Task-Force on ICT Sector Competitiveness and ICT Uptake

Working Group 1

ICT uptake

TOPIC PAPER

October 2006

European Commission staff participated in this working group as observers and helped facilitate exchanges of views and information between its members. The views and opinions expressed in this report are those of the Working Group and do not necessarily reflect those of the Commission.

Working Group 1

ICT uptake

Coordinator: Michael Bartholomew (ETNO) with Thierry Dieu (ETNO)
Deputy coordinators: Jens-Henrik Jeppesen (Intel) *&* Steen Clausen (ECTA)

Members: Alcatel, Valérie Faudon; AmCham EU, Daniela Coleman; AMD, Jen Drews; BT, Henk Mannekens; Cisco Systems, Pastora Valero; Commission, George Karageorgos, Luca Protti (as observers); CompTIA, Hugo Lueders; Deutsche Telekom, Henning Never; ECTA, Ilsa Godlovitch; EIB, Olivier Debande; EICTA, Tony Graziano; EMF, Alain Hurstel, René Schmitt; Ericsson, Magnus Madfors; ESIA, Martin Spät; ETNO, Michael Bartholomew; European Software Association, Katrijn Otten; France Telecom, Jean-Paul Simon; IBM, Corinna Schulze, Fredrik Sjögren; Intel, Jens-Henrik Jeppesen; Microsoft, Mark Lange; Nokia, Sean Krepp; NORMAPME, Freek Posthumus; Nortel, Thomas Reynaert; SAP, Christine Wenzel; Siemens, Walter van Hemeledonck; Sun Microsystems, Alain Clo; Tele2, Jan Tjernell; Telefónica, Pablo Pfost; TimeWarner, Simon Hampton; UNI-Europa, Gerhard Rohde. Commission contact points for research-related information: Bernard Barani, Max Lemke, Charles MacMillan, André Vits. Representatives of ESIA participating ad hoc: AMD, Helmut Woessener; Freescale, François Escher; Infineon, Alfred Hoffmann; Micron, Fabrizio Fama; NXP Semiconductors, Merten Koolen; STMicroelectronics, Enrico Villa.

Steering note

Prepared by the industry associations

Issue

Policy-makers widely acknowledge the importance of the production, dissemination and use of information technologies and the role of these technologies in enhancing economic growth, job creation, competitiveness and public welfare. However, the uptake of ICT in Europe has been slower than in other economies, including the United States.

Mandate

This working group will provide evidence as to the importance of ICT pervasiveness in Europe, and identify potential reasons for the divergence with leading regions. Topics to be covered will include the adaptability of workers and enterprises to changing technologies, the impact of ICT uptake on the workforce, the adequacy of ICT education and skills training for Europe's workforce, the importance of standards and ICT interoperability, the role of governments to encourage ICT uptake; and the capacity for effective ICT uptake by EU SMEs. The group will seek to produce recommendations aimed at ensuring the development of the necessary enabling environment to effectively use and fully benefit from ICTs.

ICT Task-Force

This working group is one of six under the ICT Task-Force. To see the reports of the other working groups and the overall report of the ICT Task-Force, please go to http://ec.europa.eu/enterprise/ict/taskforce.htm

ICT TASK FORCE
WG 1: ICT UPTAKE WORKING GROUP

POTENTIAL AREAS OF ACTION FOR PROMOTING THE DEVELOPMENT OF ICTs

Final draft, 11 October 2006

The Issue: *Policy-makers widely acknowledge the importance of the production, dissemination and use of information technologies, and the role of these technologies in enhancing economic growth, job creation, competitiveness and public welfare. However, the uptake of ICT in Europe has been slower than in other economies, including the United States.*

The Mandate*: This working group will provide evidence as to the importance of ICT pervasiveness in Europe, and identify potential reasons for the divergence with leading regions. Topics to be covered will include the adaptability of workers and enterprises to changing technologies, the impact of the ICT uptake on the workforce, the adequacy of ICT education and skills-training for Europe's workforce, the importance of standards and ICT interoperability, the role of governments to encourage ICT uptake; and the capacity for effective ICT uptake by EU SMEs. The group will seek to produce recommendations aimed at ensuring the development of necessary enabling environment to use effectively and benefit fully from ICTs.*

1. Introduction

The positive impact of Information and Communication Technologies on the quality of life and ultimately on growth and competitiveness is widely recognised. The growth of the ICT sector itself is essential for the growth of the economy as a whole. Beyond that aspect, a greater use of Information and Communications Technologies by the society as whole can significantly improve Europe's competitiveness on the global scene. This is why ICT are a cornerstone of the EU strategy for growth and jobs.

The objective of this working group is to understand how ICTs are being embraced by businesses and individuals and whether Europe is reaping the full benefits of ICT, compared to its main trade partners, in terms of productivity growth.

This report will try to distinguish the penetration rates of ICT (which may be similar to other regions of the world), from their usage (basic or more innovative) and finally their impact on the competitiveness.

Not all regions of the EU are equal in terms of ICT uptake. Some countries are without any doubt pioneers in this field and their ICT uptake rates are exceeding those of Europe's main competitors.

The report shall identify the barriers to ICT uptake both at macro and micro-economic levels, by business and by individual users.

The report shall focus on those areas where actions are needed either by public authorities, at the EU, national or regional level, or through public/ private partnerships.

Although barriers to ICT uptake and possible solutions to encourage it are to be found both on the supply and the demand sides, this working group should focus its recommendations mainly on the demand rather than the supply side. While EU ICT policies focusing on availability and access to ICT are important, it is equally vital that policies also concentrate on encouraging the demand for ICT by all segments of the economy and society and enhancing skills. Increased demand will in turn drive investment and growth in the ICT sector.

2. The issue

The ICT sector continues to drive about half of EU's productivity gains but this is not sufficient to improve the global competitiveness of the EU[1]. Uptake of ICT by the businesses in general remains much lower than in the United States and the trend does not significantly improve. The contribution of investment in ICT (by all economy segments) to the GDP is about half of the US level. Businesses in Europe remain slow in embracing ICT applications in their organisation and processes.

Fig 1

The ICT Sector[2]			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 *estimate*			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**			**EU**
%all research expenditure	**25%**	**35%**	ICT-enabled product/services			**17%**
% GDP	**0.31%**	**0.63%**	Non-ICT-enabled product/services			**29%**
			ICT enabled processes			**33%**
			Non-ICT-enabled processes			**12%**

Europe invests substantially less than the US in various forms of "knowledge", including IT and software, communications infrastructure, R&D and higher education. ICT investment is now half the level in the US as a share of GDP – with the gap having widened in recent years. Investment in bringing the SMEs up to speed is also lacking.

Since the mid nineties the EU is facing a constant decline in labour productivity which is mainly attributed to the lack of ICT-related investment and uptake by the various segments of the

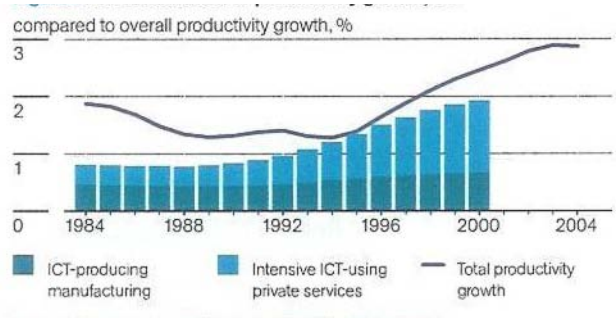
[1] i2010 – First Annual report on the European Information Society COM (2006) 215
[2] European Commission - 2004 eBusiness W@tch.

economy. A wider use of Information Society Technologies has the potential to revolutionise and maximise processes and organisations in a number of key sectors (health, transport, services, ...). Evidence shows that higher productivity growth rates observed in the US and other world trade partners of Europe are mainly resulting from greater use/ integration of ICTs by all segments of the economy[3].

