features several measures and achievements:

- **Electronic communications**: In 2006 the incumbent was floated on the stock market and its privatisation was advanced. Currently, support for broadband roll out in rural areas is being prepared and a tender is being held for public wireless access points, particularly in rural areas.

- **eGovernment:** A unified Government portal, set up in May 2006 allows access to digital services, an online one-stop-shop for individual entrepreneurs was introduced 2005 and a similar system for larger companies will go online in 2007. Also an integrated register for social and labour benefits is in its advanced planning stage.

- **eInclusion**: Public Internet access points were set up and vocational and secondary education are being restructured to emphasise ICT. Work on a 'Digital Library of Slovenia' began in 2005.

Slovenia

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)			55		87,4	26
DSL coverage in rural areas (as % of total population)			27		65,9	20
Broadband penetration (as % of population)		5,3	8,6	12,6	15,7	16
DSL penetration (as % of population)		3,2	5,4	8,6	12,8	13
Predominant download speed				0.5-1Mpbs		11,5
Households having broadband (as % of those having access to the internet at home)		21,8	40,3	61,7	62,1	17
% of enterprises with broadband access		61,8	73,9	74,9	74,5	13
Number of 3G subscribers per 100 inhabitants			1,3		5,0	15
Digital Television in households			6,9		30,6	19
Music: number of single downloads per 100 inhabitants			0,0			
Internet Usage						
% population who are regular internet users		33,4	40,5	46,6	46,7	13
Take up of internet services (as % of population)						
sending emails		29,3	35,8	41,7	43,8	14
looking for information about goods and services		29,5	36,2	41,8	42,9	14
Internet telephoning or videoconferencing		2,6		4,4	7,1	25
playing/downloading games and music		15,7	23,7	21,0	18,2	14
listening to the web radio/watching web tv		6,4	10,5	14,7	11,8	12
reading online newspapers/magazines		16,4	20,0	23,8	19,0	14
internet banking		8,6	11,5	16,1	22,0	16
Places of access						
% at home		25,9	35,4	40,8	42,6	13
% at work		20,1	22,7	28,3	23,1	10
% at educational place		8,1	7,1	9,9	8,0	11
% at PIAP		10,8	6,0	9,4	6,8	6
eGovernment Indicators						
% basic public services for citizens fully available online		50,0		58,3	36,8	8,5
% basic public services for enterprises fully available online		37,5		75,0	67,8	12
% of population using e-Government services		13,0	19,2	30,5	23,8	10
of which for returning filled in forms		2,9		6,3	8,1	15
% of enterprises using e-Government services		47,0	72,1	74,5	63,7	13
of which for returning filled in forms		35,6	44,7	49,1	44,8	16
ICT in schools						
Number of computers connected per 100 pupils				7,5	9,9	19
% of schools with broadband access				85,0	67,0	9
% of teachers having used the computer in class during the last 12 months				67,6	74,3	20
e-Commerce						
e-commerce as % of total turnover of enterprises				9,2	11,7	10
% enterprises receiving internet orders		10,7	8,8	11,6	13,9	15
% enterprises purchasing on the internet		25,5	26,1	22,4	37,9	17
e-business. % enterprises:						
with integrated internal business processes		20,5	19,9	19,7	37,3	21
with integrated external business processes		6,2	9,0	7,3	13,5	21
Security: % enterprises using Secure servers		32,3	25,5	23,8	41,0	17
% using digital signatures for authentication		15,2	5,9	10,6	14,3	14
Employment and Skills						
% employees using Internet at work		28,6	35,9	35,4	36,1	12
% of persons employed with ICT user skills.	20,0	19,6	19,6	19,0	18,5	10
% of persons employed with ICT specialist skills	2,6	2,6	2,8	3,2	3,1	9
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP	0,2				0,3	10
=== as % of total R&D expenditure	17,3				25,7	12

27. United Kingdom

ICT on the ground

In general, the UK performs slightly behind the leading group of countries in Europe for information society development. It excels in basic skill development and commercial online activities, performs better than average in overall use, but falls behind in advanced enterprise usage, including use of eGovernment services.

Broadband take-up has progressed well, and less than a third of household connections are now narrowband. Based on an overall high connectivity, usage is also generally well above average. However, growth in usage is not fast enough to push UK above mid-level rankings. High broadband penetration and a sizeable established music industry are among the factors, which have facilitated the development of Europe's largest market for music downloads - both online and to mobile devices. Using public access points is particularly popular. 3G is performing well compared to other countries and the UK is first in Europe for digital TV.

