

Task-Force on ICT Sector Competitiveness and ICT Uptake

Working Group 5

Skills and employability

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 5

Skills and employability

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Steering note

Prepared by the industry associations

Issue

ICT competitiveness depends, at the most basic level, upon the technology skills of those driving ICT innovation. ICT uptake is equally dependent on skill levels.

Mandate

Based on this premise, the Working Group on Skills and Employability has been mandated to examine four closely interrelated issues:

- (1) How to create and promote an environment that attracts and retains highly skilled ICT practitioners.
- (2) How best to interest future generations in the process of ICT innovation and the application of current ICT technologies, specifically taking into account the gender gap.
- (3) How to foster the employability of the workforce at large, including the lower-skilled workforce.
- (4) How to foster lifelong learning and how to apply ICT to transform the way people learn and work (i.e., how to obtain, manage and share knowledge and transform business processes).

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>

SUMMARY OF RECOMMENDATIONS

The following recommendations have been drawn up by representatives of ICT companies and associations, SMEs and social partners with the view to become part of a long term agenda and commitment from all stakeholders to address e-skills and employability issues both in the private and public sector in the European Union. The working group calls upon the European Commission to take these recommendations into account when working on its forthcoming policy communication and action plan on e-skills.

1. ATTRACTING AND RETAINING HIGHLY-SKILLED ICT PRACTITIONERS TO ENERGISE THE EUROPEAN ECONOMY

- The ICT industry should redouble efforts to set-up an **Industry e-Skills Leadership Group** based on existing industry advocacy groups and associations to facilitate improved e-skills information and co-operation as well as the monitoring and the implementation of coherent well focused initiatives.
- The collaboration between all stakeholders should be strengthened with a view to provide regularly up-to-date **EU-wide statistics and foresight analysis** relating to e-skills and the positioning of the EU in the global economy in this domain. This includes close ties between OECD, Eurostat, statistics offices, consultants and the ICT industry, and investment in improving statistical instruments and market surveys.
- Multi-stakeholder partnerships between industry, governments and education and training institutions should be established to promote ICT practitioner education and integrate **industry-based ICT curricula and certifications** into formal education with a special emphasis advanced ICT practitioner skills.
- The transparency regarding different qualifications and ICT career paths should be promoted by establishing and maintaining a **European e-Skills and Career portal** to set out ICT job profiles, map ICT training and certifications to specific job roles, and integrate existing national ICT skills and career portals.
- The Commission should support the promotion of good practice and the efforts of industry to develop **European quality criteria for e-skills training and certificates** and to identify efficient incentives and tools to stimulate e-skills development.
- The important on-going work towards an **EU-wide e-competence framework** should be accelerated through close cooperation with industry (users and ICT certification provider alike) to ensure compatibility of the framework with formal and non-formal ICT practitioner education and certifications.
- The Commission and Member States should consider efficient **fiscal incentives** (such as a human capital investment tax credit) and **financial support for individuals and SMEs** taking ICT training, throughout an individual's career.

2. MOTIVATING AND EMPOWERING FUTURE GENERATIONS WITH E-SKILLS

- The Commission, Member States and the ICT industry should design and run proactive awareness and information campaigns to provide parents, teachers and pupils with an accurate understanding of the broad range of future job opportunities arising from an ICT education beyond ICT practitioners.
- Enterprises and social partners should consider the role of new forms of attractive **part-time and flexible working practices** can contribute to attracting ICT workers and in particular women.

- Member States and industry should work together to **improve careers advice in and around schools** and provide **better and more frequent training of career consultants** based on a better understanding of future opportunities and derived from enhanced statistics and career path data.
- Member States and industry should work together to improve **teacher and trainers professional development** to help equip them with the necessary e-skills and to make ICT an effective and integrated part of classroom learning.
- The Commission and Member States should promote best practice on multi-stakeholder partnerships which expose individuals and SMEs to **entrepreneurial skills**.

3. BOOSTING THE EMPLOYABILITY OF THE WORKFORCE WITH E-SKILLS

- Multi-stakeholder partnerships to **train the workforce especially disadvantaged groups** (e.g. young under- and unemployed workers, older at-risk workers, and people with disabilities) and to help **connect trainees to new jobs** should be established. These partnerships between local governments, the ICT industry the local and regional job centres, Chambers of Commerce and Federations of SMEs should bring together the leading e-skills training knowledge and resources with providers of wider business skills training and job placement support services.
- The Commission and Member States should investigate **how public funding mechanisms can multiply the impact of multi-stakeholder initiatives** in delivering e-skills training, certification and employability opportunities in particular to low skilled workers and the unemployed.

4. USING E-LEARNING TO PROMOTE LIFELONG ACQUISITION OF SKILLS

- Member States should maintain and when appropriate increase their **support and investment** in educating and training employees of SMEs in basic and professional e-skills and in better ways to use ICT for learning. The objective is to reduce the e-skills gap between larger organisations and SMEs, notably the smaller SMEs and the less IT-oriented SME sectors, and prepare them for increasingly using e-learning.
- The Commission and Member States should establish mechanisms to monitor good practice for the e-skills training of SME employees across Europe in order to promote the most **successful solutions as well as e-learning business models**.
- The Commission in collaboration with the Member States should formulate **a vision and recommendations for ambitious e-learning policies** and promote at EU level the adoption of clear policy targets notably in relation to the use by SME personnel of ICT and the development of e-learning tools for them.
- The Commission should review how **EU programmes and funding instruments** (including the eLearning programme, Socrates, Leonardo da Vinci, eContent plus, the new Competitiveness and Innovation Programme, the Lifelong Learning Programme, the Seventh Framework Programme for Research and Development and the Regional and the Social Funds) **might be used efficiently to fund and support the concrete actions described above in liaison with national and regional funding mechanisms**.

Introduction

With the relaunch in 2005 of the Lisbon Strategy, the European Union (EU) has taken on an immense transition task to catch-up with necessary progress towards the 2000 Lisbon objectives and to build a globally competitive knowledge-based economy to create more jobs and growth.

Information and Communications Technology (ICT) represents one of the keys to achieve this goal. Employing about 3% of the EU-15 workforce in 2003, the ICT sector is an important industry with a high growth potential in itself. While the Western European IT market is expected to grow at an annual average rate of 6.1% until 2008, the Central and Eastern European markets are expected to swell by 13.2%, which could result in almost 1 million new jobs in the ICT sector in the whole EU.¹

More importantly, ICT has significant indirect effects on productivity, knowledge diffusion and innovation across the economy. ICT is driving a rapid evolution in product design and process by embedding both automation and intelligence into nearly every product and service. In addition, tackling and solving some of the world's toughest challenges needs ICT-literate scientists, economists, doctors, engineers and architects. As a result, steadily growing demand for people with "e-skills" (ICT skills) is a long-run trend for business of all sizes and sectors, and in the public sector. Similarly, non-ICT related professions increasingly require at least basic user e-skills.