Productivity growth in the US has been mostly driven by the ICT-using services sector. ICT-using sectors have not been in a position to capitalise on their investments in terms of productivity growth[4]. ICT accounts for 5.8% of GDP in the EU against 6.3% in the US. In the EU, ICT accounts for 18% of total investment against 29% in the US. ICT contributed respectively to 42 and 80 % of labour productivity growth in the EU and US between 1996 and 2000.[5]

ICT-contribution to productivity growth, USA

Fig 2

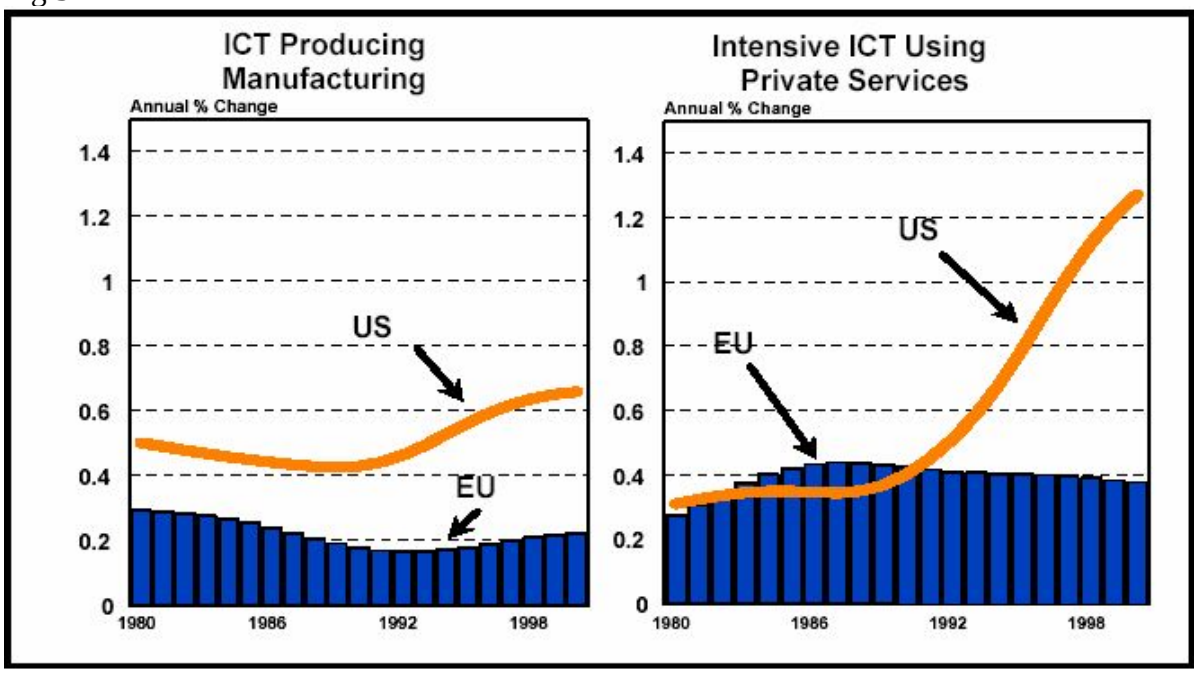


As illustrated in the graph below, the contribution to productivity growth of the ICT producing sector in Europe, although lower than in the US, remains significant and continues to increase, while the contribution of ICT using sectors to growth has been diminishing. It is obvious that this lack of uptake of ICT by other sectors of the economy is one of the main reasons for the widening gap between Europe and the US, in terms of productivity growth. This aspect will therefore will be one of the key priorities to be addressed in this report.

[3] I2010 High level group report/ March 2006
[4] Aho Group Report : Creating an Innovative Europe
[5] OECD, Indepen analysis, 2003

Contribution to the total change in Trend Labour Productivity per Hour from ICT-Producing Manufacturing and intensive ICT-using Private Services

Fig 3



Source ECFIN report European Commission DG Enterprise / GGDC

The healthcare sector is illustrative of this lack of ICT-related investments. While industries such as manufacturing and financial services invest 8-10% of annual revenue in Information and Computing Technology-based solutions that improve their competitiveness and profitability, the healthcare industry invests an average of 2%. Such lagging investment contributes to workflow inefficiencies and preventable errors that lead to rising costs and impact quality of patient care.

There is growing awareness among governments and healthcare organisations that strategic investment in innovative ICT-based solutions can yield significant business value. Besides national initiatives, the EU's long-term commitment to support ICT for health research and development activities has contributed to an emerging eHealth European industry. But in reality, the take-up has been slow. A number of causes hindering the potential of the European eHealth product and services industry can be identified: legislation has been behind what ICT can offer e.g. lack of reimbursement status of eHealth related services and products; ambiguity of legal aspects; reluctance to invest in new solutions; privacy and confidentiality concerns; lack of support of hospital management; too little involvement of lower organisation echelons in the optimization process around ICT and weak interoperability of products and solutions. The United States have started later the development of eHealth programme but is reacting swiftly to the opportunity of cost savings, with a target of 30% cost gain through an intensive ICT use in e-health.

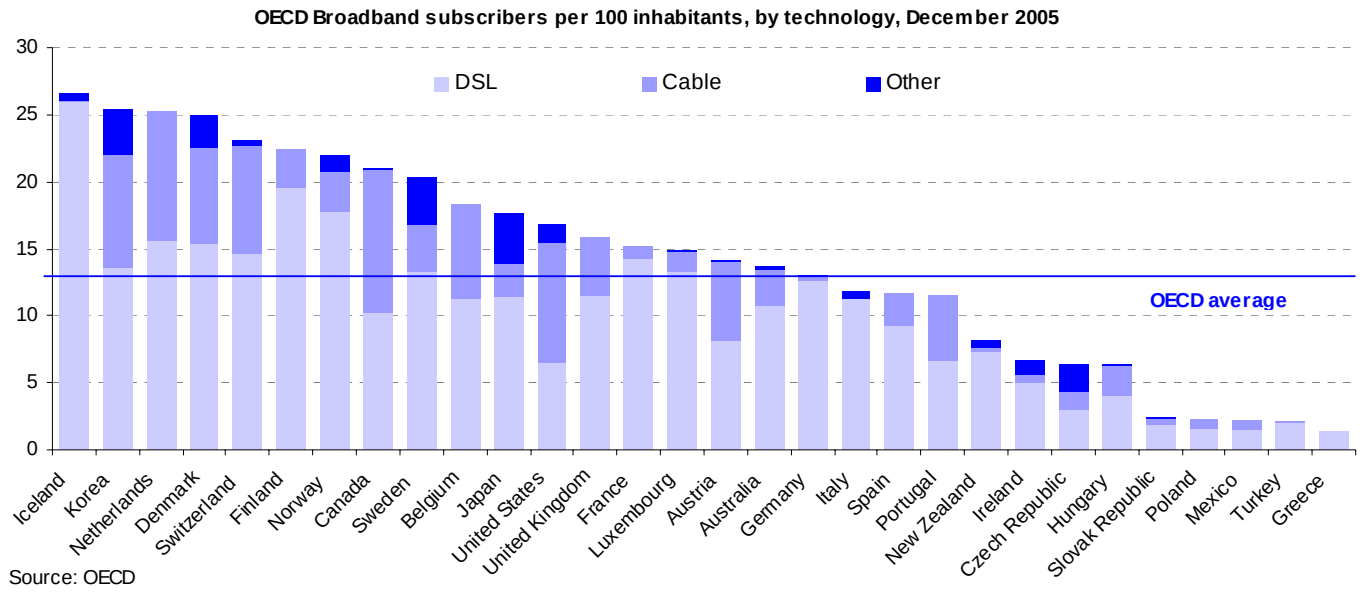
Broadband also represents an enormous potential for the retail sector. Broadband does not only have the potential to boost online shopping but also to improve retailers' relationship with both costumers and suppliers. Moreover, it can also revolutionise usual shopping habits. Broadband can also help customers finding out more about a product while in the shop. But for retailers to benefit from these opportunities, more investment in the retail sector will be needed. [6]