Online availability of public services for citizens is very high, whereas it is low and not progressing for enterprises. Enterprises use of services is also very low. ICT in education is well developed, the UK is leading Europe in teachers' use in class, and the number of computers available to students is high, while broadband availability is above average without being exceptional. Use of ICT in schools is good but mixed: While the number of computers available to students is above average without being particularly high, broadband access is good and the teachers use computers in the classroom more often than anywhere else in Europe.

Skill levels in the work force are high: for user level ICT-skills the highest in Europe. Specialist levels are slightly higher than EU average, but not developing. Investment in R&D and the ICT share of these investments are on EU average. Enterprises do not have the same high level of connectivity as citizens, although above average in Europe. Companies buy and sell online at top EU levels but are at the low end for use of eBusiness integration applications. This gap between eBusiness and eCommerce levels is a trait shared among many of the northern countries, including the Netherlands, Ireland, Finland and Norway.

ICT policies in the National Reform Programme

The UK has started to implement the priority actions set out in the National Reform Programme: Convergence, research in ICT and digital inclusion. Additional attention has been paid to:

- **eGovernment:** An implementation plan for the eGovernment strategy was launched.
- **ICT for enterprise and innovation:** The use of ICT by businesses has been recognised as a key driver of productivity and competitiveness and the DTI has been working with the sector to single out best practices and analyse the impact of ICT use.

United Kingdom

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	85	95	99,468		87,4	4
DSL coverage in rural areas (as % of total population)			94,87		65,9	5
Broadband penetration (as % of population)	4,4	8,8	14,9	20,4	15,7	6
DSL penetration (as % of population)	2,3	5,8	10,8	15,5	12,8	8
Predominant download speed				1-2Mpbs		4
Households having broadband (as % of those having access to the internet at home)	19,4	28,3	52,4	70,1	62,1	11
% of enterprises with broadband access	26,7	50,2	65,4	77,4	74,5	10
Number of 3G subscribers per 100 inhabitants			8,6		5,0	4
Digital Television in households			68,7		30,6	1
Music: number of single downloads per 100 inhabitants			39,3			
Internet Usage						
% population who are regular internet users	46,5	48,6	53,9	56,8	46,7	10
Take up of internet services (as % of population)						
sending emails	51,2	53,0	56,6	52,8	43,8	10
looking for information about goods and services	49,8	49,2	56,8	55,2	42,9	9
Internet telephoning or videoconferencing	4,0	4,0	4,8	6,7	7,1	19
playing/downloading games and music	18,6	25,3	23,3	24,5	18,2	9
listening to the web radio/watching web tv	10,3	9,6	14,9	15,2	11,8	11
reading online newspapers/magazines	22,9	18,3	24,0	23,3	19,0	15
internet banking	22,3	22,4	26,9	27,8	22,0	11
Places of access						
% at home	50,1	51,0	55,1	55,5	42,6	9
% at work	27,2	29,4	31,0	30,2	23,1	8
% at educational place	10,5	10,6	10,4	9,8	8,0	12
% at PIAP	25,0	23,7	16,0	13,8	6,8	3
eGovernment Indicators						
% basic public services for citizens fully available online	54,5	60,0		80,0	36,8	2
% basic public services for enterprises fully available online	42,9	57,1		57,1	67,8	20
% of population using e-Government services	21,1	21,7	24,3		23,8	
of which for returning filled in forms	4,1	3,4	4,8		8,1	
% of enterprises using e-Government services		34,5	38,8	52,5	63,7	22
of which for returning filled in forms	7,0	12,2	19,2	37,6	44,8	19
ICT in schools						
Number of computers connected per 100 pupils				18,5	9,9	4
% of schools with broadband access				75,0	67,0	13,5
% of teachers having used the computer in class during the last 12 months				96,4	74,3	1
e-Commerce						
e-commerce as % of total turnover of enterprises	11,9	14,3	15,6	17,4	11,7	2
% enterprises receiving internet orders	8,6	13,1	14,7	18,8	13,9	8
% enterprises purchasing on the internet		45,3	53,9	62,4	37,9	3
e-business. % enterprises:						
with integrated internal business processes		34,5	10,0	15,3	37,3	24
with integrated external business processes		9,6	8,9	10,9	13,5	13
Security: % enterprises using Secure servers			47,4	50,1	41,0	6
% using digital signatures for authentication			7,5	10,2	14,3	16
Employment and Skills						
% employees using Internet at work		54,4	38,3	41,5	36,1	7
% of persons employed with ICT user skills.	24,3	24,1	24,6	24,7	18,5	1
% of persons employed with ICT specialist skills	3,2	3,2	3,2	3,2	3,1	10
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP	6,9				5,5	5
ICT sector share of total employment	4,5				4,0	6
ICT sector growth (constant prices).	7,4				3,6	2
R&D expenditure in ICT (by the business sector), as % of GDP	0,3				0,3	8
=== as % of total R&D expenditure	24,2				25,7	7