Innovation and ICT uptake in Europe are thus highly dependent on the e-skills of the workforce, in terms of practitioner, user as well as ICT-related business skills. However, evidence points to growing e-skills gaps (either a shortage of absolute numbers of ICT workers, or a mismatch between supply and demand of specific skills). Such skills gaps risk discouraging new recruits from pursuing careers in these key roles. Europe's educational and professional training systems do not sufficiently deliver the 21st century skills needed to ensure workforce competitiveness and economic innovation. If not addressed, e-skills gaps risk slowing Europe's productivity growth and holding back business development and the competitiveness of European companies in the global market in virtually *all* industry sectors.

Moreover, the transition to a knowledge-based economy will make education and training a lifelong process rather than a one-off activity. Where knowledge becomes the main value driver for business and the key to be employable over the duration of a working life, technology-enabled learning (e-learning) can significantly contribute to lifelong learning and make it a reality – if it is effectively and consistently promoted and can build on the necessary ICT user skills of learners.

Defining e-skills broadly

When looking at ICT-related 21st century skills, it is necessary to take a holistic view of the knowledge economy rather than considering only the need for advanced e-skills.

This wider scope is necessary for two reasons. First, ICT tools enable acquisition and deployment of the 'real-life' employability skills that employers say they most need -

¹ Accenture, Jobs of the future, in alliance with the Lisbon Council, 2005.

literacy, numeracy, teamwork and collaboration, meeting deadlines, critical and strategic thinking. Second, different types of e-skills enable a wide range of careers and contributions to society, including:

- ICT practitioner – research, development, design, management, installation or support of ICT systems
- ICT user – application of ICT systems and devices in support of non-ICT work in a wide range of application sectors from retail, finance and tourism to healthcare and the biosciences;
- e-Business innovation management – application of ICT especially the Internet to develop new products and services and/or new ways of doing business. E-Business skills include a thorough understanding of how business works as well as IT project management and change management skills.

These definitions come from the Synthesis Report of the European e-Skills Forum released in September 2004². This report presents a realistic and impressive analysis of the situation and of the main challenges and includes highly relevant recommendations and priorities for development based on a large consensus of stakeholders.

Mandate

ICT industry competitiveness depends, at the most basic level, upon the skills of those driving ICT and business innovation. ICT uptake is equally dependent on skill levels. Based on this premise, the Working Group on Skills and Employability has been mandated to examine four closely inter-related issues:

- (1) How to create and promote an environment that attracts and retains highly-skilled ICT practitioners;
- (2) How best to interest future generations in the process of ICT innovation and the application of current ICT technologies, specifically taking into account the gender gap;
- (3) How to foster the employability of the workforce at large including the lower skilled workforce;
- (4) How to foster lifelong learning and how to apply ICT to transform the way people learn and work (i.e. how they obtain, manage and share knowledge and transform business processes).

This paper will analyse these issues one by one and formulate within each section a number of recommendations to stakeholders, i.e. the European Commission and European legislators, EU Member State governments, the ICT industry, Trades Unions and other labour market participants.

² European e-Skills Forum, E-Skills For Europe: Towards 2010 And Beyond, Synthesis Report, 2004.

1. An enabling environment for ICT practitioners

This section examines the category of people who drive and manage the information systems through which the knowledge society works: ICT practitioners. How do we ensure that learning provision within Member States provides enough of these highly skilled practitioners to develop the ICT environment that allows European companies to be more competitive, and the general workforce to take advantage of new ways of working and living?

The challenge Europe faces

Demand for ICT practitioners reached a peak in Europe in 2001, but the burst of the financial bubble and the recession of 2001 affected considerably investment in ICT. The bottom of the cycle was reached in 2003. The situation is now improving, although statistics from various sources indicate that possible skills shortages in certain segments of ICT practitioner, especially advanced practitioner skills, could pose a very serious challenge to the European economy if nothing is done to remedy the situation.

- A RAND Europe study (2005) into the supply and demand of e-skills in the EU (1998-2004) commissioned by the European Commission concluded that three years after the burst of the dotcom bubble “skills mismatches are the key issue” and that “the best evidence confirms that there were, in 2004, no widespread significant shortages of ICT Practitioner skills within the EU, although the growth in demand for skills for certain ICT Practitioner occupations was greater than for others, and it also appears that (demand for) employment was comparatively high in some of the new Member States”.³
- An IDC study (also 2005) looking ahead to 2008 found that there will be a shortage of up to half a million people across Europe with the advanced networking technology skills needed to drive European business. This figure represents an average advanced technology skills gap of 15.8 per cent between industry demand and workforce capacity.⁴
- Another useful indicator of skills shortages comes from industry itself: some 200,000 students enrolled in Cisco NetAcad in the academic year 2005-6 in more than 3000 academies, while Microsoft IT Academies have, to date, trained a total of 245,550 teachers and reached 5,402,100 students in the EU 25 countries. These levels cannot be explained by job market latency alone, and suggest a strong and ongoing demand for certain types of skills.
- The Commission’s own e-Business Watch also suggests that companies across Europe are already anticipating skills shortfalls for practitioners, particularly in ICT strategy, security, and developing new business solutions.⁵ Indeed, firms increasingly require from ICT practitioners a mixture of skills,

³ RAND Europe, The Supply and Demand of e-Skills in Europe. Report prepared for the European Commission and the European e-Skills Forum, September 2005.

⁴ IDC, Networking Skills in Europe: Will an Increasing Shortage Hamper Competitiveness in the Global Market?, An IDC White Paper, commissioned by Cisco Systems, September 2005.

⁵ European Commission, E-Business Survey 2006, www.ebusiness-watch.org

e.g. management, business, sales, marketing.⁶ Also the transformation process which has started in public administrations across Europe requires ICT practitioners with an e-skills profile of the “intelligent purchaser”, rather than the ICT specialist, as administrations are increasingly aware that it is not necessary to do everything in house.⁷

- The (e-)skills to drive and manage the profound changes that will be taking place in the near future.
- Forrester research suggested that practitioner skills in demand over the next few years include enterprise architects, business analysts/ relationship managers, security, web services, agile programming, business intelligence/ Web-enabled analytics, and business process modelling.⁸

Of course, micro-level statistics of this type cannot hope to provide a comprehensive picture of e-skills supply and demand. Nonetheless they do provide important glimpses of specific needs and support the case for concerted action to address resulting challenges to the European economy. The data currently available through these channels needs to be urgently supplemented by macro-level data covering the wider e-skills situation if we are to build up a comprehensive view of e-skills needs. To date there has been relatively little consistent cross-country analysis of e-skills and employment owing to differences in definitions, classifications, and data sources as well as their rapid evolution. **E-skills statistics and foresight studies require further improvement** and increased co-operation including between statistics offices and private sector analysts.