As highlighted in the European Commission i2010 initiative, a wider usage of the information and communications technologies would not only impact positively on Europe's competitiveness. Broadband-based services offer new opportunities in many sectors and can contribute to meet many of the challenges modern societies are facing including social, environmental, demographic and educational.

3. Key figures about ICT Uptake in Europe

According to recent surveys[7], 40% of EU households have Internet access at home (still important disparities are observed between countries like the Netherlands and Sweden where respectively 80 and 74% of households have access to Internet and countries like Lithuania and Slovakia where only 17 and 14 % have access to the Internet. 23% of EU households have access to broadband with similar disparities between countries (62% for Netherlands against 2% for Greece).

Fig. 4



As far as the reasons for not embracing broadband are concerned, for 22% the barrier is the price and for 14%, this is the lack of broadband access. 39% of households who do not have broadband connection are either satisfied with their current connection or do not use enough Internet. Lack of motivation is therefore certainly an issue to be addressed.

[6] Broadband the next 5 years, BT
[7] E-Communications Household Survey, European Commission, July 2006

As far as enterprises are concerned, a survey recently conducted by the European Commission's DG Enterprise for its annual eBusiness Watch report[8] on the ICT uptake among businesses, shows important disparities between sectors and between large and small enterprises. The survey shows that 74% of enterprises have a broadband connection. However, only 13 and 11% respectively are sending their employees to ICT training or using e-learning applications. An average of 50% of companies made investment in ICT in 2005. Big disparities are observed among sectors (between 79 and 70% for the hospitals and telecommunications and 44 and 43% for food and beverages and footwear sectors). Differences between countries are also visible between countries (68 % in Finland and 65% in the UK against 44 in the Netherlands and 40 % in Hungary). Among small enterprises (less than 9 employees), only 39% have made ICT investment against 86% of large companies. Similarly 43% of enterprises in the concerned sectors considered that e-business has no relevance for their operations. This sentiment is shared by 48% of small enterprises against only 19% of large enterprises.

ICT-related industries (ICT manufacturing, consumer electronics, telecommunications) are themselves intensive users of these technologies in both supply-side and business-to-consumer activities.

The pattern of e-business evolution is similar among many non-ICT manufacturing industries: Large companies drive developments, with supply-chain integration as a key objective, but there is a –very- pronounced '*digital divide*' between large players and small companies. The majority of small companies does not see ICT as an instrument to enhance their business.

ICT budgets typically represent about 5% of total cost – except in ICT sectors:

- In most sectors, ICT budgets account for 4-8% of total company costs. In ICT-related industries, budgets are significantly higher: about 12% in ICT manufacturing, about 20% in the telecommunications industry
- There is hardly a difference between size-bands or countries in terms of the relative size of ICT budgets.
- About 75% of all firms say that they plan to maintain the current level of spending. 20% report plans to increase their ICT budgets, 5% plan budget cuts.

50% of firms made ICT investments in 2005

- About 50% of all companies interviewed, and about 80% of medium-sized and large firms, reported investments in ICT for 2005.
- The average ICT investment, according to evidence from 2005, is about 4,000 – 15,000 EUR for micro and small firms, 65,000 EUR in medium-sized firms, and more than half a million euros in large companies. Among large firms, there are obviously significant variations due to the large strata of firm sizes (the size-band includes firms with 250 and with 250,000 employees).

Self-financing is the main funding source for investments

[8]Food and beverages, footwear, pulp and paper, ICT manufacturing, consumer electronics, shipbuilding and repair, construction, tourism, telecommunications and hospital activities.

- About 80% of all companies that made ICT investments in 2005 said that self-financing from the cash-flow was the main source for financing their investments. About 7% of firms used bank loans as the main source.
- Public funding and venture capital (VC) are statistically insignificant as a major financing source. Only a minority of 1% financed investments mainly from VC, and 2% used mainly public funding mechanisms.

- About 15% out of those companies that used mainly external sources (bank loans, VC, public funds) experienced difficulties in drawing funds from these sources. Difficulties are more pronounced among very small and very large enterprises; only very few SMEs reported such difficulties.

Fig. 5

Exhibit 1

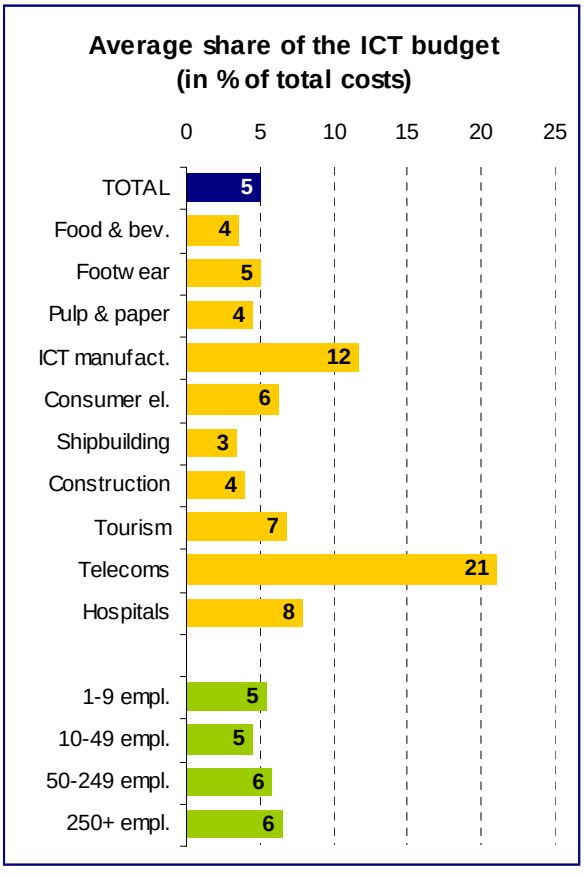
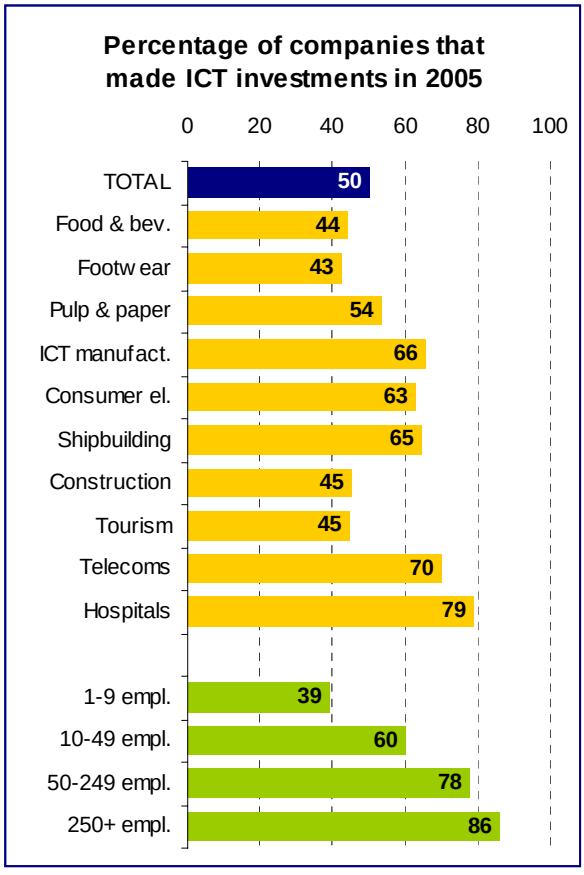