28. Norway

ICT on the ground

As for broadband, Norway has grown rapidly from a somewhat slower initial take-up than the other Nordic countries into having one of the highest number of broadband connections at home in Europe, according to Eurostat household figures (not listed in comparison table in this document). With a continued high conversion rate, broadband now accounts for more than 80% of all home connections, meaning future growth potential mostly lies in increased overall take-up. Usage is very high, and for online media and financial use only surpassed by Iceland. Like a few of the countries with the most active user base, also use in public access points is very high.

eGovernment supply levels are solid, although Norway has fallen slightly from being among the absolute top levels during a year of delayed developments. Usage of eGovernment services among citizens is however still the second highest and most consistent in Europe. Perhaps reflecting service types and business structure, enterprises are on one side very high users of advanced services, but not even in the top ten list of Europe for overall usage. ICT maturity in schools is overall very high: Number of PCs is especially high, whereas broadband connectivity and actual use by teachers are somewhat lower.

The Norwegian work force is among the most skilled in Europe, and has the second highest share of employees with expert ICT-skills. Internet use at work is high. Business use of online services and eCommerce is also very advanced. However, use of fully integrated business systems and eBusiness tools is only around EU average, and growth here has been slow. Use of eSignatures is, like for other high-performers like Finland and Iceland, still among the lowest in Europe, which might reflect other solutions or structures at play. Enterprises have a steadily growing and high broadband connectivity rate.

Norway

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	68	82	88,407		87,4	15
DSL coverage in rural areas (as % of total population)			82,669		65,9	7
Broadband penetration (as % of population)					15,7	
DSL penetration (as % of population)					12,8	
Predominant download speed						
Households having broadband (as % of those having access to the internet at home)	37,8	49,9	64,7	83,0	62,1	3
% of enterprises with broadband access	46,9	60,3	78,0	86,1	74,5	6
Number of 3G subscribers per 100 inhabitants			2,5		5,0	9
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users	65,8	67,9	73,7	76,7	46,7	4
Take up of internet services (as % of population)						
sending emails	64,4	65,8	68,2	72,3	43,8	5
looking for information about goods and services	61,3	61,9	66,8	73,7	42,9	3
Internet telephoning or videoconferencing	4,2	5,5	7,6	13,3	7,1	6
playing/downloading games and music	23,5	22,8	25,6	36,6	18,2	2
listening to the web radio/watching web tv	17,4	21,3	24,4	34,5	11,8	2
reading online newspapers/magazines	53,7	56,2	59,9	64,9	19,0	2
internet banking	48,6	54,5	61,9	66,5	22,0	2
Places of access						
% at home	60,2	62,0	67,4	73,4	42,6	5
% at work	39,8	40,6	46,6	47,1	23,1	2
% at educational place	12,5	12,9	12,3	12,0	8,0	4
% at PIAP	13,9	19,1	7,3	10,9	6,8	4
eGovernment Indicators						
% basic public services for citizens fully available online	40,0	40,0		60,0	36,8	6,5
% basic public services for enterprises fully available online	57,1	75,0		87,5	67,8	6
% of population using e-Government services	43,4	37,3	51,7	57,5	23,8	2
of which for returning filled in forms	13,2	8,5	20,6	28,2	8,1	2
% of enterprises using e-Government services	64,8	68,7	83,5	74,1	63,7	14
of which for returning filled in forms	23,0	40,0	59,2	62,3	44,8	4
ICT in schools						
Number of computers connected per 100 pupils				22,7	9,9	2
% of schools with broadband access				89,0	67,0	7,5
% of teachers having used the computer in class during the last 12 months				89,4	74,3	5
e-Commerce						
e-commerce as % of total turnover of enterprises	6,2	7,5	14,7	13,9	11,7	6
% enterprises receiving internet orders	11,6	20,0	19,8	24,9	13,9	4
% enterprises purchasing on the internet		47,3	57,2	65,7	37,9	2
e-business. % enterprises:						
with integrated internal business processes	30,5	30,4	33,8	34,3	37,3	14
with integrated external business processes	10,5	12,0	13,4	15,3	13,5	8
Security: % enterprises using Secure servers	26,2	31,4	53,7	59,2	41,0	2
% using digital signatures for authentication	10,0	5,2	7,5	8,6	14,3	24
Employment and Skills						
% employees using Internet at work	50,7	48,7	52,2	50,4	36,1	4
% of persons employed with ICT user skills.	19,4	19,5	19,5	19,5	18,5	8
% of persons employed with ICT specialist skills	4,6	4,5	5,1	4,7	3,1	2
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

29. Iceland

ICT on the ground

In most connectivity and citizen use indicators, Iceland is the most advanced country in Europe. Iceland has by far the highest take-up of broadband by households in Europe, according to Eurostat figures (not listed in comparison table in this document). Overall Internet take-up and use is also the highest in Europe. However, government service levels and eBusiness use are Iceland's weak points.