Another factor to be taken into consideration in planning future e-skills needs is the emergence of new technologies and business models, which will give rise to new high-level specialisations. New trends, including software delivered through network services and dual core technologies, are likely to shape evolving skills needs in ways which we are not yet able to predict. Close collaboration will be needed to ensure that evolving skills needs are monitored and addressed on a highly dynamic basis by all stakeholders.

Why does this matter?

On a practical level, e-skills gaps (whether a shortage of absolute numbers of ICT workers, or a mismatch between supply and demand of specific skills) can slow the speed of adoption of new technologies that can improve efficiencies across public and private organisations. They can also reduce the availability of the “go-to-market skills” needed to drive business growth. Together, these phenomena can slow Europe’s productivity growth compared to other regions of the world.

At a more strategic level, the lack of skilled technology practitioners also risks depriving the EU of the technology leaders needed to shape the products and services and so the overall knowledge society of the future, leaving the EU to *imitate* rather than *innovate* in a competitive global economy. In this regard, it is important to

⁶ See OECD Information Technology Outlook 2006 (forthcoming), Chapter 6: ICT Skills and Employment, DSTI/ICCP/IE(2005)12/CHAP6/REV1.

⁷ Leitner et al, Organisational change, skills and leadership required by eGovernment, study for the EPAN eGovernment working group during the Luxembourg Presidency June 2005.

⁸ Forrester Research, IT Skills Shortages on the Horizon – The IT skills that will be in demand in 2005 and beyond, 2005. For the UK market, this is confirmed in: e-Skills UK, Quarterly Review of the ICT Labour Market, eSkills Bulletin Quarter 4, 2005

remember the key role of SMEs and high-tech start ups in driving innovation and stimulating competitiveness in the EU compared to the rest of the world. Small and medium-sized businesses are an important source for new jobs added to the economy and IT-SMEs are the main ICT innovators in our economies.⁹ However, particularly in SMEs there is a skills gap on the level of managerial e-business skills.¹⁰

One possible response for organisations facing these skills problems is to outsource ICT processes, sometimes offshoring them to third countries both within and outside the EU. Such moves are a logical part of global macroeconomics since they can lead to reduced costs for firms. While surveys find that many IT employers increasingly offshore basic development and programming work and more junior jobs, and studies estimate that around 20% of total employment could potentially be affected by ICT-enabled offshoring, recent figures of the OECD rather suggest that offshoring may lead to slower growth of employment in occupations potentially affected by offshoring but not necessarily to actual declines in employment.¹¹ A trend towards outsourcing more complex functions may translate into a lack of job security for high end professionals within the EU. In spite of this off-shoring is expected to stay and probably grow in scale, at least for some time.¹²

Another source of labour and skills supply increasingly accessible to employers in a globalizing economy is overseas workers. The e-Skills Forum Synthesis Report noted major schemes operating following 1999 in France, Germany and the United Kingdom. Although flows through these schemes have generally receded, some workers from outside the EU are still arriving. This may be as a preparatory stage of an off-shoring step, where off-shoring companies establish subsidiary operations within client economies.

How did we get here?

The rapid emergence of ICT as a productivity-enhancing tool since the 1980s, and the subsequent emergence of the knowledge economy, are only now becoming widely understood. The speed of change and the emergence of entirely new living and working paradigms with no preconceived 'rules of engagement' have left different organisations to respond as best they can. Only now are different stakeholders searching for a consensus on how to respond to this new industrial revolution.

In the meantime, "**parallel universes**" have grown up between public formal and private non-formal ICT education, reflecting different capacities to respond to emerging skills needs. As ICT practitioner skills needs change rapidly with changes in technology, an OECD report has observed that "it is thought that the formal education system may not offer the flexibility for adapting curricula that private-sector

⁹ See OECD, "High growth SMEs and Employment", 2002, p.51, which notes that "No variable in the growth process is more important than workforce training".

¹⁰ European Commission, E-Business Survey 2006, www.ebusiness-watch.org.

¹¹ OECD Information Technology Outlook 2006 (forthcoming), Chapter 6: ICT Skills and Employment, DSTI/ICCP/IE(2005)12/CHAP6/REV1.

¹² For the UK market, see Ovum, The impact of global sourcing on the UK software and ICT services sector, study commissioned by the UK Department of Trade & Industry, June 2006. About 30-50% of companies in the EU (depending on the industry) expect that the level of ICT outsourcing will increase in the future (E-Business Survey 2006, www.ebusiness-watch.org).

schemes, usually set up as multi-stakeholder partnerships, can offer.”¹³ Adding to the confusion from a European perspective, different countries have attempted to integrate these two streams in different ways: in some countries industry certificates are becoming “de facto” standards in e-skills capacity building, in many countries such certificates exist in parallel to publicly recognised certifications. This lack of clarity over the value or application of certifications is a major deterrent to those considering a career in IT.

It should be said that much has been done to address the disconnect between private and publicly funded e-skills acquisition. The recent and current work by CEN-ISSS towards a *European e-Competence Framework*, in view of a possible *European Qualifications Framework*, can be helpful in clarifying the mutual positioning. A recent example for bridging the parallel universes is the mutual recognition of curricula for network administrator which allows students to receive with one training course two certifications, the APO-IT (sponsored by the German trade union IG Metall and CERT-IT) and the industry-based CCNA certification (sponsored by Cisco Systems).¹⁴ This initiative should be seen as an example for best practice showing the benefits of cooperation and dialogue between the social partners. Such an initiative should be emulated at European level. However, the continued existence of disconnect can impact the ability to attract the best candidates to the most highly skilled jobs, irrespective of their background.

One major consequence of the separation between public and privately-sponsored e-skills acquisition is the **lack of clear career paths and of ongoing services for skilled ICT workers to help match skills supply and demand**. The work was begun notably by Career Space, which worked to identify job typologies in order to introduce some consistency in job descriptions for both employees and employers, and this work has been picked up within the context of CEN-ISSS. But technological advances mean rapidly changing skills requirements and a changing jobs market. With such a lack of transparency over job prospects and career path, it is clear that some individuals will be deterred from entering an IT profession. Skilled practitioners do not yet have a clear enough sense of where their skills could take them, or of how to measure the progress of their career in the jobs market and the value of their e-skills to potential employers. They lack, too, effective advice on how best to update their skills for the jobs market.

