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COMMISSION STAFF WORKING PAPER

i2010 - First Annual Report on the European Information Society

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i2010 - First Annual Report on the European Information Society

INTRODUCTION

This is the annex to the first i2010 Annual Report on the Information Society. Its purpose is to report on market developments and policy initiatives since the launch of the i2010 strategy in June 2005¹ and on the achievements at European level and in Member States as set out in the Lisbon National Reform Programmes. The report provides the basis for policy proposals for the next 18 months which are presented in the associated Commission Communication.

Recent economic data confirm the central role of Information and Communication Technologies (ICT) for achieving the Lisbon target of faster growth. The ICT sector remains a fast-growing, research-intensive and innovative sector and ICT continue to drive about half of the productivity gains in the EU (see section 2.1). But this is not sufficient to improve the global position of the EU economy. A global, competitive European ICT sector would require a significant stepping up of investment in research and a sharp acceleration in the pace of innovation, requiring in turn higher investment in ICT, including advanced networks and new online services. However, the recent data confirm that there is no acceleration in the take-up of ICT by businesses and households and without this, the EU is unlikely to close its growth and productivity gap with other regions of the world.

The Lisbon strategy was relaunched in 2005 with a new partnership. The Commission has adopted a Community Lisbon Programme² for action at EU level and proposed integrated guidelines for Member State actions.³ These set out the key priorities and stress, among other things, the need to increase and improve investment in R&D and to facilitate innovation and the take-up of ICT. In response, Member States have presented National Reform Programmes (NRPs). The NRPs generally support the wider adoption of ICT: they often identify ICT as challenges but less than half of them consider the issue of uptake of technology by firms and households.⁴ Overall, the programmes fail to give a new impetus to information society policies or to include more forward-looking elements, like digital convergence or ICT research and innovation, which are central to the i2010 initiative. Nor do they show any strong sense of urgency.

The European Institutions - Council, European Parliament, Committee of the Regions and European Economic and Social Committee - have all welcomed the i2010 strategy. All recognise it as a much needed comprehensive framework for information society policies. The key role of ICT in achieving the Lisbon objectives is recognised, as is the crucial importance of stepping up significantly investment in research and development in ICT. The European Parliament strongly supports the vision of an information society with a greater focus on the

¹ i2010 – A European Information Society for growth and employment, COM(2005) 229.
http://europa.eu.int/information_society/eeurope/i2010/i2010/index_en.htm

² Common Actions for Growth and Employment: the Community Lisbon Programme, COM(2005) 330

³ Integrated Guidelines for Growth and Jobs (2005-2008), COM(2005) 141 of 12.4.2005.

⁴ The Commission Spring Report to the European Council summarises the information society elements of NRPs (see annex to Report section 2.3)

citizen and the integration of public interest concerns. Member States have committed themselves to implementing the i2010 initiative and reviewing policy strategies, in particular within the i2010 High Level Group, stressing the need for strategic discussions at the EU level on information society policies.

I. CREATING A SINGLE INFORMATION SPACE

i2010 has identified digital convergence as the main driver of market developments in the field of ICT in the next five years. The rapid roll-out and uptake of broadband is leading to the emergence of new services and new patterns of usage. The Commission has responded by adjusting the legal framework for content online and is reviewing the regulatory framework for electronic communications. The objective is to ensure coherence in regulation as markets converge. Action is also needed to stimulate the creation and distribution of rich and diverse content, to develop secure networks and services, as well as to protect consumers and maintain free and open markets, while persevering public interest objectives and the protection of consumer interests.

1.1 Convergence

Audio, video, data or voice communication services have traditionally been accessed through distinct ICT devices connected to different infrastructures. These included: PCs connected to the Internet, TVs picking up broadcast signals, telephones connected to copper/fibre local loops and mobile devices served by wireless networks.

These networking environments and technologies have developed their own business models with different players at each stage of the value chain. The business model tended to be based on a one-to-one connection between a service and a network infrastructure (e.g. an SMS message conveyed primarily over a dedicated mobile infrastructure, an email sent over the Internet). Associated with this, there was a multiplicity of sector-specific regulations taking into account the particular infrastructure, access devices and types of content or services accessed.

Convergence is radically changing this picture: the traditional coupling of network infrastructures and the services/applications they can deliver is disintegrating rapidly. A single networked infrastructure can today deliver the full range of multi-media content to both fixed and mobile devices.

The impact on the market can already be seen. Telecom and cable operators are increasingly moving into each other's markets by offering 'triple-play' services (data, voice and video). These services are sometimes extended to mobile services. TV over IP, whether fixed or mobile, is one of the first examples of converged services. These new services are the source of new partnerships between network operators, Internet service providers and content distributors.

The device market has seen a sharp rise in sales of consumer electronics products that bridge the gaps between IT and Internet equipment and consumer electronics. MP3-player sales almost tripled in the past year with over 25 million units sold in 2005.⁵ Sales of game

⁵ EITO 2006; data for Western Europe including Austria, Belgium, France, Germany, Italy, Netherlands, Spain, Switzerland and UK

consoles, now increasingly relying on online multi-user games, increased from 11.8 million in 2004 to 16.3 million units sold in 2005. In the same year, flat-screen TVs, increasingly with HDTV and computer display options, generated the highest sales income of any consumer electronic device.⁶

A range of new offers have arrived on the market demonstrating both product convergence and the convergence of industries: IT companies and mobile phone producers both sell portable music devices and digital cameras on a large scale. WiFi radios playing Internet radio, media centre PCs as well as Internet-connected home cinema and hi-fi systems are starting to enter the living room. Mobile phones are using Voice over IP (VoIP) for calls and are becoming integrated with home networks and wireless Internet hotspots. Apart from MP3-players, most of these offers are still in an early market phase.

The online content market is estimated to be worth €1.4bn and this is expected to double by 2009⁷. The largest segments of the market are games (26% of the total), music (19%) and publishing (19%).

In electronic communications, revenues from fixed telephony are on a long-term downward trend. Prices are falling due to competitive pressure from more operators and reduced demand as consumers switch to mobile or to VoIP.

Mobile revenues have historically offset fixed-line losses but this source of compensation is declining. Mobile revenues are stagnating in saturated markets and competition is increasing. However, this should not be exaggerated: growth in mobile telephony services remains positive and decelerated only slightly in 2005.

Third generation (3G) services do not yet represent an important source of growth. In the UK, which is one of the most advanced countries for take-up of these services, 3G mobile phones make up 9% of the mobile market but an estimated 40% of 3G users only use their phones for voice and texting, as the cost of Internet access from a mobile phone remains high.

Triple-play is seen by operators as a way to offset declines in revenues. In increasingly competitive markets, bundling enables operators to differentiate their offers. This may increase convenience for consumers, who receive different services and a single bill, but also raises concerns about consumer information and ability to make informed choices. To be able to do this, the operator must own the local loop. One consequence of this is already visible in the rapid increase in *shared access*⁸ in those markets where triple play has emerged.

Convergence is thus increasing competition and leading to rapid growth of the broadband market:⁹

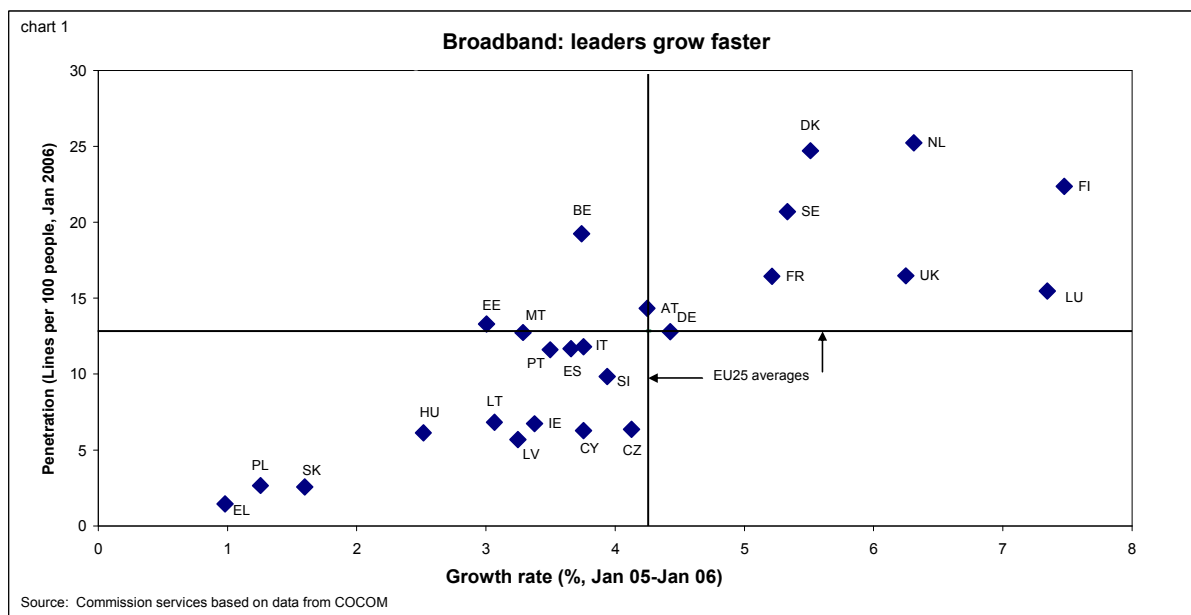
⁶ EITO 2006

⁷ EITO 2006

⁸ Shared access or line sharing means that the same local loop is used both by the incumbent and the entrant. The incumbent rents the high frequency band to the entrant for DSL services, while it keeps the low frequency band for analogue telephony services.