Exhibit 2



Source: *e-Business W@tch* (2006)

4. Main barriers to ICT uptake and Policy Recommendations

The relatively low levels of ICT investments are explained by various factors that will be detailed further in the subsequent sub-sections of this report. Several reports identify as the main explanations for low ICT investments, the fragmentation of markets in Europe and the multiple levels of regulation and requirements innovators have to face, but also the difficulty in implementing necessary organisational changes to benefit from ICT investment. Other barriers are the inappropriate educational and skills levels, the product market regulations and the low levels of services market integration across Europe.

4.1 In the macro-economic environment:

Lack of innovation culture

The issue:

One of the first reasons explaining the lower level of investment is the lack of an "innovation friendly market"[9]. The market does not sufficiently rewards innovation leaders. Reports also point to the weakness of the innovation culture in Europe, despite efforts made by companies in the ICT sector[10] to compensate this. There is also a lack of access to risk capital. There is a lack of incentives for venture capitalists to invest in Europe's ICT sector. According to a recent ranking of the most innovative companies, only three European companies are in the top 20, one of them belongs to the ICT sector[11].

An innovation culture cannot only be promoted through a top-down approach, it has to be developed at the level of each enterprise as well. Innovation has to go beyond technical aspects, it has to be built on innovation friendly company cultures. Such a culture is characterised by features such as: failure tolerance, interdepartmental teams and networks, no status symbols, horizontal instead of vertical career paths, open and transparent information flows, high density of informal communication, tolerance towards deviating opinions, etc. A company culture that promotes diversity, creativity, develops individual potentials, encourages thinking "out of the box" and overcomes traditional silo mentality.

Policy recommendations:

- Creation of a venture capital friendly environment to support the entry and growth of new entrepreneurial firms. The Aho Group Report suggests among others the creation of a "Single Fund" structure to avoid double taxation for an investor located in one EU member state investing through a fund in another; strengthen the European Investment Fund; encourage the venture capital to focus on key areas for the future.

- EU policy makers should envisage the creation of lead programmes in fields of excellence such as e-health, logistics and transport.

[9] Aho Group report
[10] For instance, Innovacom - the venture capital subsidiary of the France Telecom Group – since 1988 invested in more than 300 start-up.
[11] Business Week, 24 April 2006 (http://www.businessweek.com/magazine/content/06_17/b3981413.htm)

- Continue to develop such means with the specific needs of SMEs in mind, creating and supporting the winners. Possible tools could include microcredits, strengthening equity capital, mezzanine financing, securisation of loans, etc.

- Actions should be taken to fully incorporate SMEs in innovation development programs and in government procurement programs.

- Coordination must be improved between private and public research programmes. This would also contribute to reduce know-how transfer to other workd regions.

- The European Commission should collect and promote examples of innovative company cultures and may even consider to set out an innovation award for companies that successfully develop innovative approaches.

Lack of flexibility of the production environment

The issue:

Several sources identify a lack of market flexibility to allow the reorganisation of economic activity, or "creative destruction", as a key factor – and argue that the opportunity cost of economic rigidities rose during the 1990s. If there is no change, the outlook is for low growth and relatively high levels of unemployment. To be more profitable and to contribute to productivity growth, capital and knowledge investment needs to take place in an environment where "creative destruction" can occur.

Today some social models hinder innovation from taking place. In some – but not all Member States – the rigidities of labour markets deter companies from being innovative and exploiting innovation and ICT to achieve the same level of productivity growth seen in competing geographies. Innovation implies some transformation within the production organisation. If this transformation cannot occur or if it takes too long or is too costly, then investment will not be made.

Business model innovation requires flexibility and the allowance for structural change. Achieving the full benefits of ICT requires institutional and organisational change. Such change is more readily introduced if there is economic flexibility and scope for changes in the location, organisation, inputs and outputs of enterprises.

Social models need to facilitate, to a greater extent, transformation and adaptability of enterprises and workers, thereby allowing for production (of both services and goods) to shift to higher-value added segments. If policy makers take immediate and decisive action to sharply reduce the legal and financial barriers to restructuring that discourage hiring and new business formation and their growth, business in Europe will be in a stronger position to cope with global competition and Europe better prepared to sustain its social models of choice.

The provision of training is key to enable people to cope with transformation, to maintain their employability and facilitate their re-integration into the labour market.

Product market regulations can also be a barrier to innovation. The use of Information and Communication Technologies allows companies to enter markets and to develop new products and services. Product market regulations should not prevent companies from extending beyond their traditional markets. Countries with a high degree of product market regulation have registered lower levels of productivity growth in ICT-using sectors.

Europe must come up with methods for making the high level of social protection that its citizens enjoy, compatible with the structural reforms that allow greater flexibility of production factors. The flexibility that economies such as the United States enjoy (facility to create and to launch companies, restructure them, obtain financing, etc.) constitutes a major advantage. We must create an environment of "creative destruction" where the dynamics of the markets favour the disappearance of business models that are not very competitive in an ICT-driven environment and which, in turn, are replaced by others.

Policy recommendations:

- **Implement a package of reform measures** including liberalisation of product, service and financial markets as well as making labour markets more responsive to change and where the ICT usage traditionally brings bigger productivity gains. Opening services markets will create new opportunities for innovative, often ICT-driven services. It will also increase incentives for companies to innovate and improve productivity.

- **Foster entrepreneurship and experimentation:** most of the countries that have benefited from ICT-driven growth have low barriers to entry and exit, enabling firms to experiment and test business models (e.g. by reducing regulation and red tape). Change management should be actively promoted, especially as a tool for SMEs to ease take up of the new eBusiness solutions. It is also important that the financial failure of new business ideas is made less punitive.

- **Ensure policies promote greater adaptability of firms and workers** and scope for "creative destruction" in Member States by altering, where standard contracts are overly rigid, the level of flexibility provided in areas such as periods of notice, costs and procedures for individual or collective dismissal, or the definition of unfair dismissal (Wim Kok 2003 Employment Task Force).