Given the need to update skills constantly, affordability of training/ certification is a key factor: individuals who would like to get into ICT may not be able to do so if government-sponsored training does not include career-relevant certifications as part of its education system, and the individual cannot afford to pay private sector rates. This issue is relevant not just at the entry point into a career but throughout an individual’s working life. More than any other career, perhaps, ICT practitioners are expected to update their skills and remain current if they wish to continue working. **Lifelong learning** is a laudable policy aim, but is far from being a reality. Implementing lifelong learning requires close cooperation between industry (who may see younger recruits as a way of controlling costs) and the public sector (to effectively encourage the retention and development of skilled workers by industry). Changing demographics also make it a necessity: slowing population growth and a

¹³ OECD Information Technology Outlook 2006 (forthcoming), Chapter 6: ICT Skills and Employment, DSTI/ICCP/IE(2005)12/CHAP6/REV1, p.24.

¹⁴See www.cisco-meets-apo.filmportrait.de. The Cisco Networking Academy programme, started 10 years ago and running now in 160 countries, is probably the largest industry-led ICT training and certification program operating in a public-private partnership and not-for-profit. More than 3.000 networking academies and 7.000 teachers have helped train more than 1 million students in Europe.

diminishing working age population¹⁵ mean that employment rates in the EU must rise and / or productivity increase, and that available workers should remain productive for longer.

From an EU perspective, some of these problems are exacerbated by the different education and training cultures between some Member States which limit the application of the IT certifications and skills qualifications obtained by an individual to a specific market. The private sector has already developed schemes that allow **transferability of skills between national markets**, but the lack of sufficient mutual recognition arrangements between national public education and industry certification systems can affect worker mobility.¹⁶ This can risk depriving companies of the skilled individuals it needs, and limit the working opportunities of an increasingly international group of workers.

Recommendations

- Industry should redouble efforts to **set-up an Industry e-Skills Leadership Group** based on existing industry advocacy groups such as the e-Skills Certification Consortium (eSCC), to develop and facilitate improved e-skills information and co-operation in Europe as well as the monitoring and the implementation of coherent well focused initiatives.¹⁷
- Establish closer collaboration between all stakeholders to **develop reliable statistics and foresight scenarios regarding e-skills requirements at EU level** to provide a reliable basis for policy decisions and to help labour market participants to take informed career decisions:
 - Ensure that the current work of Eurostat and national statistics offices is supplemented by other studies including those commissioned by companies.
 - Member States to Increase investment in **improving statistical methods, consolidating data and developing foresight scenarios at EU level**.
 - Increase cooperation between industry representatives, public statistics offices including Eurostat, and private sector analysts in **designing statistical studies in order to improve transparency and consistency of methodologies**.
- Increase transparency regarding different qualifications and ICT career paths by establishing and maintaining an **e-Skills and Career portal** to set out European job profiles, map industry-based ICT training and certifications to

¹⁵ See Eurostat, News Release, 48/2005, 8 April 2005. Working-age population (15-64 years) is set to fall from 306.8 million people in 2004 to 254.9 million people by 2050. The proportion of elderly people (aged 65+) is expected to double from 16.4 percent in 2004 to 29.9 percent in 2050.

¹⁶ The European Commission has presented on 5 September 2006 a formal proposal for a European Qualifications Framework (see European Commission, Recommendation on the establishment of the European Qualifications Framework for lifelong learning, COM 2006 (0479). The proposal encompasses general and adult education, vocational education and training as well as higher education, with the Commission hoping that having a system based on learning outcomes will mean that it will improve recognition of learning that has taken place outside traditional forms (ie. non-formal and informal learning). Once adopted by the European Parliament and the Council, the proposal will form a recommendation that is non-binding on member states, although it is expected that participation will be high.

¹⁷ For more details and membership of the eSCC, see www.e-scc.org.

specific job roles, and integrate existing national ICT career portals.¹⁸ With the initial financial support of the EU Commission, such a Career portal should be initiated, developed and maintained by an industry consortium in close cooperation **with members of** the CEN-ISSS European e-Competence Framework project together with other stakeholders including the social partners.

- Increased collaboration between industry, governments, employers and education institutions **via multi-stakeholder partnerships**¹⁹ to address **e-skills issues** and with a view to reconciling the "parallel universes" by developing new e-skills curricula:
 - The Commission should continue current efforts to **benchmark** existing multi-stakeholder partnerships in order to foster co-operation and help bring about an enabling legal and financial framework. This research should lead to concrete recommendations to Member States.²⁰
 - Consider how to develop enhanced e-skills curricula, including via **the integration of industry ICT curricula and certifications into formal education**. Integration can be achieved notably through (i) official recognition of industry e-skills training and certification by public education bodies (ii) transfer of credit points between formal and industry-based training, including at EU-level through the existing European Credit Transfer and Accumulation System (ECTS) and the emerging European Credits Transfer System for Vocational Education and Training (ECVET).
- CEN / ISSS should accelerate work towards the **EU-wide e-competence framework** (currently under development) **and maintain close cooperation with industry** (user industries and certification providers) with a view to ensuring eventual compatibility of the framework with formal and non-formal ICT practitioner education and certifications, and to foster increased workforce mobility by facilitating Europe-wide recognition of qualifications.
- Member State governments should **consider introducing fiscal incentives** (such as a human capital investment tax credit) and increased financial support for individuals and SMEs taking agreed categories of ICT training, throughout an individual's career.
- The Commission should **gather information on existing experience and best practices to fiscal incentives**, and investigate ways to ensure that incentives for ICT training are in place and ensure that companies selling hardware or software do not directly benefit from them.
- The Commission should initiate further research and evaluate good practice in order to promote the development of **European quality criteria for e-skills training and certificates** in close co-operation with relevant stakeholders.

¹⁸ There are a number of national and private portals such as the CompTIA TechCareer Compass (<http://tcc.comptia.org/>), which should serve as key references for this endeavour.

¹⁹ See e.g. the European Alliance on Skills for Employability (described in section 3 below)

²⁰ eSkills Public-Private Partnerships, - Associative economics of multi-stakeholder partnerships for e-skills development and certifications, Issue Paper for the "European eSkills Forum" (eSF), 2004, http://www.e-scc.org/docs/PPP_eSkills_Forum_Final.doc.

2. Stimulating the interest of future generations in ICT

The challenge Europe faces

Europe's comparative productivity and competitiveness will increasingly depend on how effectively and efficiently technologies are developed and used by present and future employees and managers, particularly given the rapid ageing of the European population and the resulting loss of workforce.

The volume of students in Computer Sciences and Electronic Engineering disciplines is generally judged insufficient to satisfy projected labour market demand: Eurostat figures indicate a shortfall of at least 100,000 graduates for the year 2004-5, although this figure is probably a significant underestimation.²¹ Moreover, data from Sweden and Germany shows that the number of students starting ICT/Informatics educations is decreasing, implying a future decrease in new supply from the formal education system in these countries²². These shortages must be resolved by attracting a relevant number of students to learn ICT practitioner skills.