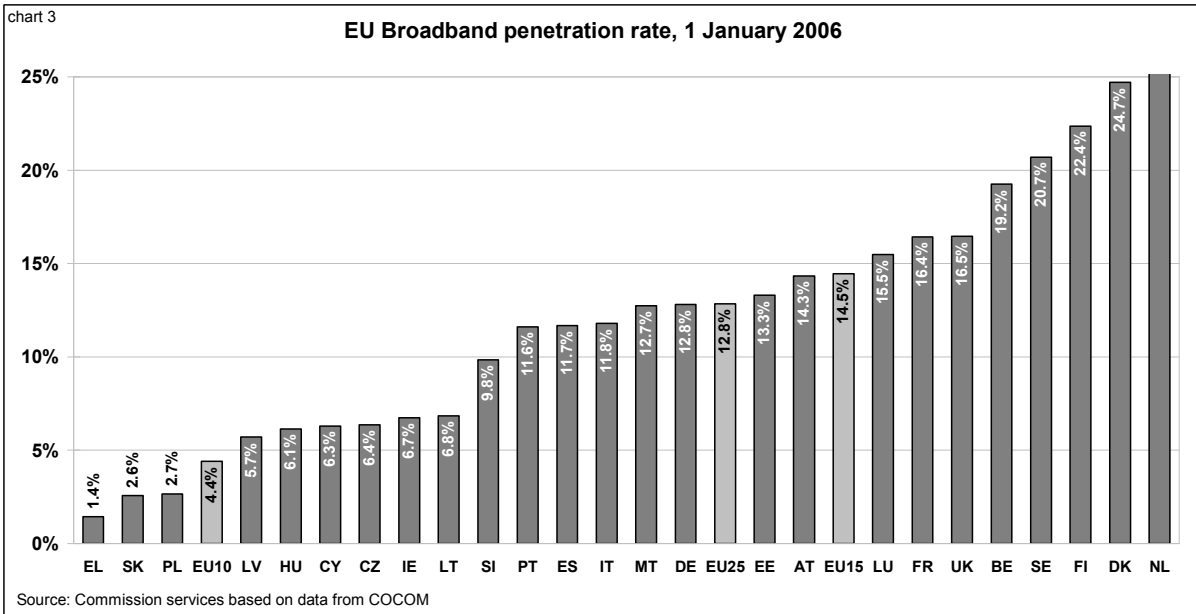
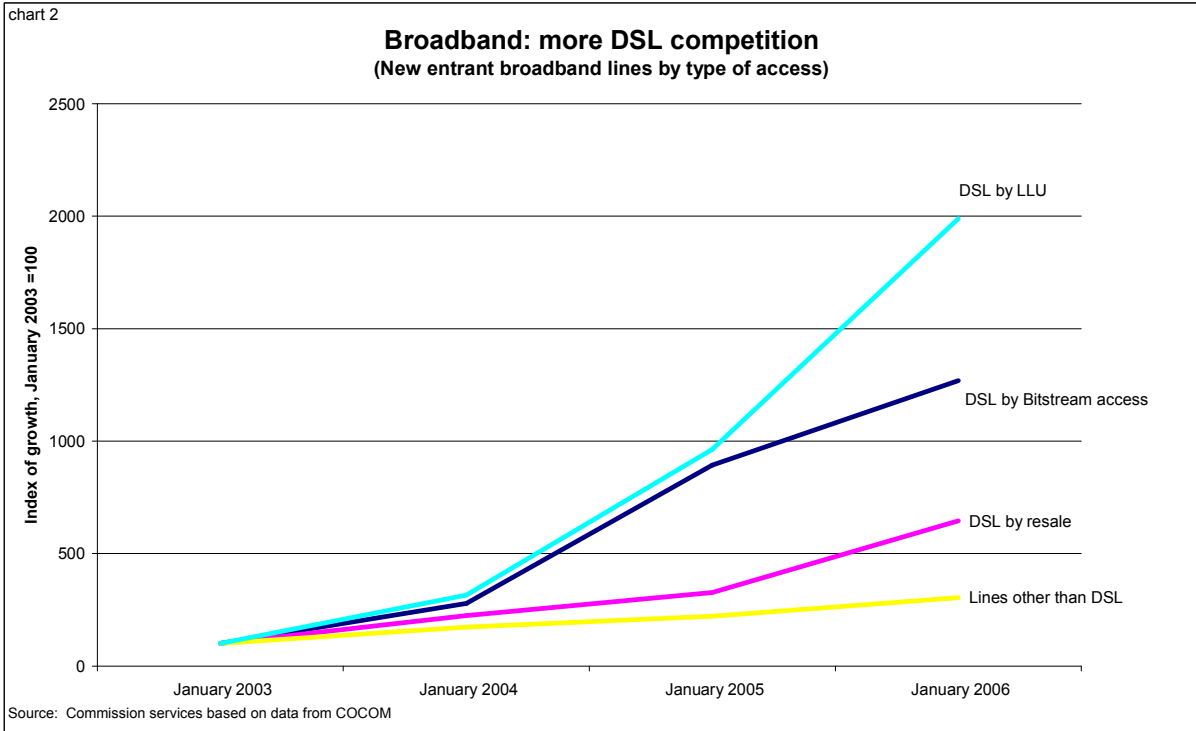
⁹ Market data are for January 2006, supplied by the Communications Committee (COCOM) supplemented by 3rd country data supplied by the Broadband Subscriber Database.

- Broadband now reaches 12.8% of the EU25 population (almost 59 million lines), a 21% increase since 1 July 2005. In some Member States, more than half of household fixed Internet access connections are broadband.
- In October 2005, Europe overtook the USA in terms of the number of broadband lines. Broadband penetration rates in Europe are still far behind the world's leader (25.5% in Korea) but take-up is growing fast and the gap is narrowing.
- Broadband growth has, however, been uneven and the gap between Member States has increased as a result. Well-performing countries are growing faster than those lagging behind (chart 1).



- Broadband growth is driven by increasing competition, with new entrants gaining just over 50% of the broadband market in the EU25. Competition is driven by both facility-based competition and effective regulation.
- In 2005, there was a significant change in the pattern of access by new entrants to the incumbents' local access networks (chart 2). Formerly, most new entrants provided high-speed Internet access through simple resale products or indirect access to end users (bitstream¹⁰), while incumbent operators still retained control of the network. In 2005, 42.5% of new entrants' high-speed Internet access lines were provided through local loop unbundling (LLU) or shared access, up from 37.6% in 2004. In these cases, new entrants compete at the infrastructure level, allowing customers to change provider. All operators then compete on an equal footing, offering packages with broadband connection and bundled services.

¹⁰ With bitstream access, the incumbent leases access to its high bandwidth architecture; with resale, the incumbent provides its broadband or telephony retail services to new entrants on a wholesale basis.

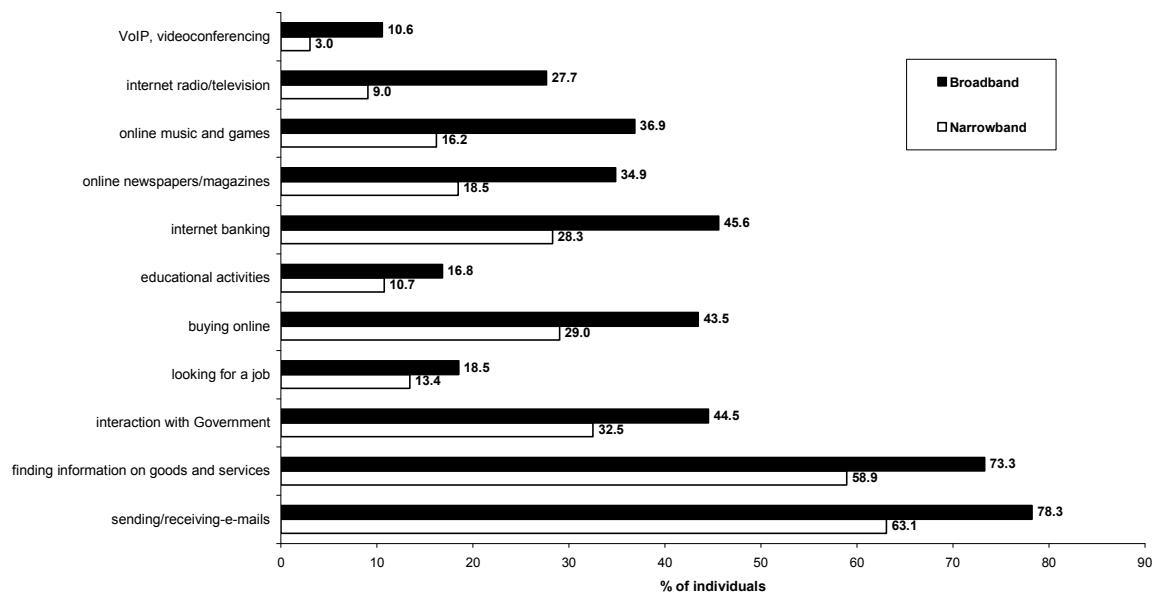


Not surprisingly, the availability of a broadband connection tends to have an impact on the intensity of Internet use and the kind of services accessed on the Internet. This applies both to individuals and businesses.