- **Policies need to ensure that as many people as possible benefit from investments in new technology.** Replacing old technology with new will necessarily entail some redistributive effects.

- **European governments can respond by developing an adaptability agenda that supports innovation and an upward shift in the value added chain.** Some countries are already putting in place strategies to secure quality of and access to education, lifelong learning and active labour market measures to increase the adaptability of their workforce while adapting regulations that impact on firms' ability to respond quickly to changing market conditions.

- **Successful policies manage to combine different forms of labour market flexibility/ mobility with employee security**, recognising that in a global environment, job security will

not come from protecting individual jobs but from giving people the skills they need to remain adaptable throughout their working life.

- As demonstrated, policy levers have an important impact on an organisation's ability to reorganise economic activity and allow for "creative destruction" to take place when implementing new IT. The rate of success, e.g. in terms of productivity gains, will also depend on the organisation's ability to change and manage this change through internal factors. Managing change is never easy but any change programme requires strong leadership and a system for communicating between management and the workforce. How this communication takes place will necessarily differ from one organisation to another but it will need to be open and clear to encourage all parties to pull in the same direction. The promotion of change is essential especially for SMEs. Change promotion programmes should involve businesses, local government and trade unions[12].

- EMF does not support main conclusions and considers that European delay in ICT uptake does not result from an insufficient liberalisation of the market, nor from an insufficient deregulation of the employees rights. The European telecom market is one of the most opened in the world comparative with US or Chinese market. Our ICT sector needs a strong and coordinated European industrial policy, through lead programs visible for the citizens, broadband optical fiber deployment and measures to increase R&D investments. All ICT-driven changes must be managed in consensus with all the stakeholders and in particular the trade-unions. In order to increase ICT uptake, there is a need to amplify social dialogue through
  (1) introducing a regular negotiation process in ICT companies on the industrial changes and on the evolution of skills and competencies.
  (2) promoting eTrade Union project, a platform to strengthen European social dialogue and inform employees, stimulate mobility.

ICT uptake and interoperability

The issue:

Interoperability policy discussions have advanced in recent years to identify distinct areas which involve a variety of market and government considerations and often require different policy responses and actions by different stakeholders. Specifically, interoperability issues can be categorised as technical, legal, semantic, and organisational. The industry remains primarily responsible to deliver technical interoperability to meet market needs. Technical interoperability has advanced in recent years, but at the same time the complexity of the ICT industry and concerns about fragmented markets also continue to increase. These are important issues for the ICT industry and for ICT uptake, yet they are not unique to the European market and do not themselves explain differences of ICT uptake between Europe and other regions. On the other hand, the legal, semantic and organisational interoperability issues that exist in Europe do have a more direct impact on the differing levels of ICT uptake in this region vis-à-vis the rest of the world. This section addresses these distinct aspects of interoperability separately.

[12] An example of such programme is the Bristol eProcurement progamme

Legal, Semantic and Organisational Aspects of Interoperability

Differences between EU member states in regulatory requirements have slowed the widespread usage of some technologies (for example, digital signatures). Lack of agreement on semantic data requirements, and organisational differences between administrations, have hindered the European uptake of available technology that could improve productivity. While this impacts all vendors, SME producers in particular are less able to develop separate solutions for 25 countries, depriving them of the opportunity to serve a wider market of 450 million users, and SME customers cannot cope with multiple forms and requirements (eInvoicing is a typical example). In areas of electronic authentication or electronic payment, more focus is needed on consistent legal and semantic interoperability in order to enable increased uptake across the EU.

eGovernment:

The deployment of eGovernment applications throughout the EU level will play a key role in motivating citizens, businesses and administrations to more actively use broadband, facilitate communications and ultimately improve the effectiveness of administrations. The lack of legal, organisational and semantic interoperability is an obstacle to the roll out and take up of e-government services. The incompatibility of services from one country to the other discourages citizens and businesses from embracing them. Interoperability needs to be addressed at the administrative, semantic and legal levels through a closer cooperation between governments. Timing is also an issue. Citizens from more advanced countries should not be penalised because of other countries which are too slow in developing the service.

Example: eHealth

One key area in which legal, organisational and semantic interoperability is necessary is eHealth. The goal is to improve patient safety by ensuring seamless exchange of information among all stakeholders across the whole continuum of care. This requires increased cooperation among healthcare systems, services and tools as well as interoperable Electronic Health Records (EHR) and Electronic Medical Records (EMR).

The ICT sector can deliver interoperable framework architecture, technical solutions for patient summary and identifiers as well as an emergency data set. But the efforts of the ICT sector will only produce results when Member States adopt nationwide interoperable EHR and EMR and harmonise local, regional, national and cross-national eHealth implementations.

There are other policy-related obstacles impeding uptake of eHealth: vague or non-existent government policies to integrate novel eHealth solutions into mainstream medical and social care; inertia in adopting systematic reimbursement policies for eHealth-based products and services (eg. telecare, and homecare); and determination of basic legal principles needed to remove legal uncertainty from the practice of eHealth (eg. liability). This compartimentalisation of rules and principles across different Member States creates, in practice, a heavily fragmented market.

<u>Recommendations:</u>

- Industry recommends therefore that member states give full support to the current efforts by the European Commission to stimulate a wide and harmonised application of eGovernment and to improve interoperability, as outlined in the European Commission's April 2006 Communication on an Action Plan on i2010 eGovernment Action Plan: "Accelerating eGovernment in Europe for the Benefit of All."
- Industry recommends that the current efforts underway in the Commission to address legal, semantic, and organisational interoperability issues be given greater priority.

The continuing importance of technical interoperability

In Europe today, as in the global ICT marketplace, while broader connectivity and other developments have already achieved the result that a certain level of technical interoperability exists, perhaps to a greater degree than at any time in the past, interoperability nevertheless continues to be an important and growing challenge. Much has been achieved as the industry has responded to customer and government needs for greater technical interoperability, and new technologies have evolved that enable better interoperability. However, due to the huge opportunities made possible by the two components of convergence – digital information and universal connectivity – the reach, scale and complexity of what can and should be made interoperable in order for the ecosystem to deliver the benefits of convergence has grown even more. Therefore, interoperability now is more important than ever before and sustained efforts are called for towards ensuring that interoperability is broadly implemented in products and services while taking into account other important objectives such as incentives for innovation and security.

At the same time, the ICT sector continues to innovate and launch new products and services at an unprecedented speed, and as ICT uptake is an important overriding policy objective, it is appropriate for policy makers to continue to monitor developments in this area. Many ICT products and services result from close industry collaboration in standardisation groups or direct collaboration among competitors to test products or to license intellectual property, and policymakers should continue to encourage such collaboration.