Moreover, today's European pupils and students – tomorrow's workforce – do not sufficiently acquire both ICT user and business skills, and the wider set of employability skills that European employers and enterprises need for future competitiveness, i.e. teamwork, collaboration, and analytical problem-solving skills.

The education system needs to deliver these 21st century skills and improve the motivation of students to acquire these skills. It is a first step in the right direction that in the 2006 Lisbon Progress Report on Jobs and Growth, e-Skills and e-Literacy programmes were proposed in the majority of member states to address perceived shortcomings in the integration of ICT knowledge into school curricula. However, employers, academia and governments must articulate much more clearly the need for 'real-life' employability skills and the role of ICT tools and learning in gaining these skills.

Some work is being done to address the image problem which afflicts the ICT industry and ICT skills: industry-run ICT events for youngsters such as the Microsoft sponsored "Imagine Cup"²³ or the Cisco-sponsored "networking parties" aim to improve the image of the sector by adding a "coolness" factor. Nonetheless, more effort is needed to address negative perceptions of ICT education and highlight how ICT careers can serve as a link to a wide range of business & creative activities.

Europe's ICT gender gap

Attracting more women into ICT education and careers could relieve some of the pressures on supply. It is important to focus on removing barriers to female pupils'

²¹ Figures measures only the shortfall of numbers of ICT graduates against specific ICT practitioner posts, and do not consider e.g. graduates working in other industries, replacement of workers leaving ICT practitioner posts, and the needs of user industries.

²² See RAND Europe report, 2005, p52, cited in footnote 3 above.

²³ Now in its fourth year, the Imagine Cup (sponsored by Microsoft) is a worldwide student technology competition. It is designed to provide an outlet for students to explore technological and artistic interests outside the classroom and challenges them to apply their imagination and creativity to technology innovation. Teams are tasked with developing innovative projects that offer practical applicability and present real-world solutions to real-world problems. In 2006, 65.000 students from 100 countries took part.

and students' confidence in, and motivation to acquire, e-skills, otherwise the present ICT gender gap in Europe is unlikely to improve, and the goal of increasing the overall workforce's e-skills will be hard to achieve.²⁴

Europe already has a significant ICT gender gap - women make up about 43% of the European Union workforce but only 18% of computing professionals are women. In the category of computer associate professionals, women comprise just 20% of the total. Women participate to a much greater extent in the ICT sector in the US (34% of the practitioner workforce) and in countries such as Singapore (55%) where ICT practitioner work has become the career of choice for many women.²⁵

In terms of competency in using ICT tools, a recent Eurobarometer survey found that women in Europe are more likely than men to feel that they cannot use computers (48% versus 35%). The gender difference is even more marked in terms of self-assessed lack of competency in using scientific and technological tools and equipment (72% versus 47%).²⁶ For basic computer user skills, the gender aspect appears to be less relevant in most EU countries, a recent Eurostat study found.²⁷

There are a variety of reasons why women do not choose, or indeed leave, a career in ICT, which include an upset work/life balance, a dominant male culture within the sector, and less value placed on the 'softer' management skills.²⁸ If ICT degrees become more multidisciplinary as skills needs evolve towards business and other employability skills, and the image of the industry changes accordingly, this may be a factor attracting more women into ICT-related occupations.

Student motivation gap

To succeed in a fast changing business world, students need not only to learn academic content, they also need to know how to keep learning — and make effective and innovative use of what they know — throughout their lives. "Employability skills" include critical-thinking and problem-solving skills, communication skills, creativity and innovation skills, collaboration skills, contextual learning skills, and information handling and media literacy skills. Students must be able to use technology to learn content and skills — so that they know how to learn, think critically, solve problems, use information, communicate, innovate and collaborate.

Today's young people generally acquire fascination and basic facility with technology at an early age from its ubiquity in the society around them, assisted further when it is available at home – e.g. the mobile phone, DVD, home PC. But this fascination and facility with technology appears limited for the majority of consumer devices and applications; since it is not reflected in enrolment and graduation rates in mathematics, sciences and technology.

²⁴ See, for example, the e-Skills UK "Computer Club for Girls" which aims to "transform the attitudes of a generation of girls to careers in IT". <http://www.e-skills.com/Resources-&-Consultancy/cc4g/1166>

²⁵ European E-Skills Forum, "E-Skills For Europe: Towards 2010 and Beyond", Synthesis Report, Sept 2004.

²⁶ Cited in: European E-Skills Forum, "E-Skills For Europe: Towards 2010 and Beyond", Synthesis Report, Sept 2004.

²⁷ Eurostat, How skilled are European in using computers and the Internet?, Statistics in Focus Nr.17/2006.

²⁸ DTI, How to retain women in the IT industry, Women in the IT Industry: Phase 2 Research, July 2005.

At present around 750,000 European students are graduating each year in maths, science and technology (MST); with Ireland, France and the UK producing the highest overall numbers of such graduates (in relative terms); while Estonia, Cyprus and Portugal are performing best in terms of female graduates with just over 40% of their MST graduates being female.²⁹

One of the key reasons for the students' motivation gap is that ICT is often presented and perceived in schools as a specific (narrow) career path, possibly reflecting a legacy 'silo' approach to teaching ICT as a specific module rather than integrating it with teaching other core subjects. According to recent data, Ireland, Finland and Belgium (Wallonia) rate higher for integration of ICT into other subjects, while the Czech Republic and Hungary only teach as a separate subject, and in Italy, ICT is not included in the compulsory curriculum.³⁰ This reflects widespread lack of awareness by teachers and curriculum designers of how technology drives breakthroughs in other sectors and disciplines and sets up exciting careers beyond digital design or ICT systems administrator.

Teacher-readiness gap

In the past decade basic technology access and curricula availability in primary and secondary schools has made a lot of progress. However in many EU countries there are still not enough computers per classroom to enable true integration of technology into teaching of most subjects; and lack of teacher capacity/ motivation of older teachers to do so is also a key constraint.

One reason is that school frameworks change slowly and retain a lot of bureaucratic approvals that make it harder for teachers to innovate in bringing ICT into other subjects. There is some evidence that when the national Government sets the goals and empowers teachers to figure out how to get there and deliver it, skill levels rise (e.g. Sweden). However many governments also retain traditional standards and tests so teachers feel constrained to 'play it safe'.