Persons who have broadband Internet access at home are more likely to be regular Internet users: 81% of broadband household residents use the Internet at least once per week compared to 63% of narrowband household residents. Having a home broadband connection also increases the tendency to take up Internet services, the effect being correlated with the bandwidth required. For example, email does not require bandwidth and is used by most regular users, with only a slight difference between broadband and narrowband households. However, broadband household residents are nearly four times more likely to use more advanced services such as VoIP and video conferencing (chart 4).

chart 4

Use of internet services by individuals (2005) Broadband v. Narrowband

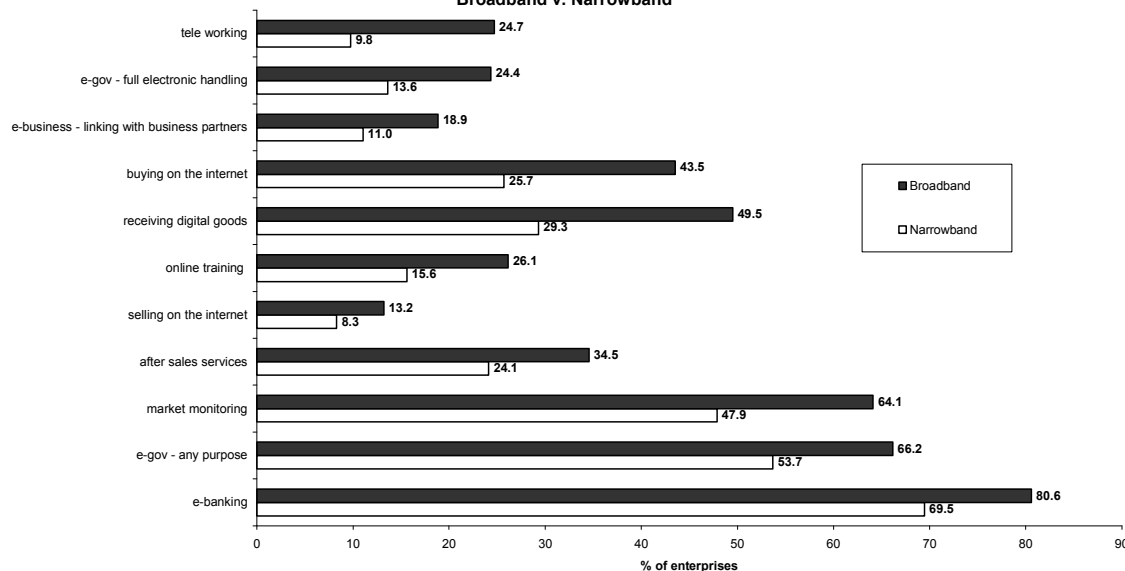


Source: Eurostat, Community survey on ICT usage in households and by individuals (*) EU25 estimation based on available country data

For enterprises, there is a similar pattern (chart 5). For a simple operation, such as finding information on goods and services, having a broadband connection helps but is not a decisive factor. On the other hand, when it comes to more complex operations, such as teleworking, enterprises with broadband are almost 3 times more likely to implement them compared to those with only narrowband (from 24.7% to 9.8%). The two Eurostat Community surveys thereby confirm that broadband is a key enabling factor for the development of advanced Internet services and eBusiness.

chart 5

Use of internet services by enterprises (2005) Broadband v. Narrowband



Source: Eurostat, Community survey on ICT usage & e-commerce in enterprises.

1.2 The Policy Response to Convergence

i2010 identifies four challenges for convergence: speed, rich content, interoperability and security, indicating the need to create a consistent framework for information society and media services to promote investment and competition. The actions envisaged under i2010 (see below bullet points) aim to ensure that the EU will fully benefit from the opportunities and prospects for strengthening the Single Market:

- **Review the electronic communications regulatory framework, including defining an efficient spectrum management strategy:** the regulatory framework for electronic services entered into force in July 2003 and is undergoing its first regular review. The current rules are designed to encourage competition in the electronic communication markets, improve the functioning of the Single Market, ensure Universal Service and safeguard consumer interests. The Commission monitors progress through regular Implementation Reports. The 2005 edition¹¹ highlighted the success of the framework. Evidence suggests that intensifying competition is bringing increased consumer benefits and that the outlook for innovation and investment is positive. A series of actions to launch a general reform of spectrum management and specific harmonisation measures were carried out in 2005 (see box¹²). In addition, the Commission is currently consulting on a proposal for measures on international roaming charges, which - as many stakeholders have complained - are high and vary considerably between the Member States.¹³
- **Create a consistent internal market framework for information society and media services:** Convergence is driving the decoupling of the network infrastructure from the type of audiovisual services it can deliver. With audiovisual services becoming available online, convergence also allows service providers to make their content available on a pan-European basis. However, the different audiovisual service providers, who now compete with each other, receive different regulatory treatment depending on the mode of

Television without Frontiers

The proposal for the revision of the TwF Directive presented at the end of 2005 aims at creating a single framework for all types of audiovisual media services irrespective of the technology used to transmit or receive them. This common framework will create a level playing field between the different audiovisual content providers and provide operators of non-linear audiovisual media services with the legal certainty necessary to offer their services on a pan-European basis. It proposes replacing disparate national rules applying to non-linear services on protection of minors, against incitement to racial hatred and against surreptitious advertising with a basic, EU-wide minimum standard of protection for audiovisual services. This new policy approach should accelerate the advent of a seamless single market for audiovisual services and promote a strong and creative European content industry.

Spectrum

The *Spectrum Policy Report* identified policy priorities and an action plan for their implementation.

The *Communication on spectrum markets* paved the way for a coordinated introduction of secondary trading of radio frequencies in the Union.

The *Communication on the forthcoming International Telecommunication Union (ITU)1 radiocommunication conference* provided guidance for international spectrum negotiations with particular reference to the spectrum implications of the digital switchover.

Several *spectrum harmonisation* measures were adopted (including on short range radars for automotive applications and on WiFi).

Spectrum bands reserved for paging systems no longer in use were *reallocated* to special needs applications such as hearing aids and emergency alarms.

¹¹ European Electronic Communications Regulation and Markets 2005 (11th report), COM(2006) 68

¹² all documents referred to in the box are available from:

http://europa.eu.int/information_society/policy/radio_spectrum/ref_documents/index_en.htm

¹³ http://europa.eu.int/information_society/activities/roaming/index_en.htm

delivery.

- In response, the Commission has proposed a modernised Television without Frontiers Directive¹⁴, which defines a set of rules applying to similar audiovisual services irrespective of the technology used to deliver them (see box).
- **Continued support for the creation and circulation of European content; and**
- **Identify and promote targeted actions for interoperability, particularly digital rights management (DRM).**

In the online environment, providers of content services can make their services available on a global scale. Allowing the licensing of copyright on a pan-European basis remains a major challenge to the creation of a Single Information Space for the distribution of online content. In the EU, the copyright license to distribute content online has to be negotiated in each Member State. This is hampering the development of cross-border online content services.

The 2005 Recommendation on collective EU-wide cross-border management of copyright and related rights for online music¹⁵ is a first step in removing obstacles to pan-European management structures for copyright and related rights and demonstrates the Commission's commitment to removing progressively obstacles to the development of pan-European content services.

Convergence also represents a challenge for traditionally separate sectors that today need to work together to develop new ways of distributing content online for their mutual benefit. In 2005, the Film Online initiative was launched to create a dialogue between the film industry and service providers. Furthermore, the proposals for MEDIA 2007¹⁶ and the eContentplus¹⁷ Programme adopted in 2005 promote the use of new technologies to increase the creation and distribution of European multilingual content.

Convergence offers a range of benefits to consumers and citizens through easier access to a wide range of information and greater capacity to create content. However, there are also a number of concerns: protection against malware threats and how to enhance consumer trust; safeguarding privacy; ensuring the proper implementation and enforcement of data protection legislation; addressing issues of liability; lock-in effects through lack of interoperability or new control points such as DRM; lack of transparency with respect to conditions of services or prices; security of payments and transactions; lack of adaptability of consumer protection rules to new mobile services, etc. The need to assess the potential effects of both existing and future policies in terms of consumer concerns has become clear, especially since adverse effects in this area can have significant negative consequences for the success of a business model.

The legal framework for the protection of consumers as well as for the protection of their privacy is already in place and applies to the information society as well as to audiovisual services. However, the protection provided to European consumers could be challenged by

¹⁴ <http://europa.eu.int/comm/avpolicy/regul/com2005-646-final-en.pdf>

¹⁵ http://europa.eu.int/eur-lex/lex/LexUriServ/site/en/oj/2005/l_276/l_27620051021en00540057.pdf

¹⁶ http://europa.eu.int/comm/avpolicy/media/pdf/files/com470_en.pdf

¹⁷ http://europa.eu.int/information_society/activities/econtentplus/docs/prog_decision_2005/econtentplus_decision_en.pdf

factors such as cumbersome and complex contractual agreements, enforcement of consumers' rights in the digital environment, lack of dispute settlement mechanisms or the extra-territoriality of services and content provided from outside the EU.

Some of these concerns have been addressed in the proposed revision of the Television without Frontiers Directive. This will apply to all audiovisual services available in the EU and provides for a minimum standard of protection for minors, against incitement to racial hatred and against surreptitious advertising. The Commission has also proposed a new Recommendation¹⁸ to respond to the challenges brought about by technological developments in terms of the protection of minors and human dignity and the application of the right to reply in online media. This proposal is currently being discussed in the Parliament and the Council.