Interoperability, convergence and the digital networked era in the commercial context:

In the emerging business environment of the digital networked era, many new markets present opportunities for strong economic growth due to the expected benefits of network effects – a virtuous cycle of increasing utility to users and increasing returns to enterprises as more and more users join an interoperable environment on the communications networks. The convergence of previously separate broadcasting, telecom, fixed media and IT services being accessible from multiple sources and channels for consumption on different categories of devices is an inherent part of this opportunity. While interoperability is a prerequisite for both convergence and the associated network effects to become reality, its smooth progress is not a foregone conclusion as there are multiple considerations that market participants take into account when choosing their preferred technical and commercial approaches. Objectives such as maximising return from investment into technology or service development, competitive differentiation, ensuring an optimal user experience, and strategies aimed at capturing a market-winning critical mass are but a few of the possible business rationales that may lead to choices to limit interoperability (vis-a-vis products and services from other market participants) in products and services. In fact, network economy characteristics may be a strong incentive for selective

approaches to interoperability as the rewards of becoming the market leader are unusually strong. This may be called the interoperability paradox of the network economy: The potential systemwide reward for good interoperability (growth through lack of fragmentation) and the potential individual firm reward ("winner-take-all") for selective interoperability are both powered by the characteristics of network economy.

Further, it is important to realise that interoperability cannot be approached in a wholesale fashion; it is not realistic to require or to even imagine "extreme interoperability" – that all products and services always were interoperable with all other products and services, for every functionality provided. Such a theoretical requirement would stifle development and market deployment of new and improved products and services. Timing also is important: over-emphasis on early interoperability can be counter-productive but leaving implementation of interoperability too late may create structural problems associated with the extremes of excessive fragmentation or high concentration. The importance of interoperability needs to be recognised but it should not become a straitjacket for business.

In the digital networked environment, many services and experiences require the interaction of multiple players and the creation of value networks through which a combination of actors provides a total end user experience. For such compound services to come together, the various players need to coordinate their commercial roles – create a commercial interface – for the implementation for which they enable the technical interoperability of their inputs in the value chain. Achieving this commercial coordination is no easy task and does not happen at the flip of a switch. Such commercial networking cannot be imposed but should be encouraged – within and between the value chain layers and converging sectors – as a prerequisite for implementing practical interoperability in the digital ecosystem.

Publicly available technical specifications as standards are a recognised tool for defining interoperable technical interfaces and thereby enabling market participants to deploy interoperable solutions. The industry efforts in standardisation are very substantial and have achieved very significant results. The importance of standards is growing (due to the increased complexity resulting from convergence) and the industry is responding with sustained efforts. Standards-based software and other technology is already to a large – and growing – extent available to European SMEs thus enabling them to take advantage of technologies for their own benefits, to develop innovative solutions and globally competitive new services. Leading software solutions - both proprietary and open source implementations - implement many standards enabling IT infrastructure to meet the need of businesses to deliver new services globally. Availability of interoperable technology boosts creativity in a cost-effective way. Use of standards and collaborative processes also attracts highly skilled resources and enhances efforts to look for new technology usages. Standards which become widely adopted in implementations are a leading way to deliver interoperability. GSM mobile telephony is a leading example of how an EU standard, when it has been consistently adopted by market participants, has delivered astounding benefits to users and all participants in the mobile communications business ecosystem.

Regarding policies relating to technical interoperability, the ICT industry acknowledges the constructive approach taken by the Commission in the discussion of digital interactive TV services, where government interests in the uptake of these services across Europe focused on the concern for interoperability combined with the need to encourage innovation by industry. Announcing the Communication on Interoperability in Digital Interactive TV Services (6

February 2006), Commissioner Reding stated that: “Compulsory technical standards imposed by regulators are not necessary for the roll-out of interactive digital TV in Europe. This dynamic market is best served by voluntary, industry-led standardisation initiatives.” The Commissioner emphasised that: “Our policy is to encourage investment and promote freedom for industry to innovate.” While promoting open standards, the Commission decided not to require one – specifically because cooperation among stakeholders demonstrated that interoperability was possible without mandating a solution. In order to enhance uptake of digital interactive TV services, the Commission’s regulatory approach focused on the important goal of interoperability without losing sight of the equally important goals of promoting innovation, investment and diversity in technical solutions and business models.

Recommendation:

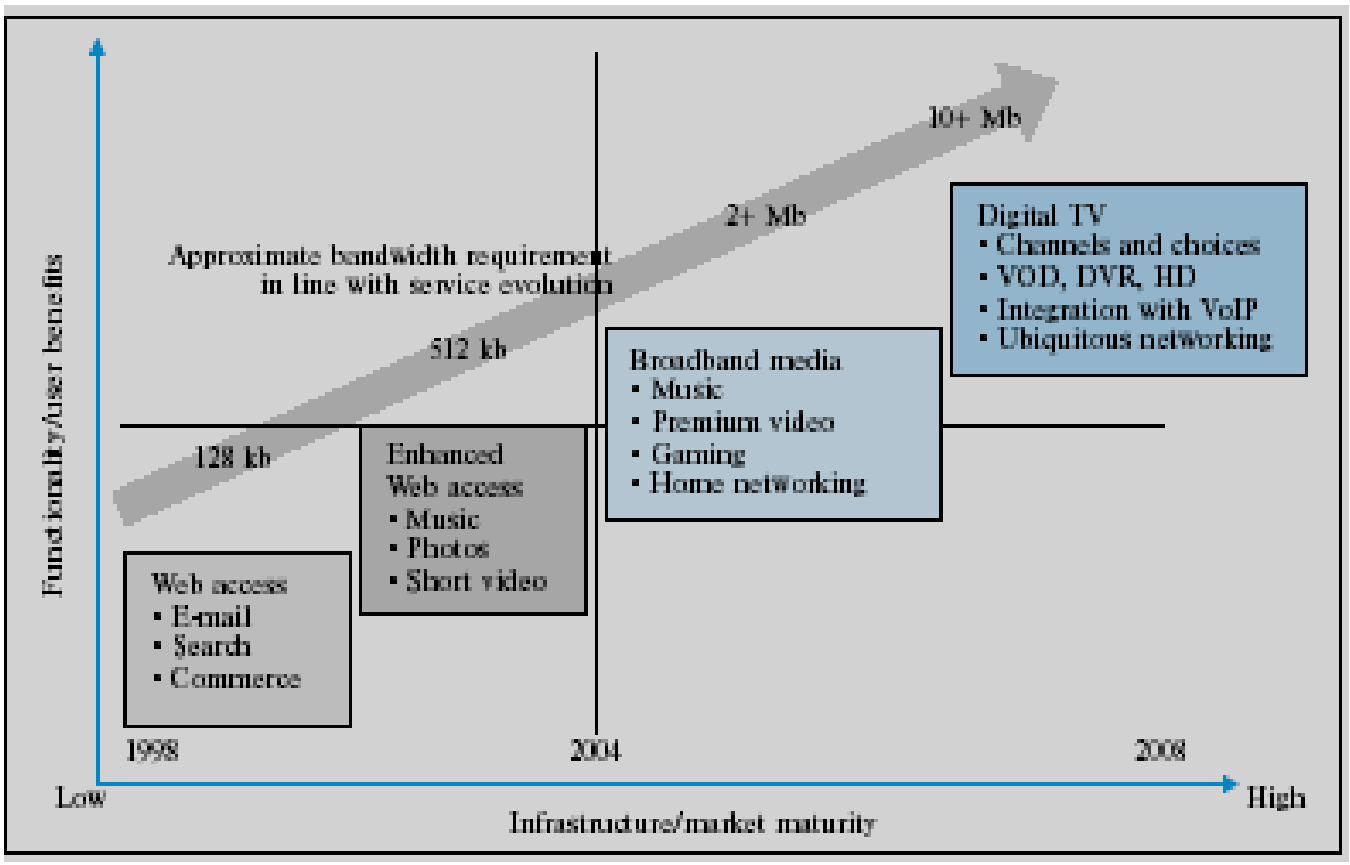
Industry recommends that any policy effort relating to technical interoperability should encourage broad stakeholder cooperation and voluntary market-oriented solutions to achieve the goal of interoperability rather than legislate the specific means to achieve it. In support of industry-led efforts, the EU and the Member States should maintain a policy priority for interoperability along other key objectives such as innovation and security, support industry-led standardisation and promote the widespread adoption of standards in products and service implementations. Policy measures should allow for temporal and business considerations in a competitive marketplace and may include, as appropriate, active dialogue with industry on challenges in formation of value networks and other potential barriers to implementation of interoperability as well as maintaining an agenda of priority identification, target-setting and monitored progress of interoperability in respect of an evolving priority list of functional digital enablers of ICT innovation and uptake.