The citizens are also the most active service users in Europe in most regards, and both for utility and media use. Close to 90% of all connections are now broadband.

eGovernment supply levels have not developed in the same speed as in other countries and are now only average. Usage of eGovernment has however picked up and is now the highest in Europe. Schools are very well connected to broadband. The number of computers available to students is high, although not among the very highest in Europe, and classroom use of computers by teachers is only average.

While the level of IT-specialists is above EU-average, its level of basic user skills, although not known for 2006, has been more average before. Enterprise use of ICT varies: Commercial use is high, especially for selling online, whereas eBusiness use is not on the same levels.

Iceland

Broadband	2003	2004	2005	2006	EU25	Rank
Total DSL coverage (as % of total population)	90	92	92		87,4	10,5
DSL coverage in rural areas (as % of total population)			79		65,9	9,5
Broadband penetration (as % of population)					15,7	
DSL penetration (as % of population)					12,8	
Predominant download speed						
Households having broadband (as % of those having access to the internet at home)	40,3	56,4	75,2	86,8	62,1	2
% of enterprises with broadband access	19,9			95,2	74,5	1
Number of 3G subscribers per 100 inhabitants			0,0		5,0	24,5
Digital Television in households					30,6	
Music: number of single downloads per 100 inhabitants						
Internet Usage						
% population who are regular internet users	74,7	76,9	80,6	84,1	46,7	1
Take up of internet services (as % of population)						
sending emails	73,0	73,4	75,2	77,0	43,8	1
looking for information about goods and services	68,8	71,9	73,0	76,2	42,9	1
Internet telephoning or videoconferencing	6,8	8,8	14,1	18,2	7,1	1
playing/downloading games and music	29,6	33,8	28,6	34,0	18,2	3
listening to the web radio/watching web tv	16,7	21,1	31,4	42,6	11,8	1
reading online newspapers/magazines	59,6	61,1	64,9	66,9	19,0	1
internet banking	47,7	53,6	60,9	66,8	22,0	1
Places of access						
% at home	68,8	65,1	76,9	79,7	42,6	1
% at work	37,8	41,2	46,6	49,2	23,1	1
% at educational place	12,3	12,9	17,1	19,5	8,0	1
% at PIAP	3,8	5,6	11,6	15,3	6,8	2
eGovernment Indicators						
% basic public services for citizens fully available online	18,2	36,4		36,4	36,8	14
% basic public services for enterprises fully available online	42,9	71,4		62,5	67,8	17
% of population using e-Government services	55,7	58,5	55,3	60,6	23,8	1
of which for returning filled in forms	39,4	18,7	19,9	27,4	8,1	3
% of enterprises using e-Government services	97,4			94,6	63,7	1
of which for returning filled in forms	63,1			80,6	44,8	1
ICT in schools						
Number of computers connected per 100 pupils				14,8	9,9	8
% of schools with broadband access				92,0	67,0	4,5
% of teachers having used the computer in class during the last 12 months				79,5	74,3	9
e-Commerce						
e-commerce as % of total turnover of enterprises	5,9			8,0	11,7	12
% enterprises receiving internet orders	5,9			29,5	13,9	2
% enterprises purchasing on the internet				60,0	37,9	4
e-business. % enterprises:						
with integrated internal business processes	30,7			40,6	37,3	9
with integrated external business processes	8,7			10,2	13,5	15
Security: % enterprises using Secure servers	48,1			39,9	41,0	12
% using digital signatures for authentication	5,5			9,4	14,3	20
Employment and Skills						
% employees using Internet at work	45,9			46,4	36,1	5
% of persons employed with ICT user skills.	18,8	18,1	17,2		18,5	
% of persons employed with ICT specialist skills	3,4	3,2	3,6		3,1	
Indicators on growth of ICT sector and R&D						
ICT sector share of total GDP					5,5	
ICT sector share of total employment					4,0	
ICT sector growth (constant prices).					3,6	
R&D expenditure in ICT (by the business sector), as % of GDP					0,3	
=== as % of total R&D expenditure					25,7	

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