- **Define and implement a strategy for a secure European Information Society:**

In February 2006, a high-level research seminar was held on “**Trust in the Net**”. The conclusions of this seminar highlighted the following priorities:

- (1) European policies on trust & security: the effective development of these policies requires a public-private partnership, including industry, academia and government to ensure the right balance between technological development and regulations.
- (2) Security, privacy and economics: future technologies and regulations need to stimulate economic growth without compromising data privacy and data protection.
- (3) Empowering the user: a better understanding of the psychology of trust is needed to develop security solutions that are proportionate to security needs and build security tools so that users do not have to care about security.
- (4) Secure software: an industry-led initiative is needed to take up the responsibility for producing, delivering and maintaining secure and fault-tolerant software.
- (5) Standardisation, certification: there is a need for standardisation and support for certification of security products and processes.
- (6) Test-beds and demonstrators: there is a need to implement test beds and large-scale demonstrators on aspects of security and privacy to build technology expertise and trust in technology applications.

Security-related research projects are being funded under the Preparatory Action for Security Research (2004-2006), and more substantial activities in the area of security research are scheduled within the 7th EU Research Framework Programme with a view to the establishment of a coherent European Security Research Programme (ESRP) starting in 2007.

¹⁸ http://europa.eu.int/comm/avpolicy/legis/key_doc/legispdffiles/com04-341-en.pdf

II RESEARCH AND INNOVATION

2.1 Economic Impact of ICT

The ICT Sector ¹⁹			Impact of ICT			
	EU	USA		EU	USA	
1. Size (% of the economy)			5. Take-up of ICT by businesses			
1995-1999	5.2%	7.2%	% of enterprises integrating systems with			
2000-2003	5.6%	7.2%	suppliers	10.2%	15%	
			customers	9.3%	17%	
2. Growth (real terms)			6. Investment in ICT			
2000-2003	5.3%	4.6%	As % of GDP			
				2.4%	4.2%	
3. Market Revenue growth (nominal terms)			7. Labour Productivity			
2004	3.8%	3.9%	1995-1999	Total	1.8%	2.3%
2005 <i>estimate</i>			of which: ICT		0.9%	1.7%
Total ICT Sector	3.6%	3.9%	Non-ICT		0.9%	0.6%
Communications	3.1%	2.8%	2000-2004	Total	1.1%	2.8%
IT	4.1%	4.6%	of which: ICT		0.5%	0.9%
			Non-ICT		0.5%	1.9%
4. ICT Research and Development			8. Innovation by businesses			
%all research expenditure	25%	35%	EU			
% GDP	0.31%	0.63%	ICT-enabled product/services			
			Non-ICT-enabled product/services			
			ICT enabled processes			
			Non-ICT-enabled processes			
					17%	
					29%	
					33%	
					12%	

In 2005, economic growth in the EU improved and is forecast to be around 2% in 2006. However, this still is well below the annual GDP growth of 2.7% registered by the US between 2000 and 2005. Europe also still has a mediocre productivity performance and low investment in R&D, which represented only 1.9% of GDP in 2004.²⁰ It is well established that the use of ICT contributes to the prosperity of modern economies. Empirical evidence supporting this assertion is based on growth accounting models that link the production and

¹⁹ Notes: (1) Size is % value-added at current prices in the EU15 – source: Groningen Growth & Development Center (GGDC) – 60 Industry Database; (2) average annual growth of value added at constant prices in the EU15 – source: GGDC-60 Industry database; (3) annual growth of market value in % - source: EITO 2006; (4) R&D in 2002-2003-source: Commission services; (5) 2004 - EU: EUROSTAT Community survey on ICT usage – EU 15; US: Business in the information age (6) Annual average 2000-2004 - EU15 - source: GGDC- Total Economy Growth Accounting database; (7) average annual growth rates in % - EU15 - source: B. van Ark and R. Inklaar (2005); (8) % of companies having introduced innovations in previous 12 months – EU 15 – source: European Commission - 2004 eBusiness W@tch.

²⁰ COM(2006) 30

use of ICT to the productivity of the economy.²¹

ICT impact productivity through several channels. 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”). In the longer term, as the new technologies are adopted throughout the economy, *more efficient models of business organisation*, new products and services come into use. It is not possible, however, to isolate the ICT-induced efficiency gains from efficiency gains that stem from non-ICT factors.

From 1995 to 2000, aggregate productivity in the EU grew by 1.8% per year. At least 55% of that increase was due to ICT. Over 2000-2004, productivity growth fell to 1.1% but the contribution of ICT remained high at around 45%.²² **These figures underline the key role of ICT in realising the Lisbon objectives of competitiveness and growth.**

One strong feature of the comparison between the EU and the US over the last ten years is that **the impact of ICT on productivity in the EU has been consistently half of the impact in the US**. In the period 2000-2004, ICT accounted for productivity gains of 0.5 percentage points per year in the EU as against 0.9 percentage points in the US. The US outstrips the EU both in terms of efficiency gains in the ICT sector and in terms of investment in ICT:

- (7) **Efficiency gains in the ICT sector:** several indicators confirm that the ICT sector is a dynamic, innovative and research-intensive sector in the EU and the US, but to a lesser extent in the EU. The ICT sector has grown to represent 5.6% of GDP in the EU and 7.2% in the US. On the 2005 Innovation Scoreboard²³, the ICT sector in the EU ranks second in terms of the innovation indicator and is above average in all factors defining innovation, in particular in R&D, innovation expenditure, sales of new-to-market and new-to-firm products and the share of employees with higher education. The sector also has an above average R&D investment relative to other sectors: It represents 25% of R&D investment in the EU, which is 5 times more than its share in GDP. But as a proportion of GDP, the European ICT sector’s investment in R&D is only half of that of the USA²⁴.
- (8) **Investment in ICT:** between 2000 and 2004, investment in ICT accounted for 2.4% of GDP in the EU15 as against 4.2% in the US. EU businesses are also slower in adopting advanced IT applications to integrate business processes.

There is a significant difference in the contribution of ICT to productivity before and after 2000. In the second half of the 1990s ICT related factors were both a significant source of the acceleration in the US productivity growth and an important determinant of the divergence in performance between the EU and the US. Over 2000-2004, the relatively poor performance of the EU in productivity was related more to the lack of efficiency gains in the economy than to specific ICT factors: Efficiency gains in the economy were negligible in Europe but in the

²¹ B. van Ark and R. Inklaar: *Catching up or Getting Stuck? Europe’s Troubles to Exploit ICT’s Productivity Potential*, GGDC, University of Groningen, September 2005.

²² Commission estimate based on B. van Ark and R. Inklaar: *Catching up or Getting Stuck? Europe’s Troubles to Exploit ICT’s Productivity Potential*, GGDC, University of Groningen, September 2005.

²³ European Innovation Scoreboard, <http://trendchart.cordis.lu/scoreboards/scoreboard2005/index.cfm>

²⁴ Commission estimate for 2002-3 based on Eurostat and OECD sources.

USA, accounted for half of productivity growth. **ICT have therefore contributed to cushion the economy from the collapse in productivity growth in the EU since 2000.**

Productivity data confirm the appropriateness of the i2010 proposals to focus on boosting research and innovation in ICT and fostering adoption of eBusiness. Progress in these actions is reviewed in sections 2.2 and 2.3 below.

2.2 Research and Innovation:

In order to boost Europe's performance in ICT research and innovation, i2010 has proposed to:

- Increase by 80% the Community ICT research support by 2010 and invited the Member States to do the same.
- Prioritise strategic ICT research around FP7 key technology pillars (2007).
- Define complementary measures to encourage private investments in ICT research and innovation (2006).
- Make specific proposals on an Information Society for all in the Community Strategic Guidelines on Cohesion 2007-2013.

The ambition to strengthen research efforts has been overshadowed by the debate on the Financial Perspective and by the recent EU performance as presented in the Annual Progress Report on Growth and Jobs²⁵. The debate has made it clear that the EU is likely to fall short of its R&D expenditure target of 3% of GDP and that the Community effort up to 2013 will be around 30% less than that anticipated by the Commission. However, it is also clear that research will remain a top priority in the Financial Perspective and the Commission's Annual Progress Report has made concrete proposals to increase investment in knowledge and innovation.

The report of the Independent Expert Group chaired by Mr Esko Aho, requested by the European Council at Hampton Court, *Creating an Innovative Europe*²⁶, made a number of proposals relevant for research and Innovation in the ICT sector, such as the calls to:

- Provide an innovation-friendly market through harmonised regulation, ambitious use of standards, driving demand through public procurement, a competitive intellectual property rights regime and fostering a culture which celebrates innovation;
- Focus on large-scale actions in seven identified strategic areas, two of which are in the ICT field (eHealth and digital content), while of the others have direct links with ICT;
- Build innovative partnerships for research – the role of ETPs was highlighted here.

25 Time to Move Up A Gear The European Commission's 2006 Annual Progress Report on Growth and Jobs COM(2006) 30.

26 "Creating an Innovative Europe", Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit and chaired by Mr Esko Aho, January 2006; http://europa.eu.int/invest-in-research/action/2006_ahogroup_en.htm

Research Co-ordination

Europe has a fragmented landscape for the public funding of R&D in ICT, ranging across a number of structures at European/national/regional level, each with differing policies, strategies and objectives. This fragmentation, particularly in the ICT sector, where high levels of investment are needed to develop solutions for large-scale markets, is a major European weakness that needs to be tackled. To this end the Commission has set up structures for co-ordinating national R&D in ICT both at policy level and at programme level. This has included discussions among national and European decision makers to build a consensus on future visions for ICT research in Europe and with the aim of mapping the national landscapes in ICT research, creating a portal with summaries of countries' IST programmes, and comparing the results of national ICT R&D foresight exercises to identify strategic themes for trans-national cooperation.