Network and service investments

The issue:

Investment in the development of next generation -access and core- network infrastructures, service platforms and new service propositions is essential for the delivery in the future of new services to professional, residential and public service markets. Their success will largely determine the future competitive position and welfare state of Europe and the success of its ICT industry and European industry as a whole in the global competitive environment. Completion of the Information Society objective, will act as a strategic advantage for Europe.

Fig. 6



Policy recommendations:

- The European Commission and Member States are asked to closely follow and support these developments at the highest policy level. *The conditions to achieve these objectives will continue to be discussed in the context of the review of the EU regulatory framework for e-communications services.*

- EU policy must encourage the development of competitive broadband markets and at the same time allow further infrastructure investment to respond to customers' needs.

- The use of public funding to develop broadband infrastructure, in order to bridge the digital divide, should be limited to those cases where private investment is not economically viable. Clear guidelines are needed to ensure that public funds are used in a transparent way and do not distort competition. Apart from these cases, governments should merely support and deploy policies aimed at increasing take up and usage of ICT. Public interventions aimed at promoting particular technologies ahead of normal market developments, could have a deterring effect on future investment plans.

4.2 In the micro-economic environment

Lack of awareness/ skills among SMEs

Figures show that investments in ICT are much slower in small and medium sized enterprises than in the large ones. One of the main reasons for this slow take up of ICT by SMEs is the failure of grasping the benefits that ICT can bring in terms of productivity and efficiency and a lack a awareness of solutions available.

The lack of uptake by SMEs is not so much a problem of costs of hardware or applications. The problem is twofold: first there is not enough internal expertise to choose the appropriate technology from a diverse and rapidly changing market and so the SME has often to rely on external advise. Secondly, there are not enough suitable applications for SMEs. They should be encouraged to contract specialised service providers that customise existing applications and make them usable for SMEs.

The SMEs are not a homogeneous group of IT-users, and have different level of needs. Certainly the IT-SMEs and the larger SMEs have a need for good technicians who need solutions to keep their knowledge up to date. But below that level of size, SMEs do not always have highly educated IT-personnel. There is a need to provide them incentives for sending the average employee to training and provide them with the basis skills to exploit eBusiness applications adapted to the type and size of SMEs.

eLearning is not a natural way for the average SME-employee to improve skills. The company structures usually do not allow for specialised IT-personnel, resulting in a lower and less innovative use of ICT. The usual IT-support to the SME is a local IT-SME that can spend limited time and effort to solve the problems.

Individual examples prove that cost and time savings for SMEs by effective use of ICT and eBusiness tools are equivalent with business development. The use of ICT will allow SMEs to make considerable gains from it as they can optimise business process and time. A study conducted in Finland by 3angle partners shows that the smaller the company is, the more impact it can have.

Fig.7

Table 3. Increases in financial measures due to investment in e-business drivers for small and large companies.

	Increase (percentage) for companies with revenue less than $1 million		Increase (percentage) for companies with revenue of at least $10 million	
Financial measure	Mean	Median	Mean	Median
Revenue/employee	46.9	40	13.2	5
Gross margin	39.6	25	11.8	8
Return on assets	47.6	40	10.3	5
Return on investment	50.2	50	20.9	10

Policy recommendations:

- Recognise that the present technology implementation programs are too weak, focus only on small numbers and have mostly very local importance, and that the current approach through R&D programs and the large IT-Providers, is not adapted to SMEs.

- Promote a gradual approach for ICT uptake by eEnabling the SMEs, from buying computers and websites into being fully eBusiness operative.

- Reinforce the infrastructure for eBusiness, by accelerating eGovernment, eProcurement and eBanking programs.

- Provide the resources to educate, coach and integrate the SMEs relying on IT-SMEs and local support centres that can help to get the applications adapted to their particular needs and business models and reinforce European best practice exchange.

- Need for education programmes, developed in partnership by governments and industry to educate the business community on how the benefits will help encouraging SMEs to use new technologies to their full potential.

Lack of consumer demand

The issue:

The lack of consumer demand is also a factor than can explain the delay in the roll out of innovative ICT products or the reluctance to develop eBusiness applications.

There is generally a lack of awareness among individual users of benefits and opportunities of ICT in private life. More compelling products and service platforms towards mass market are needed in order to increase general public interest. Higher speeds, lower prices, advanced services (IP TV, fixed mobile convergent offerings, etc…), are also important.

A recent survey on attitudes towards innovation shows that only 51% of European citizens have a pro-innovation attitude[13]. This may partially explain the low demand for certain types of innovative broadband-based services. It shows the need for enhancing a truly ICT culture in Europe.

Sources indicate that the lack of uptake of new innovative broadband services digital is mostly the result of a lack of skills rather than a problem of broadband availability. The Dutch Presidency in its report "Rethinking the European ICT Agenda" suggested that there should be a shift from "access to all" to "skills for all". Enhanced skills and motivation would in turn increase demand and hence lead to more investment and service roll out.

[13] http://trendchart.cordis.lu/scoreboards/scoreboard2005/innobarometer.cfm

Reports suggest that while US consumers are largely confident in using their credit cards for on line transaction, EU consumers in certain countries are still reluctant to proceeding to online payments, although others do so for 90%. The uptake of many innovative broadband based applications by consumers will depend on the ability to enhance consumer confidence in online transactions[14].

Policy recommendations:

- Campaigns are needed to raise awareness among end users of benefits that broadband can bring to them.

- Further efforts are needed to make ICT more affordable and accessible to low income people or to users with special needs. Regulators and governments have a role to play in eliminating cost barriers. To ensure the accessibility of ICT to people with visual, audio, cognitive, speech or motor impairments Europe needs an objective, attainable and standards-based uniform environment to provide a common set of base requirements for all vendors.

Insufficient use of eGovernment applications as a driver for ICT Uptake

The issue:

New information management technologies and a more systematic use of efficient company management techniques should be encouraged in the administration in order to enhance its efficiency. The high level of services that administrations provide in Europe, the cultural and linguistic diversity, and the great complexity of administrative structures create a complex situation. Many European governments have quite ambitious eGovernment programs in place or in development. Examples include the Nordic approach, with the latest success in Denmark of eInvoicing, the Austrian, Belgian or Dutch programmes. But even older programs like the UK eProcurement program are now growing with success.

Three factors are key to ensure success:

- Always make sure to include all actors of importance, so a good mix of small and big enterprises,
- Use the local relays to reach down to the small actors to educate, to coach them during implementation,
- Show the example through a wider usage of eGovernment and eProcurement on a local basis.