Providing incentives to teachers and school districts to integrate ICT into all subjects is the key, e.g. teaching writing skills and e-skills together with literature studies; and connecting ICT with e.g. maths, science, geography, and biology courses in ways that bring out the excitement and 'cool' factor (and connect to interesting career paths). This puts a major responsibility on teachers and their ability to gain e-skills and use them innovatively in teaching their core curriculum subjects.³¹

A further requirement is to help teachers of various subjects to better understand how ICT can be embedded into their teaching and to change teaching methods by using the newly acquired e-skills meaningfully in their classrooms. There are a number of initiatives from industry that show the way, in terms of what can be done to train the teachers,³² but these and similar initiatives would certainly benefit from increased

²⁹ European Commission, Progress towards the Lisbon Objectives in Education and Training, SEC(2006)639.

³⁰ Eurydice, Key Data on Information and Communication Technology in Schools in Europe" 2004 Edition, figure B3.

³¹ In Austria and Ireland, for example, the European Computer Driving Licence (ECDL) was used to train teachers. A requirement of this sort changes teacher behaviour and motivation to bring ICT into all subjects, supported by private sector sponsorship of hardware discounts and curriculum support.

³² An industry-led initiative, the Intel Teach to the Future Programme, has trained more than 3 million teachers worldwide, amongst them around 703,000 in EU countries in the past 4 years, reaching approximately 20 Million students yearly. Currently, the Intel Teach Program is moving towards an

buy-in by public educational bodies and by broadening them to the teacher community as a whole.

Technology Entrepreneurship skills gap

In addition to generating the promise of ICT as a rewarding future career, it is crucial to also “deliver the promise” to future students and trainees in ICT professions. This means that the higher education and vocational training systems need to supply people who have the skills that the labour markets need.

As indicated in the section on ICT practitioners, stronger collaboration between governments and education institutions with industry is crucial to help enhancement of formal education curricula in this respect.

A further important element is to teach future generations the entrepreneurial and business skills that the ICT professionals of tomorrow will need. Entrepreneurship is crucial to building local innovation capacity. It brings new technologies to market, and supports economic development through building strong local and regional economies. Job creation starts with innovation which often generates start-up SMEs, which in turn need services and support and thus create more service and support jobs. Key to job creation is to encourage and foster more innovation, but also to make sure that start-up entrepreneurs have the skills to survive and help their businesses flourish.

A major reason for the failures during the last most innovative period, the ‘dot com’ era in the late 1990s and early 2000s, was not only the over estimated market (commonly referred to as the “internet bubble”). A considerable part of the failures of the dot com era were also due to young “amateur entrepreneurs”, i.e. technical innovators with little or no business skills. Computer Sciences and Electronic Engineering courses have failed to include the necessary business skills.³³

Business skills would ensure a better transition from the technical innovation phase to the go-to-market phase, where initially most of the responsibilities and ownership is taken on by the technical entrepreneur. An example from the private sector addressing this challenge is the cooperation between Intel’s Philanthropic Education Group with UC Berkeley’s Haas Business School of Entrepreneurship in developing the worldwide programme and curricula” Technology Entrepreneurship – Theory to

online platform (already running in Germany and Austria) which will certainly drive these numbers further up.

Another industry-led initiative, the Innovative Teachers Network (ITN) initiated by Microsoft gives educators globally access to peer-based, interactive online communities of practice where they can share best practice, lesson plans and other teaching material, and participate in discussions and forums. Components on the ITN include community portals that can be set up locally; professional learning programmes; content from educational partners from around the world; and the ability to tailor sites to specific needs.

³³ This shortcoming also reveals the larger problem of a lack of acceptance and sufficient support mechanisms for entrepreneurship. Making a direct comparison between the US and the EU, there is an obvious difference in the innovation mentality (or the exploitation thereof). Surveys indicate that 60% of EU citizens have never considered setting up a business, and 50% agree with the view that “one should not start a business if there is a risk of failure”. In the US, by comparison, the proportion of risk-averse people falls from one half to only one third (Commissioner Jan Figel, Europe’s learning systems for economic and social growth, Entrepreneurship in Education - European Summit, Brussels, 6 September 2006).

Practice”.³⁴ Over 300 professors in Europe have already been trained on how to teach Technology Entrepreneurship at their universities.

Recommendations

- Member State governments and the ICT industry should run proactive awareness and marketing campaigns, to provide both parents and pupils with an accurate understanding of the broad range of future job opportunities arising from an ICT education beyond IT professionals (mathematics, biology, design and fashion, health etc...). These campaigns should target pupils and students from very early on in their education and career path discussions, they should be targeting both parents and pupils and should seek to encourage higher participation of girls in ICT related courses, breaking down gender related intangible barriers.
- Moreover; **EU programmes** such as “Youth in Action” could financially support this kind of projects run by non-for-profit associations.
- At the level of employment, **companies should introduce more widely part-time and flexible working, including home working opportunities**. Part-time work should be offered to both women and men, as this would make it more acceptable with the company culture.
- Governments and industry should work together to **improve careers advice in and around schools** and provide **better and more frequent training of career consultants**. The content of consultations should be based on a more realistic understanding of future opportunities based on robust statistics and foresight scenarios and up-to-date job profiles and career paths contained within an online ICT career portal (see recommendations in section 1 above) .
- Governments should **increase investment in teacher professional development** and ongoing teacher support mechanisms. Partnerships between the ICT industry and learning institutions can help equip teachers with necessary e-skills and an understanding of how to make IT an effective and integrated part of classroom learning, and to ensure ongoing technology and job market update.
- In order to **encourage exposure to entrepreneurial skills**, the Commission should document best practice on multi-stakeholder partnerships which deliver these skills to individuals and SMEs.

³⁴ The model curriculum can be viewed at www.intel.com/education/highered/entrepreneur/index.htm.

3. Fostering the employability of the workforce including the low skilled

The challenge Europe faces

For Europe to realise its full potential as a knowledge-based economy, it needs a knowledge economy workforce – one in which all citizens have the necessary ICT user skills and future generations gain these skills as part of their education.

While there is consensus that Europe needs greater numbers of people with more advanced ICT practitioner skills who provide the infrastructure and innovation needed for the knowledge economy, it is often forgotten that a region's competitiveness is strengthened if technology skills are embedded throughout the population. This includes those with very basic skills.

It is because of considerations around Europe's competitiveness basis, and not only because of the need for social and digital inclusion, that Europe urgently needs to increase the employability skills and opportunities for millions of low skilled people. This is especially about the 6 million early school leavers, the 20 million long-term unemployed in the EU, and those in low-skilled jobs where international competition is increasing the risk of a wide spread longer term unemployment.

European employer surveys generally cite the most important skills for employment across sectors and organisations as being: literacy, numeracy, IT user skills, communication skills, teamwork and problem-solving skills, and customer service skills. These skills enable people to undertake more interesting and better paid work, adapt to innovations in business process, and improve productivity and competitiveness at enterprise level. Such skills can also enable individuals, especially those over 50, to move more readily from sectors where jobs are declining (like manufacturing) to sectors where growth is stronger (such as in services), to extend working life through full or part-time work, and to contribute to community organisations after retirement.