In 2005, a number of steps were taken in this direction:

- Proposals were tabled for the 7th **Research Framework Programme (FP7)** and the **Competitiveness and Innovation Programme (CIP)** for the years 2007-2013. Both have been designed to complement each other to “turn knowledge into added value”, position Europe in the lead in key ICT areas and ensure that ICT is rapidly transformed into

socio-economic benefits for Europe's citizens, businesses, industry and governments. The FP7 focuses on ICT research, technological development and demonstration activities, whereas the ICT Policy Support Programme within the CIP aims to stimulate the deployment and best use of innovative ICT-based solutions.

- Partnerships with the industry and the Member States were developed, including the launch of new **European Technology Platforms** in fields that are strategically important for European industry and society.
- **Coordination initiatives with the Member States** were developed to reduce the fragmentation and improve the coherence of public research efforts in Europe, through exchange of knowledge, sharing of best practice and development of common visions and strategies for ICT research.

In 2005, debates were launched to strengthen the link between research and innovation as called for in the Annual Progress Report on Growth and Jobs:

- The 2005 Action Plan for European **Standardisation** proposes a review of standardisation policy in the area of ICT together with a revision of the legal framework (Directive 98/34/EC) to open it to the service sector and to new deliverables from the European Standardisation Organisations.
- Member States have explored the possibility of using an EU-wide “**pre-commercial public procurement of innovation**” which is a risk-sharing scheme for the public procurement of high tech R&D products and services.
- In 2005 the Commission launched the **Europe INNOVA** and **PRO-INNO Europe** initiatives.

These initiatives include projects designed to help develop and implement innovation policies in the ICT domain, including eHealth and in innovation-related fields such as

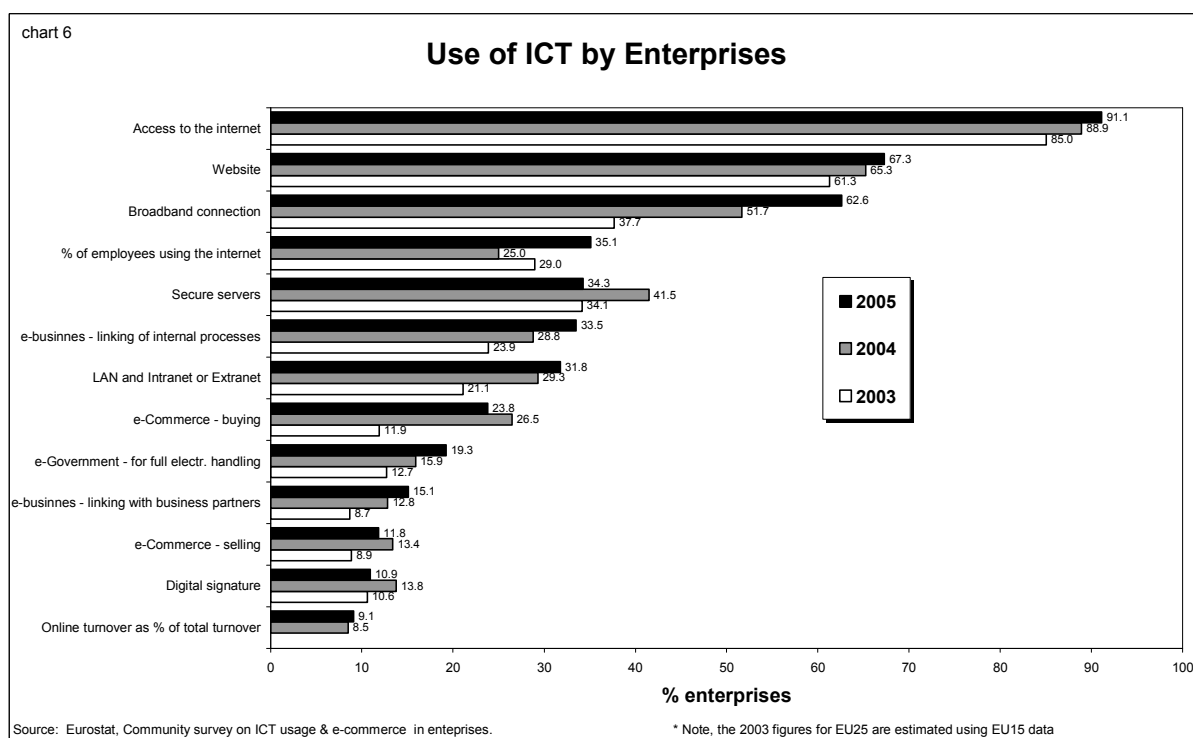
European Technology Platforms

ETPs help industrial and academic research communities in specific technology fields to coordinate their research and tailor it to a common “strategic research agenda” (SRA), which sets out R&D goals, time frames and action plans for technological advances. So far, 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). The platforms' strategic research agendas typically seek to overcome barriers to the development, deployment and use of new technologies. ETP stakeholders agree to support their strategic research agenda financially and to monitor its implementation. The Commission has actively encouraged the openness of the platforms to involve all relevant players and in particular SMEs.

standards, procurement, clustering, access to finance, technology transfer, IPR and innovation management.

2.3 Adoption of ICT by businesses

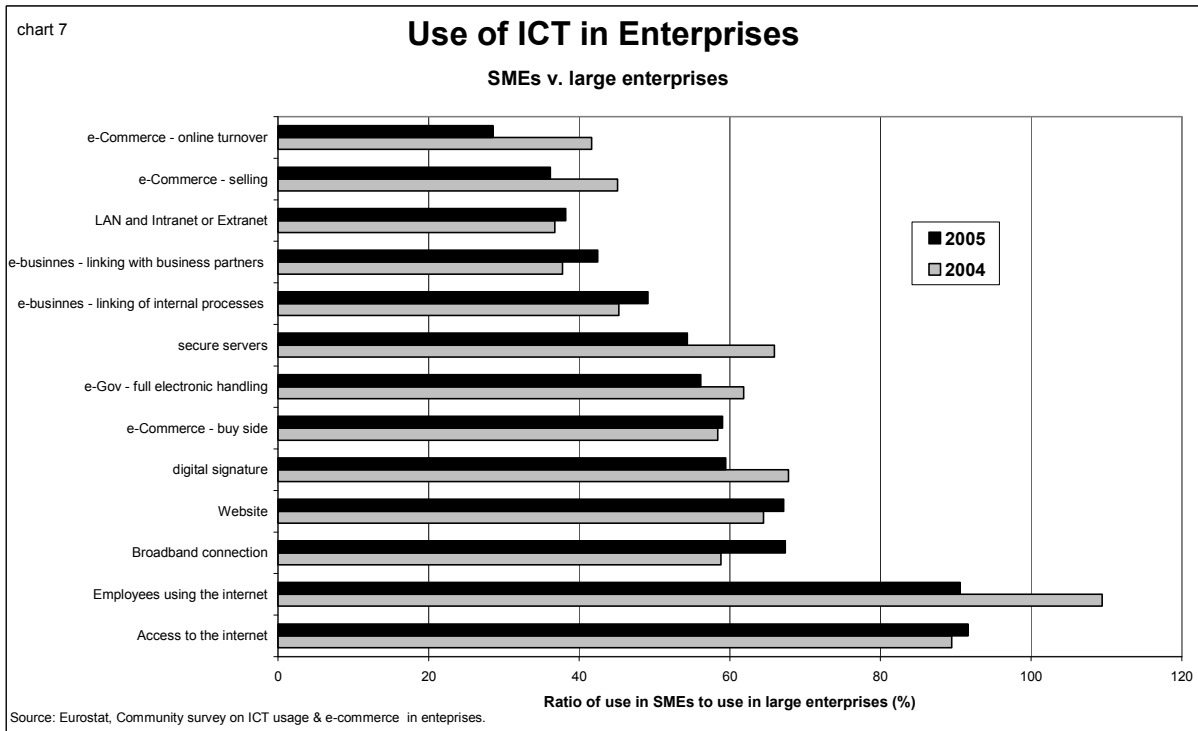
Economic evidence on the productivity gap between the US and the EU has indicated that European businesses have invested less and later in ICT and that they are less efficient in the use of ICT and/or slower in reaping the benefits from ICT investment. Between 2000 and 2004, ICT capital formation²⁷ accounted for 2.4% of the GDP in the EU-15 and for 4.2% in the US. Micro-economic evidence on connectivity and use of ICT by businesses shows that although most firms are connected (91.1% in 2005), only a minority use more advanced eBusiness solutions, e.g. to establish automatic links between customers or suppliers. Use of these advanced applications is growing (15.1% of businesses in 2005 as against 12.8% in 2004) but remains small.(chart 6)



There is also a substantial gap in the use of ICT between large companies and SMEs, which is even larger for more complex applications (see chart 7). In terms of basic connectivity, there is little difference and the proportion of SME employees using the Internet is also about the same as in large companies. However the gaps grow as the applications become more complex and the proportion of SMEs buying and selling online is only around a third of that of large companies. There are some signs of catch-up but of the 13 applications and uses shown in the chart below, in 6 saw SMEs fall further behind compared with 2004.

²⁷

Data are in current prices. ICT capital formation comprises: IT equipment, Communication equipment and software. Source: University of Groningen, Total Economy Growth Accounting Database



The development of eBusiness is benefiting from important changes that are taking place in the software industry, with a shift from the sales of products towards the provision of on-demand services. This is driving considerable changes in innovative and competitive segments of the global economy.

New software and service architectures are emerging that allow not only the integration of business processes within companies but also the networking of companies, creating new collaborative environments. Key enabling technologies behind these advances are Grid technologies and service-oriented architectures, areas where Europe has demonstrated excellence and leadership in the relevant research. It is expected that such developments will help to overcome the hesitation of SMEs to invest substantially in ICT.