Tools for exchange of best practices should also be considerably improved. We might also consider actions to standardize and co-ordinate tools in such a way that we achieve economies of

[14] Dutch Presidency Report, “Rethinking the European ICT agenda”, 2004

scale at the European level as well as facilities so that companies and citizens can deal with the various administrations throughout Europe in a simpler manner.

We must foster integrated ICT policies that are regularly adapted to the changing needs. Several examples in the EU and beyond, illustrate the success of an integrated approach with regular adaptation.

Policy recommendations:

- Government should invest in exploring the opportunities of ICT for solving public domain problems in the area of education, health, security, mobility, traffic safety and the environment.
- Governments should act as innovation leaders and act as private sector catalysts.
- Governments should set a target that each citizen should possess the means and capabilities to actively participate in the Information Society.
- Governments should set up programmes (tax incentives) to promote the purchase of Broadband enabled PCs and training package.
- All public services should be accessible by eGovernment. Enterprises and citizens must be able to complete most of their transactions with government on-line.
- Governments should be encouraged to commit themselves to fix a date for the paper-switchover and for all relations with citizens to be carried out by electronic means.

Lack of adapted education and training policies to rapidly changing requirements for new skills.

The issue:

We must push for educational systems at various levels (primary, university and post-graduate education) to adapt to the new environment that new technologies are shaping. We should stress such aspects as new study plans and innovative methods of teaching that make use of the opportunities that ICT offers.

As in other areas, it also important to consider developing plans that allow these actions to be co-ordinated at the European level, thus obtaining economies of scale and facilities for companies that are developing in Europe.

Adaptation of the education systems must be supplemented with actions, partnerships and co-financing by firms, workers and governments to foster life-long learning.

It must be recognised that the level of eSkill development is different for SME-users and large organisation employees, with the latter being much more in need of staying at the cutting edge of technology. SME's rely often on outsourcing to IT-SMEs for that purpose. That implies a dual approach to eSkills maintenance.

Policy recommendations:

- Creating an ICT culture and enhancing personal ICT skills of citizens in order to boost further broadband take up**:** As recognised by the European Commission, broadband is a major driver for the competitiveness in the ICT sector. Investments by the private sector have resulted in the past years in a well developed broadband markets with high level of coverage. Efforts must now focus on demand side to encourage citizens and business to widely embrace broadband. Increased demand will in turn encourage further roll out of services and infrastructures. Enhancing personal skills are best achieved through public-private partnerships (already covered partly by other working group).
- Programmes to encourage IT literacy and usage by enabling people to have computers and/ or Internet access (employee programmes to buy or lease computer equipment tax free/ university/ school programmes to purchase computers/ discounts and tax breaks to groups of people affected by digital divide). Such projects are sometimes referred to as Government Assisted Purchase Programmes (GAPP). Some examples of such projects follow below[15]:

  Since 1998, Swedish employees have been able to purchase a PC from their employer, tax-free. The purchase price is deducted from their salary as monthly repayments spread over 36 months. By 2001, PC ownership in Sweden had risen from 41 per cent to 80 per cent of households.

  In 1999, the UK Government launched its Home Computing Initiative (HCI), which enables businesses to loan computer equipment to their employees as a tax-free benefit worth up to £500 per year.

  In 2001, the French Government introduced tax exemptions on PCs purchases of up to €1,500.

  In Italy, PC sales in 2003 have increased following the government's launch of a €175 rebate on PC purchases by 16-year-olds, and a €200 grant for families and professionals. In 2004, low-income families qualified for a €150 bonus and teachers could buy a notebook PC at a discount price agreed with Consip.

  These projects have an impressive track record of bringing ICT equipment to citizens, helping those citizens to improve skills and employability etc. Member States that have not yet implemented such projects should do so, and existing programmes can be expanded to include more groups in society. The European Commission should help Member States get the best results by sharing information and best practices in this area.

- Provide the resources to educate, coach and integrate the SMEs relying on the support of IT SMEs and on existing relays for SMEs throughout the EU.

- Set an objective of 100% European schools connected to broadband Internet: Broadband connection of schools and all education sites should obviously be a priority across Europe. While broadband is becoming a daily tool improving living standards for people, businesses

[15] Source: http://www.intel.com/business/bss/industry/government/gappbackgrounder.pdf

and public sector, a divide will appear between those knowing how to use the tool and those not knowing. School is obviously a key place to minimize this divide and stimulate demand.

Furthermore the school of the future will rely on true broadband connectivity. Next generation networks enable teachers to customize and enrich their courses with advanced multimedia content. Schools should prepare for this transformation. Otherwise, a divide will appear in the education provided to kids between connected schools and non-connected schools.

While Europe is catching up in terms of penetration rate, the broadband connection rate of schools in some Member States shows a gap with other world regions. For instance, a significant number of Member States have almost caught up or are now ahead of the United States in terms of broadband penetration. As highlighted by a recent European Commission survey on broadband connections in schools[16], 67% of EU schools have a broadband connection. If the EU is still well behind the 95% penetration rate achieved in the US schools thanks to their e-Rate program, the situation varies significantly among member states.

We recommend the European Commission sets an objective of 100% broadband-connected schools – including primary schools - within the next two years.

- Universities should have a minimum percentage of credits for on-line learning in their curricula and they should facilitate on-line programmes for postgraduates (life-long learning).

Barriers to circulation of digital content.

The issue:

Content is a basic part of converging services (e.g personal HDTV). A policy should be promoted that contributes to its development in Europe, considering such aspects as regulation of non-linear services, management of collecting societies, use of DRM vs. levies, etc. Distribution models in Europe are not taking full advantage of the possibilities of the digital world (e.g.: windows). Barriers to innovative distribution models (e.g. podcast) and the role of home gateways. The wide availability of digital quality content is one the key drivers for consumers to embrace new technologies.

Policy recommendations:

- **Regulatory barriers** to the delivery of quality content through new online distribution channels must be lifted to benefit fully from potential offered by electronic business.

[16] http://ec.europa.eu/information_society/eeurope/i2010/docs/studies/final_report_3.pdf

- **Levies on copyrights** should be phased down. The European Commission should issue additional guidance for Member States on the application of levies in the digital environment. While the Community has established rules in this area in recent copyright legislation (Directive 2001/29/EC), these mandates have not been implemented at national level and further guidance is needed.

  The Community should act to address the ICT uptake barrier imposed by levies, particularly given the fact that levies can create significant trade distortions and obstruct the free flow of goods within the Community. There are serious doubts as to whether existing levies regimes can be justified under the industrial property exception under Article 30 EC Treaty.

  By increasing the cost of digital products, national copyright levies directly reduce consumer purchasing power — in turn constraining consumer uptake of new ICT products and content delivery systems. Levies also diminish sales of both the levied product and related products and services that might or might not be levied — reducing the funds available to ICT firms for R&D in downstream innovation. Recent estimates indicate that levies imposed in the EU-15 cost producers nearly €750 million in lost sales revenue (resulting from the higher price and lower unit sales), with a total effect (on producers, SMEs and consumers) of €2.1 billion in 2005.[17]

[17] Nathan Associates Economic Impact Study (May 2006)
http://www.eicta.org/press.asp?level2=42&level1=6&level0=1&docid=660