Why IT user skills training matters

At the level of basic skills, already 45% of all EU workers and 73.5% of white collar workers use a computer for their job. Still, regular ICT training of staff is not a pervasive activity in firms and learning-by-doing (on the job) dominates, particularly among smaller companies.³⁵ 22% of the employees and self-employed never used a computer, and 46% do not regularly use the Internet.³⁶

Workers with better skills get better wages. There is a strong relationship between skill levels and the possibility of having a good career and a decent salary. For example, one additional year of school or training, is estimated at about 6.5% in terms of increased salary and its effect could be as high as 9%. And the link between skill levels and individual wages are also more closely related in periods of rapid

³⁵ Only 9% of employers in micro-enterprises (up to 9 employees) and 16% in small enterprises (up to 49 employees) have regularly attended ICT training programmes, while the percentage in large organization reaches 41%. European Commission, E-Business Survey 2006, www.ebusiness-watch.org.

³⁶ Eurostat, How skilled are European in using computers and the Internet?, Statistics in Focus Nr.17/2006.

technological change.³⁷ Independent research commissioned by Microsoft has shown that human resource managers in Europe consider IT certificates to be important both for IT and non-IT roles, would choose candidates with IT certification over those without, and would be willing to pay an average of 6,9% additional salary for the certified skills.³⁸ Moreover, employability skills are more vital than ever in an ageing Europe, as there is a growing need to increase the employment rate.³⁹

Again, work is already being undertaken to try and address these needs: the European Alliance on Skills for Employability is a partnership under the umbrella of the e-Skills Certification Consortium (eSCC) composed of Cisco, CompTIA, the European Computer Driving Licence (ECDL) Foundation, EXIN, and Microsoft, together with Randstad and State Street Corporation. The Alliance aims to help train and provide access to technology to 20 million Europeans by 2010 by investing in and promoting the provision of skills training for employability to disadvantaged groups: young under- and unemployed workers, older at-risk workers, and people with disabilities.⁴⁰ Professional SME organisations like UEAPME and NORMAPME would like to develop similar education programmes for user skills with a specific focus on SME needs. They already support the Pan-European Network of ICT & eBusiness for SMEs (PIN-SME) that aims to link SMEs to IT-SMEs and enablers.

However, further work is needed to ensure that employability skills training needs can respond to the skills needs of the local employers and economy – for example, sectors with good growth and demand for skilled workers. Such training needs to provide participants with skills certification that employers recognise and value, and needs to be backed by availability of job search support and work experience placements to create a ‘fast-track’ between training and job creation/ employment. And, there needs to be ongoing training support for teachers and adult learning institutions to help keep their skills up to date.

EU institutions, national and regional authorities, via funding mechanisms like the European Social Funds, can have a crucial role to play in leveraging and scaling up existing or new cross industry multi-stakeholder partnerships aimed at delivering technology access, ICT skills training, certification and employability opportunities to the very low skilled and the unemployed.

³⁷ Commission Communication "Investing efficiently in education and training: an imperative for Europe" (COM(2002) 779 of 10 January 2003, Section 3.2.

³⁸ Microsoft Corporation, Delivering 21st century skills for employability in Europe, 2006.

³⁹ From 2005 to 2030 the number of people aged over 65 will rise by 52.3% (40 million), while the age group of 15-64 will decrease by 6.8% (20.8 million). The ratio of dependent young and old people to people of working age will increase from 49 per cent in 2005 to 66 per cent in 2030. To offset the loss of working-age people, we will need an employment rate of over 70%. See European Commission, Green Paper on Demographic Change, 2005.

⁴⁰ Working with government, industry and NGO partners across Europe, the Alliance will be investing in partnerships that aim to support and assist:

- Today's untapped work force – unemployed youth who have dropped out of education and the over-50s who need new skills and confidence to find jobs later in life – to gain basic ICT skills for work and life through local community ICT training centres, ICT academies and online training;
- Tomorrow's European knowledge workers – by bringing ICT skills into the mainstream of schools curricula with an emphasis on support and training for teachers, students and their communities;
- And thus supporting Europe's SMEs by widening their recruitment base of local people able to use IT as tools for business growth and innovation.

For more information, refer to www.e-scc.org/alliance/.

Recommendations:

- **Establish multi-stakeholder partnerships** to train the workforce especially disadvantaged groups: (e.g. young under- and unemployed workers, older at-risk workers, and people with disabilities) and to help connect trainees to new jobs. These partnerships will bring together local governments, the ICT industry the local and regional job centres, Chambers of Commerce and Federations of SMEs to bring together the leading IT skills training knowledge and resources with providers of wider business skills training and job placement support services. Such partnerships should also promote access for training participants to internships and work experience in local SMEs and larger businesses.
- The European Commission, member states and industry should jointly investigate how public funding mechanisms (including the European Social Fund) can help multiply the impact of existing or new cross industry multi-stakeholder partnerships delivering ICT skills training, certification and employability opportunities to the very low skilled and the unemployed.

4. Using e-Learning to promote lifelong acquisition of skills

This section focuses on the impact of ICT on learning and working processes, mainly dealing with non-formal and informal learning in a working environment. However, many considerations may also be relevant for other dimensions of learning, including formal learning in schools and universities. Indeed, it would seem important to apply the same principles and strategy in the different sectors of formal learning so that learners start to develop the attitudes, knowledge and skills that they need in order to learn throughout life.

The challenge Europe faces

The transition to a knowledge-based economy makes education and training a lifelong process rather than a one-off activity. Knowledge becomes the main value driver for business and, for the individual, the key to be employable over the duration of a working life. The core challenge for professional learning is therefore to support knowledge workers with technology-enhanced learning by promoting motivation, performance, collaboration, innovation and commitment to lifelong learning.

The role of ICT for learning and working processes

ICT has the potential to deliver a number of benefits in the process of lifelong learning and rapidly changing skills requirements for the workforce and citizen in general:

- by increasing the speed and degree of the dissemination of knowledge
- by facilitating knowledge and skills acquisition
- by providing flexible learning opportunities for students, the workforce, and citizens, and by creating new collaborative learning opportunities

- by helping to design learning materials with new characteristics better supporting the learning process
- by personalising learning and improving the management of the training process

Traditional forms of learning provision (such as the classroom) are not disappearing but they are changing and a new, broad spectrum of informal and non-formal learning opportunities is opening up.