ICT can have a disruptive impact on companies and markets, thus driving innovation. Disruptive change is already evident in manufacturing (e.g. through *personalisation/customisation*, i.e. inserting a service into a product), in retailing (through eBusiness, diffusion of RFID/electronic labelling, automation of points of sale and supply chains, and mobile commerce), and more recently in service industries (through radical improvements in the automatic creation and personalisation of eServices and of eServices support for physical services, and through the ICT-enabled productivity of assets and resources). The next disruption will most likely be threefold:

- The emergence in the enterprise environment of the “Internet of Things” enabling detailed and timely knowledge of product location and life cycles as well as individual and dynamic prices for goods.
- The development of radically new forms of business and computable representations of aspects of the world, resulting in the creation of “innovation ecosystems” in the form of SME networks which cooperate globally by dynamically exchanging resources, applications, services and knowledge.

- New ways of flexible and mobile teamwork as well as dynamic and agile communities giving rise to new collaborative environments over the Internet.

To meet these challenges, enterprises have to reach key targets: increased flexibility, economies of scale and scope, cost reduction, shorter timelines, access to technologies, improved quality, and improved operational efficiency. A major effort will be required to achieve enterprise interoperability especially where the market fails to find solution.

These technological developments will translate into efficiency gains if businesses match investment in ICT with moved to reorganise business processes. However, skills shortages are an important constraint. The availability of adequate ICT skills is an important condition for fostering the competitiveness and innovation capabilities of enterprises. Between 2000 and 2004, ICT skills do not seem to have developed to a great extent: the share of people with ICT-specialist and IT-user skills in the total number of people employed remained basically constant from 2000 to 2004 (3% and 18% respectively in 2004)²⁸. However, the ‘value added’ and quality of jobs in the sector has increased over time implying lower skilled jobs have been replaced by more highly paid and skilled jobs. Competition, technological and organisational changes have changed the occupational profile of the ICT sector and the skills it requires. For example, digitisation and related changes in electronic communications have reduced the need for traditional skills in maintenance and repair, but boosted demand for computer and electronic engineering professionals.

Moreover, according to some estimates²⁹ for the EU, EEA and candidate countries, the shortage of skilled workers in 2005 is around 230 000 and is expected to reach some 615 000 in 2008, corresponding to an increase in the skills gap from 6% of the demand for network skills in 2005 to 11.8% in 2008. There is an increasing shortage in particular in IP telephony, security and wireless networking. Improving the availability of e-skills involves actions both at European and national level in several areas: education, training, industrial and labour policies in particular, and also in other domains such as immigration, taxation and research.

The i2010 Communication of 2005 has proposed two actions in relation to eBusiness:

- Define eBusiness policies aiming to remove technological, organisational and legal barriers to ICT adoption with a focus on SMEs; and
- Define tools to support new patterns of work that enhance innovation in enterprises and adaptation to new skills needs.

²⁸ Commission estimate from the labour force survey using OECD skill definitions

²⁹ Networking Skills in Europe: Will an Increasing Shortage Hamper Competitiveness in the Global Market, IDC, September 2005

eBusiness

Review of legal barriers for enterprises engaged in eBusiness. This has highlighted the main difficulties as being: the validity and recognition of electronic documents in transactions related to goods inside the EEA (certificate of conformity, etc.), national legal and administrative eBusiness practices in the field of eSignatures, eInvoicing and contract conclusion and implementation.

Interoperability Commission has launched a set of research projects on enterprise interoperability.

Digital Ecosystems This is an FP6 Research project to provide small and micro enterprises with ICT applications and services to improve their efficiency and business integration and to enable the integration of local value chains within the global market. Research complemented by ERA, national and regional initiatives.

Grids: Grid technologies allow users to share data, software, instruments and work together more closely and are expected to have a strong positive impact on the development of eBusiness. In 2006 new Grid-enabled collaborative technologies developed in FP6 were deployed in production environments by key European automotive companies. They can also be beneficial for SMEs as they allow greater computing power to be integrated into their local working environments without large investment in ICT infrastructures.

eBSN (European eBusiness Support Network for SMEs): is a network of policy-makers established by the Commission services in 2003. It has grown into an effective policy-exchange mechanism that has brought together 175 policy initiatives and private-public partnerships in this field involving 29 European countries. The eBSN has facilitated a shift in the focus of public policies from the generic promotion of ICT infrastructure towards specific actions on coaching businesses on how to integrate ICT with their overall business strategy. It has also inspired new eBusiness policies by exchanges of good practice and through fostering cooperation between government, the business community and academia.

The **European eSkills Forum** aims to foster an open dialogue between stakeholders and to catalyse actions to address eSkills mismatches.

European Network of Living Labs and Collaborative Work Environments. These bring technology test-beds into real life user environments and further develop the concept of eWork as a tool for innovation within the work process

III INCLUSION, BETTER PUBLIC SERVICES AND QUALITY OF LIFE

3.1 Inclusion

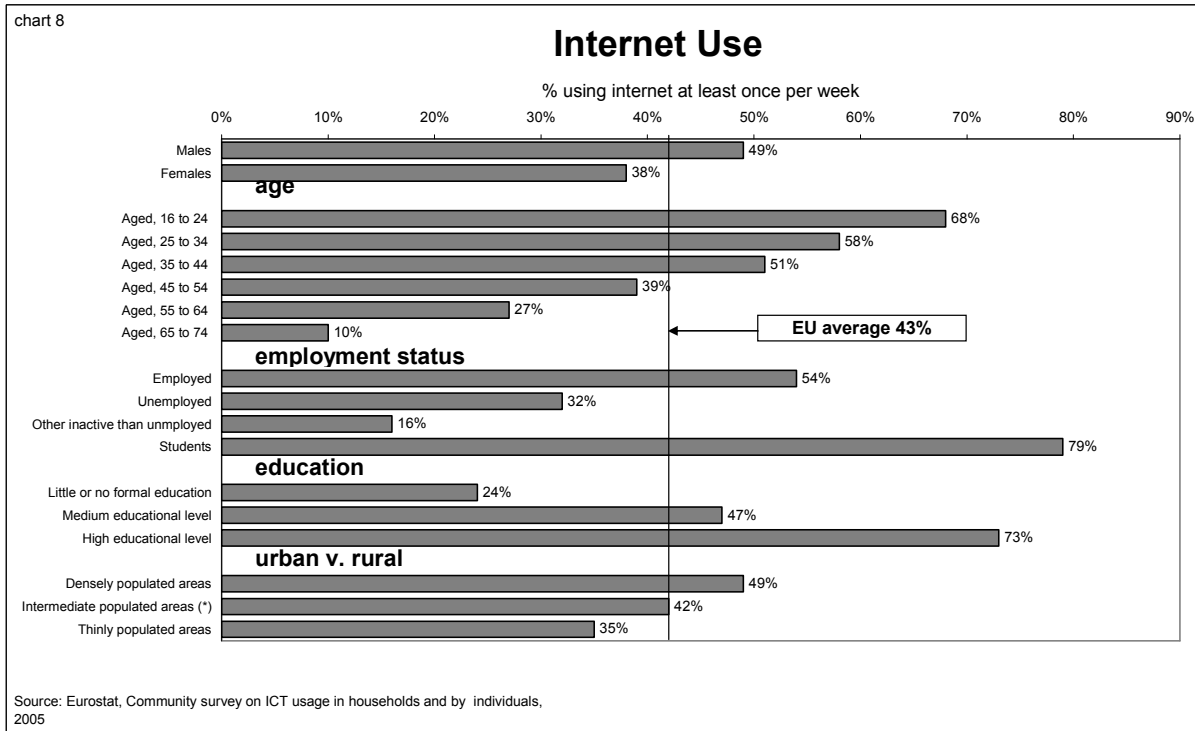
Information and communication technologies are becoming key enablers of modern life. They are used at work, in day-to-day relationships, in relating with public services as well as in culture, entertainment and leisure and for community and political participation. In this context, eInclusion is basically social inclusion in a knowledge society. Therefore, beyond access to ICT tools and services, beyond even digital literacy, a definition of eInclusion should focus on people's empowerment and participation in the knowledge society and economy. The definition of eInclusion³⁰ agreed in the preparatory work for i2010 is the following:

eInclusion refers to the effective participation of individuals and communities in all dimensions of the knowledge based society and economy through their access to ICT, made possible by the removal of access and accessibility barriers, and effectively enabled by the willingness and ability to reap social benefits from such access.

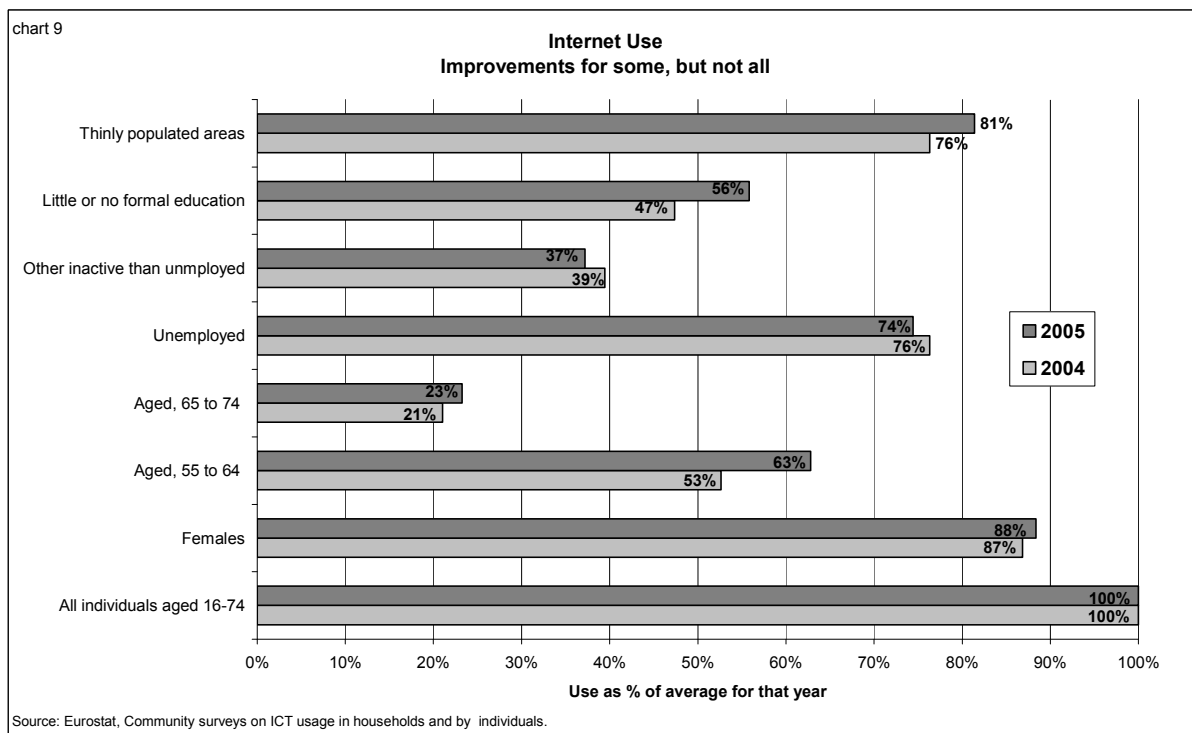
³⁰ This definition is taken from "eInclusion New Challenges and Policy Recommendations", a report to the eEurope Advisory Group, 2005

Further, eInclusion refers to the degree to which ICT contribute to equalising and promoting participation in society at all levels (i.e. social relationships, work, culture, political participation, etc.).

eInclusion deals with the use of ICT to include groups of people at risk of exclusion and aims at avoiding new divides that present and future innovations may create. Therefore monitoring needs to be comprehensive and rely on a broad set of indicators.



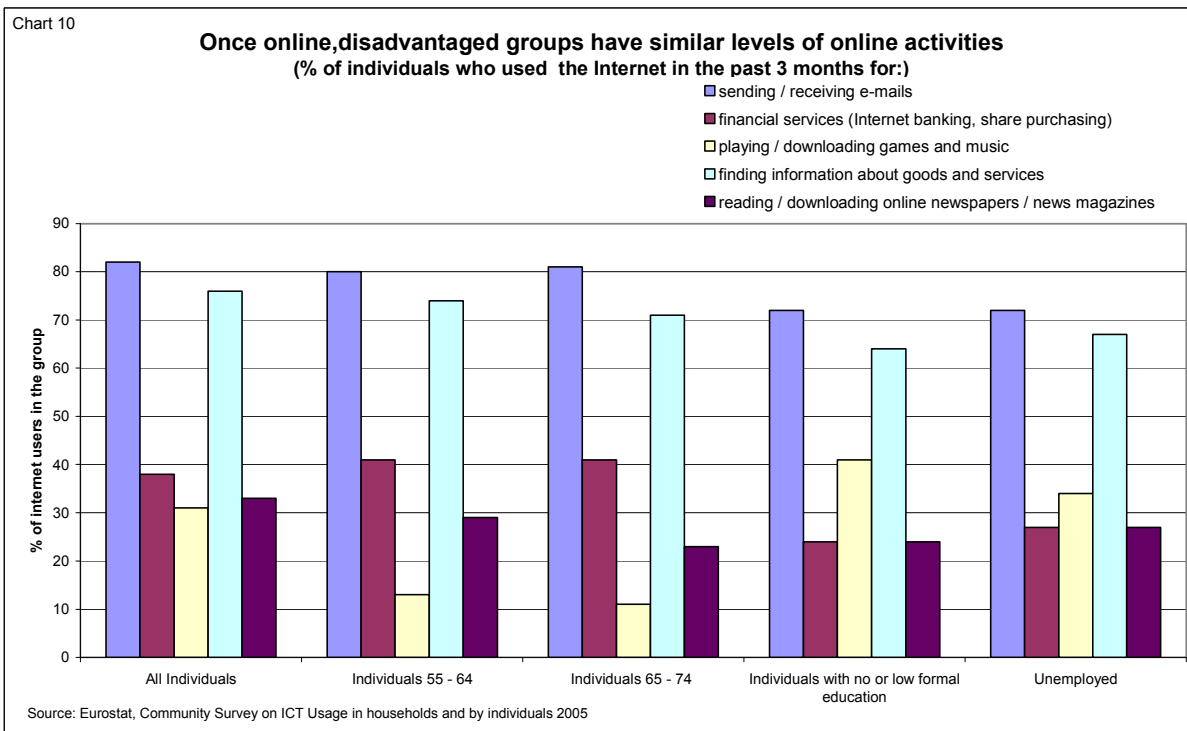
The Community household survey allows the monitoring of Internet use by different socio-economic groups, and this is shown in the chart 8. The groups most excluded from the information society are the elderly, those out of the labour force and those with a low education. This suggests that employment is an important factor in Internet usage, as indicated by the very low rates for those of retirement age and those not in the labour force. Usage rates are also lower amongst women and those living in sparsely populated areas but these differences are likely to be highly correlated with those relating to work, i.e. more women are not in the labour force and make up a higher proportion of those of post-retirement age. Low usage in sparsely populated areas may be partly due to higher rates of unemployment areas but there could also be other specific geographical factors.



There has been some improvement in the relative position of those groups with low usage rates but not for all. This is shown in the chart 9, which compares usage rates with the EU average for each year. In general, the changes over time have been small but with two exceptions: use by 55-64 year-olds (+10 percentage points) and by those with little or no education (+9 percentage points). The improvement is visible in all countries, but particularly large in Germany and the UK.

This is partly consistent with what has been highlighted in other instances for eInclusion: the socio-demographic factors do not carry the same weight and do not evolve in the same directions or at the same speed. For example, gender-related and geographical differences in access and use seem to reduce over time. In fact, (as the chart on Internet use shows), in 2005 the rate of regular Internet use by woman and by people living in a thinly populated area was very close to the EU25 average (only about 5 percentage points below). The age gap also tends to narrow over time, except for the population segment over 64. By contrast, socio-economic gaps, especially by occupation, show the least signs of reducing over time. Generally, there are strong links between poor education, unemployment and low income, the largest gap in 2005 being found among the low-educated and the economically inactive, which stand at less than half of the EU average Internet usage rate. However, the low educated might be improving at a faster speed than previously thought. Disabilities are also often a major impediment for even the most basic level of access and use of ICT, though the community ICT surveys do not allow monitoring of this factor.

One positive message identified by the Household survey results is that once online, different demographic groups perform similar online activities. This is shown in the chart 10 in relation to email communication and online searching.



Policy response

For inclusion, i2010 has proposed to:

- Issue policy guidance on eAccessibility and broadband coverage (2005);
- Propose a European Initiative on eInclusion (2008).

The i2010 initiative is the first time the wide range of eInclusion policies have been brought together in a coherent and co-ordinated way with the ambitious objective of “inclusion, better services for citizens and quality of life” and presented at the same level as regulatory and research issues.

eInclusion covers a wide range of policies from general measures to stimulate the take-up of ICT to actions targeting groups or areas and including embedded eInclusion provisions in other policies such as eGovernment.³¹ The i2010 communication identifies 5 themes in eInclusion policy: the geographical digital divide, eAccessibility, digital literacy and skills, ageing and culture. Some of those correspond to well-established EU policies.

In 2005 and early 2006, Communications were adopted on bridging the broadband gap and on eAccessibility. These launch policies which will be implemented over the next five years.

The **eAccessibility Communication** incorporates the main findings of a consultation held in 2005, which showed that there is a lack of consistency regarding the accessibility of ICT products and services in Europe, and that therefore eAccessibility should therefore remain a priority of the EU's ICT policies. It proposes the use of three policy levers available to Member States:

- improving the consistency of accessibility requirements in public procurement contracts in the ICT domain;

³¹ For example the eTEN project 'ePoll' enables participation in the democratic process for all, providing a service that is accessible to all citizens.

- exploring the possible benefits of certification schemes for accessible products and services; and
- making better use of the “eAccessibility potential” of existing legislation.

eAccessibility and IST: The Information Society Technologies (IST) section of the 6th Framework Programme for Research (FP6) allocated a total of €69m to 26 projects concerned with eAccessibility and the development of products and services for people with cognitive disabilities.

eAccessibility and eTEN: The focus on inclusion (including accessibility) for eServices has been increased and strengthened for the projects in the eTEN programme and will play an equally important role in the Commission's future initiatives in service deployment, such as those supported by the CIP.

Bridging the Broadband Gap In 2005, broadband was available to about 60% of businesses and households in the remote and rural areas of the EU15, and to more than 90% in the urban areas, but the gap is higher in the new Member States.

Policies aiming to enhance broadband availability can be promoted in the less profitable areas of the Union with the help of EU cohesion and rural development funding.

Local and regional authorities play a fundamental role in bringing broadband to their communities. To supplement this, the Commission has proposed two main strands of action in its communication on bridging the broadband gap: strengthening of national broadband strategies that should set clear targets and reflect regional needs; and reinforcing the exchange of best practices. The Commission is supporting the set-up of a website that will act as a single meeting point for local authorities and industry players in terms of information and best practices.