In a business environment, eLearning⁴¹ is an efficient and cost effective tool for fostering workforce development that can lead to cost savings through better utilisation of the time of learners, efficiencies in personnel resources in institutions providing education and training as well as reductions in physical requirements.

Address the infancy of the e-Learning market

Despite strong restructuring in the past few years, the corporate e-learning market is still characterized by low market transparency and limited knowledge of products and services. It is fair to say that the corporate e-learning industry is an immature and dynamic market which is still in its defining process. The resulting lack of transparency and the inadequacy to the needs of smaller enterprises is especially hindering SMEs from using e-learning more prominently. Nonetheless, large consortia are still working to develop foresight, tools and applications and this gives reason to believe that the impact of e-learning will increase significantly in the future⁴².

Research and the cost effectiveness of courseware development have been the key weaknesses of the e-learning industry and still prove to be a challenge for economic development today. Market expectations for e-learning in the late 1990's were expecting a 5 billion dollar market in 2005. The real market situation has proven 10 to 4 times smaller.⁴³ In fact, it is difficult to estimate the market correctly as there is no single market but a collection of niches. The majority of eLearning company business plans were based on over-optimistic market expectations, which has proven a serious burden on many providers. To decrease the share of R&D investments on costs, there have been a large number of mergers. The recent examples of eLearning industry investments show that after large R&D investments companies continue to invest in sales and marketing while they prefer to reduce spending on product development. In parallel, E-LEARNING has become a reality as an internal process in many large organizations ranging from industry to universities.

The first-generation of learning technologies did not deliver their promise. These initial systems were built to automate and extend an existing process, rather than to enable a better process that improves learner performance. Today, vendors and end-users understand that eLearning is not about automating the training process. It is not even (only) about new channels for delivering content. It is about learner-centricity: delivering the right content, at the right time, over the right channel to the right person. Instructor-led training will still have its place, but will be part of a larger

⁴¹ This report adopts the widely used term of e-Learning to cover the use of technology in learning in general, including blended learning (face-to-face teaching using technology).

⁴² See, for instance, PROLEARN, an EU-funded project which aims to improve cooperation between academia and industry in the area of technology enhanced learning, <http://www.prolearn-project.org/>

⁴³ Dang, J., et al, Providers' business models in the e-learning Industry, NoE Prolearn, Deliverable 6.2, July 2006.

and more strategic learning infrastructure that takes a 360-degree view of the learner and enables every learner to know exactly what they need to know, when they need to know it. This capability, for the first time, enables learning technology to deliver results not just in the form of cost savings, but in the form of improved performance from employees, partners, customers and any other constituency in the learning universe.

Enable SMEs to use ICT and embrace e-learning

Large corporations have the most advanced understanding and deployment of e-learning. Many of the pre-requisites for effective implementation of e-learning are in place at this level. SMEs on the other hand, especially the 21,5 million 10 persons companies in Europe, demonstrate a completely different approach to e-learning. Training in general is less of a priority for the SME manager as his resources are much more stretched than in bigger companies, and e-learning in particular is not yet adapted to be operational for most SMEs. Although the need for training exists, the lack of resources for implementation is a major bottleneck and the lack of market transparency result in difficulties to understand the offers and compare prices and performance of alternative e-learning applications.

It is crucial that small business workers will also profit from the new learning opportunities to ensure their continuous employability, as well as the competitiveness of SMEs in an increasingly knowledge-based economy. However, direct education and coaching is still the most efficient way to train employees of SMEs as they often still need to acquire the e-skills necessary for e-learning. Moreover, SMEs require solutions for learning content management systems with low entry cost, a price structure adapted to their size and needs, and platform solutions together with larger IT-providers to increase compatibility. Finally, training needs to follow a gradual approach⁴⁴ and be based on the advent of ICT in SMEs' daily business through eBusiness solutions (ePayment, eInvoicing etc.).

Such a 'Trojan horse approach' needs commitment by SME's large partners. This is well illustrated by the uptake of eInvoicing in countries like Belgium, Denmark and Finland.⁴⁵ Here, a strong unified consortium of the banks, large industries and government offices have created easy to use eInvoice solutions that cost a fraction of paper ones. They teamed up with IT-SME educators and support offices to get the SMEs on board. In Denmark, 80% of their SMEs are now eInvoice enabled, Belgium is around 15%. Such experiences need to be made replicable, a task that the Commission should help with by developing a best practice exchange mechanism.

A thorough analysis of the specific needs of SMEs is critical not only because of their importance to the European economy but also because they currently show the lowest penetration rate for the use of ICT in general and in learning. However, the long-term gains in economic growth and employment can be significant, if SMEs are helped with their investments of resources to narrow the eTechnology gap between small and large organisations.

⁴⁵ The KMO-IT program in the Flanders region, the Finnish Karelia eInvoicing programmes are cases in point. Other examples include, for instance, the UK eProcurement implementation programme, and the Dutch "Nederland gaat digital" programme,

Recommendations:

- The EU and its Member States need to **increase investment in educating and training employees of SMEs in basic e-skills and in better ways to use ICT for learning**. Support programmes and projects should be organised in cooperation with specialised IT-SMEs regional development organisations and business associations. The objective is to reduce the e-skills gap between larger organisations and SMEs, notably the smaller SMEs and the less IT-oriented SME sectors, and prepare them for increasingly using e-learning.
- **The European Commission and Member States should establish mechanisms to monitor good practice** for the e-skills training of SME employees involving e-learning methodologies **across Europe in order to promote the most successful solutions as well as e-learning business models**.
- Based on the above information, the European Commission, in collaboration with the Member States, should formulate **a vision and make recommendations for ambitious e-learning policies and promote at EU level the adoption of clear policy targets**, notably in relation to the use by SME personnel of ICT and the development of e-learning tools for them.
- **The European Commission should review how existing EU programmes** (including the eLearning programme, eContent plus, MINERVA, the Competitiveness and Innovation Programme (CIP), the Lifelong Learning Programme, Seventh Framework Programme for Research and Development and the Regional and the Social Funds) **might be used to fund and support the concrete actions described above**.

Conclusion

The adequate provision and deployment of e-skills is a crucial factor for technological development and economic growth. Stakeholders from the public and private sector make good progress to better address the challenge to sufficiently deliver 21st century skills for the workforce and to increasingly act together. However, much needs to be done to ensure that the present workforce and future generations acquire the right practitioner, user and business e-skills. The European Commission has a crucial role to play in this process by fostering a continuous dialogue, both between Member States and public and private stakeholders, promoting best practices, providing European-wide e-skills statistics and forecasts and developing policy analysis and recommendations.

For these reasons, this Taskforce calls upon the Commission to present in the near future a policy communication addressed to EU Member States and designing a long-term e-skills strategy, and a corresponding e-skills action plan proposing targeted actions for the years ahead.