3.2 Better public services

The renewed Lisbon strategy emphasises the role of public services in achieving the objective of growth and competitiveness. The priorities set by the Annual Progress Report on Growth and Jobs include sustainable public finances and better regulation to simplify administrative procedures. Use of ICT in public services is central to these aims and all Member States have adopted an eGovernment strategy for modernising their economies and nearly all have included this in their National Reform Plans.

As a result, public services have become increasingly available and sophisticated. By October 2004, 84% of basic public services for citizens and businesses were available online. The degree of sophistication of online public services has also increased and 40% of services are fully interactive.³² The impact of such strategies is visible: half of companies and one citizen in five obtain online information on public services and use is growing fast among companies.

³² ‘Fully interactive’ means that application for, payment of and - where appropriate - delivery of the public service can be done electronically. Source: Online Availability of Public Services. European Commission 2005, http://europa.eu.int/information_society/soccul/egov/egov_benchmarking_2005.pdf

Use of Online Public Services	EU15		EU25	
	2003	2004	2004	2005
% population (16-74)				
obtaining information	21	24	21	21
downloading official forms	10	11	10	10
sending filled forms	6	6	6	6
% enterprises				
obtaining information	44	43	45	51
obtaining forms	38	40	41	50
returning filled in forms	23	26	29	33
full electronic case handling	12	15	16	19

Source: Eurostat, Community Surveys on ICT Usage in households, by individuals and enterprises

As part of the Lisbon objectives, Member States' reforms of public finances also aim over the longer term to control increases in spending and improve quality against the background of globalisation and ageing. The European population is getting older, life expectancy continues to increase and net immigration is likely to continue. These structural trends will increase the demand for social services in areas like health or education. The benefits of ICT for these sectors have been demonstrated.

eGovernment and eHealth policies have built on the political consensus reached in previous years at EU level. This consensus was expressed in the 2004 eHealth Action Plan³³ and the 2006 eGovernment Action Plan³⁴.

At the **2005 eGovernment Ministerial conference** Member States agreed on the following strategic objectives:

- “No citizen left behind: inclusion by design”;
- Use of ICT to make a reality of effective and efficient government;
- Delivery of high-impact services designed around users needs; and,
- Widely available, trusted access to public services across the EU through mutually recognised electronic identification and authentication (eIDs).

Amongst these priorities, effective and efficient government is critical to the Lisbon objectives. Public services have a central role to play in a dynamic single market by providing the right market conditions, by simplifying procedures and by reducing the time and costs for

³³ *eHealth - making healthcare better for European citizens: An action plan for a European eHealth Area* COM(2004) 356

³⁴ *i2010 eGovernment Action Plan: acceleration eGovernment in Europe for the benefit of all.* COM(2006) 173. See also the “*Signposts towards eGovernment 2010*” document, which summarises the discussions of the leaders and representatives of the national eGovernment initiatives in the eGovernment subgroup; http://europa.eu.int/information_society/activities/egovernment_research/doc/minconf2005/signposts2005.pdf

businesses to interact with their administrations. Electronic procurement has been chosen as a the first application to focus on, as its use in appropriate circumstances may result in price reductions of 10-20% and transaction cost reductions of up to 50-80%. A rough estimate puts the EU annual savings from eProcurement at € 37.5 billion.³⁵

The adoption of the **eHealth Action Plan** in 2004 and progress in its implementation represent significant achievements in speeding up the reform of the health systems. The main achievement in implementation in 2005 was the setting up of the European Union public health portal. At European level, studies were commissioned in best practice, interoperability, patient identifier, legal issues, and labelling and certification. At Member State level, by end 2005 several had announced eHealth roadmaps including major eHealth applications and services deployment.

Beyond the agreement between Member States on common objectives or framework for the use of ICT in various areas of public services, cooperation at the EU level has started on concrete issues in the design of applications³⁶. Applications for public services have matured and have been widely deployed, but the full economic potential of ICT in the public sector can only be realised if technology choices are carefully designed to fit within the obligations of public services, while ensuring its full privacy and data protection compliance. Here the priorities are interoperability of health records and of government applications at the different levels of government, and secure and interoperable authentication, which fully respect privacy and data protection principles as set by the Data protection directive³⁷, to ensure access to all citizens and businesses. These issues are dealt mainly at the national level, but some have a European dimension linked to the four freedoms of the Internal Market. The main initiatives in this field are:

Interoperability of health records: the interoperability of health systems and services is a major challenge for individual Member States, particularly for those which cooperate and collaborate closely through trans-border or cross-border services. Interoperability can help resolve a number of pressing issues affecting Europe's healthcare systems and services, such as: supply and demand, legal and regulatory issues, market requirements, and demographic and cost pressures. At the 2005 eHealth conference, Europe's Health and Technology Ministers concluded: "we need to raise awareness of the pressing need for a more integrated and interoperable European health information space." The Ministers committed themselves to taking up this challenge in a staged and structured approach over the next fiveyear period'.

Interoperability Communication: Last February, the Commission adopted a Communication on Interoperability between national administrations for pan-European eGovernment services. One of the major challenges of eGovernment is the multiplicity of government layers in the EU at the national, regional and local levels. Interoperability in eGovernment requires that all these layers are able to exchange information and to approach each other for services that are being delivered at a different administrative level. This communication calls upon the Member States as well as industry to collaborate to make this interoperability happen by setting priorities, publishing policy documents/guidelines and technical recommendations and encouraging standardisation.

eID Initiative: Interoperable electronic identification and authentication management (eIDM) for access to public services is a key enabler. Member States have recognised the importance of having interoperable eIDM based on common specifications in the EU. A harmonised ID card might be one way to implement eIDM but it is a national choice to do so or not.

³⁵ Action plan for the implementation of the legal framework for electronic public procurement, European Commission, 12.12.2004

³⁶ The implementation of some of these pilots will build on the experience and preparatory work from the eTEN programme and will take advantage of the new 30% financing rule to launch larger projects.

³⁷ Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data

3.3 Quality of Life

The contribution of ICT to quality of life and sustainable development often goes unrecognised and i2010 aims to give it more visibility by launching flagship initiatives on key social challenges. The three priorities were set out: the needs of the ageing society³⁸; safe clean transport; and cultural diversity.

Two of the flagship projects, Digital Libraries and Intelligent Cars have already been launched and the third, Independent Living in an Ageing Society is expected to start in 2006.

Digital Libraries: the aim is to make information resources easier and more interesting to use in an online environment. The Communication "i2010 Digital Libraries"³⁹ structured this initiative along three lines: online accessibility; digitisation of analogue collections; preservation of digital material. Responses to an online consultation confirmed a broad support for the Digital Libraries' initiative and identified copyright and public-private partnerships as the main issues to be tackled in future. A High Level Expert Group will advise the Commission on this area. Preparatory work has started on a proposal for a Recommendation on digitisation and digital preservation and on a Communication on digital libraries of scientific information.

In the framework of the digital libraries, the Commission also works on **scientific publication systems and markets:** This offers opportunities to develop new scholarly communication systems that serve researchers, research users and research funding organisations more effectively, and which increases returns on R&D investments and enhance innovation. The new technologies, in particular Internet, offer to the scientific community very powerful dissemination means which have revolutionised the way in which scientists communicate. Furthermore, they enable, as compared to the paper era, an enhanced treatment of the information (e.g. search engines, cross referencing, etc) that constitutes both for the authors and the readers an invaluable service. The behaviours and practices have profoundly changed: As an example, it is now of common practice for researchers to deposit a copy of their article in their personal website or on their institution's repository. In some disciplines, electronic archives, containing published or not yet published articles, have become for researchers the prevalent communication tool.

Intelligent cars: This initiative concerns technology that prevents rear-end collisions could eliminate 4 000 accidents per year across the EU if just 3% of cars had it by 2010. Technology that helps you stay in lane, or to overtake, could prevent 1 500 accidents per year if only 0.6% of cars had it by 2010. And technology that wakens drowsy drivers could help prevent 30% of fatal motorway crashes and 9% of all fatal accidents. The intelligent car initiative, unveiled in February 2006, addresses the need for stronger take-up of new technologies to make cars safer, cleaner and more efficient. It has three aims:

- to co-ordinate the efforts to accelerate the development and take-up of these technologies;
- to support R&D including a set of field operational tests to assess the impact of eSafety; and
- to build awareness of the benefits of eSafety technologies.

Quality of life also depends on sustainable development, which has been an EU priority in particular since 2001, when the EU Sustainable Development Strategy was launched. Since then, environmental protection and sustainable development have been taken into account throughout EU policies and activities.

i2010 could contribute to sustainable development in many ways, notably by cutting greenhouse emissions through greater energy efficiency: For example, Grid technologies offer an efficient means of capturing, processing, analysing and modelling the massive datasets produced by monitoring systems. One such is the Global Monitoring Environment and Security (GMES) system, which collects high-quality environmental data and integrates them with geographical and socio-economic information. There is also 'Eco-innovation' through

³⁸ eTEN supports a range of projects to promote independent living and quality of life in an aging society, e.g. MobilAlarm (mobile alarm services for independent living); Health Service 24, MCC (telemedicine and ensuring home-based management for patients)

³⁹ COM(2005) 465, adopted on 30 September 2005.

embedding ICT in devices and services, and industrial research to make manufacturing systems more resource-efficient and products more environmentally friendly.

Sustainable development is critical to Europe's quality of life and forms a major component of a European Information Society, so it could be included in the i2010 initiative as a fourth flagship to be launched in 2007.