THE EUROPEAN E-SKILLS FORUM

E-SKILLS FOR EUROPE: TOWARDS 2010 AND BEYOND

SYNTHESIS REPORT **September 2004**

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The European e-Skills Forum has been established by the European Commission in March 2003 with a view to foster an open dialogue between all relevant stakeholders and to catalyse actions with a view to helping to narrow the e-skills gap and to address e-skills mismatches. This synthesis report will be presented at the European e-Skills 2004 Conference (www.eskills2004.org) organised by the Commission in co-operation with the European Centre for the Development of Vocational Training and leading stakeholders on 20-21 September 2004 in Thessalonica.

This Synthesis Report has been prepared as a collective view of the European e-Skills Forum. The conclusions reflect, as far as is possible, the personal opinions of the members of the Forum without prejudice to the official position of their organisations.

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TABLE OF CONTENT

INTRODUCTION

The European Council 2000 in Lisbon launched the ambitious strategy to make the European Union "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion". In a knowledge-based economy, acquiring, generating, and exploiting knowledge are increasingly key determinants of success for enterprises and individuals. Knowledge workers are increasingly the focal point of the labour force, given their ability to drive innovation or apply technologies and business practices in ways that improve competitiveness, foster innovation and the creation of new products and services. ICT and e-business skills (e-skills) are fundamental for the further enhancement and development of productivity and knowledge-intensive products and services.

Despite the economic downturn and three consecutive difficult years for the ICT sector and after the excessive optimism which was prevalent at the turn of the century, the long-term demand for professionals with ICT and e-business skills still exceeds the supply, in particular in user industries. The situation has been analysed in depth by the ICT Skills Monitoring Group with representatives of the Member States and Norway, resulting in a benchmarking report on 18 December 2002. This benchmarking study assessed the state of play with respect to the perceived e-skills gap and identified national and regional policy initiatives as well as the lessons that can be learnt from them.

In this context, the creation of a European e-Skills Forum of stakeholders was proposed by the declaration of the European e-Skills Summit[1] in Copenhagen on 17-18 October 2002 and welcomed by the Council Conclusions of 5 December 2002 on ICT and e-business skills in Europe. The European Commission established the European e-Skills Forum in March 2003. The objective was to bring together all relevant stakeholders to listen to their views and catalyse discussions and actions to address e-skills issues. The Forum brought together experts from the ICT industry, economic and social partners, European associations, universities and training bodies as well as representatives of the Commission, European Centre for the Development of Vocational Training (Cedefop), Member States, acceding and candidate countries, EEA/EFTA countries and OECD.

This synthesis report: "e-Skills for Europe: Towards 2010 and Beyond" presents a shared vision of the problem and of the challenges ahead and proposes priority actions to be launched at both European Union and country levels. It draws on four detailed issue papers prepared by the working groups and discussed in plenaries, on supply and demand, managing social change, international aspects and public private partnerships.

It has also been prepared as a contribution for the European e-Skills 2004 Conference[2] (Thessalonica, 20-21 September 2004) and for the preparation of the report of the Commission to the Council and the European Parliament on the progress made in addressing the issue of e-skills shortages and mismatches in Europe. The issue papers as well as all contributions and presentations (including those relating to a two-day workshop on e-skills industry certifications organised in March 2004 in cooperation with Cedefop and the eSCC, an industry certification consortium) are accessible via the "online Forum" set up on the Internet[3] and managed by Cedefop to facilitate the work of the Forum and get the views of all interested parties.

THE IMPORTANCE OF E-SKILLS

Information and Communication Technology (ICT) has considerable impact on the overall economy and a significant effect on productivity growth approaching several percentage points in many countries. The use of ICT throughout the value chain contributes to improved business performance and trends suggest that ICT will continue to be a driver of growth.

While effective use of ICT can make major improvements in an enterprise's productivity and competitiveness, the need for changes in human resource development, government support policies and favourable company culture in achieving this has not always been sufficiently taken into account. And these issues must be managed effectively. Attempts at introducing ICT successfully in adverse conditions often fail.

ICT is adding automation and intelligence to every product and to the way products are manufactured, transported and recycled. In the longer term the need for information-handling capacity and intelligence will grow in all products and in everyday services.

As the significance of technological tools and processes continues to grow within almost all branches of industry, the comparative productivity and competitiveness between enterprises in different countries will increasingly depend on how effectively and efficiently the technologies are used by the staff, present and future employees and managers.

The competitiveness of European industry is thus dependent on both the effective use of ICT for industrial and business processes and the knowledge, skills and competences of existing and new employees. Thus the global performance of European enterprises will depend increasingly on differences between the rates of take-up and effective functioning of new technologies in European enterprises compared with those in their competitors in other economies.

Enterprises with global functions and markets can and will utilise opportunities open to them outside Europe to exploit available competent and talented workforce for their global product creation and delivery.

The most vulnerable areas for loss of European competitiveness are the segments linked to R&D, e.g. practitioners working in research and product creation. This can also have a significant impact on employment creation further down the value chain. It relates closely to income from intellectual property and can have a knock-out impact on university research and education as well as lost opportunities, where Europe cannot compete.

A long-term strategy for ICT promotion and for the realisation of ICT's full potential for European development should be agreed and further strengthened and all agents of development – technology, the markets and society – should act together.

The e-skills concept

The term "e-skills" encompasses a wide range of capabilities (knowledge, skills and competences) and issues with an e-skills dimension span over a number of economic and social dimensions. The ways individuals interact with ICT vary considerably, depending on the work organisation and context of a particular employer, or home environment.

In view of this complexity it is necessary to establish a number of underlying concepts that need to be distinguished for policy analysis, development and response purposes, while recognizing that specific national, regional, sectoral and organisational perspectives may vary.

The term e-skills covers mainly three categories[4]:

- ICT practitioner skills: The capabilities required for researching, developing and designing, managing, the producing, consulting, marketing and selling, the integrating, installing and administrating, the maintaining, supporting and service of ICT systems;
- ICT user skills: the capabilities required for effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work, which is, in most cases, not ICT. User skills cover the utilisation of common generic software tools and the use of specialised tools supporting business functions within industries other than the ICT industry;
- e-Business skills: the capabilities needed to exploit opportunities provided by ICT, notably the Internet, to ensure more efficient and effective performance of different types of organisations, to explore possibilities for new ways of conducting business and organisational processes, and to establish new businesses.

e-Business skills are strategic and related in particular to innovation management, rather than technology-management, skills - which are part of ICT practitioner skills.

The competence needs of both ICT practitioners and users are changing rapidly, as ICT develops and the range of new applications widens. Even though the labour market in some Member States has succeeded in meeting most of the quantitative needs, the qualitative gaps in terms of skills gaps and mismatches are often expanding.

It is necessary to distinguish the following deficiencies:

- Shortage: a insufficient numbers of skilled people in the labour market or in an occupational segment;
- Gap: a competence shortfall between the current and needed competence levels of individual staff within organisations;
- Mismatch: a mismatch between the competence of the trainee or graduating student/learner and the expected competence needs of the employers. Mismatch is assumed to arise from course/curricula misalignment.

E-skills shortages, gaps and mismatches threaten productivity development within both the ICT industry and the user sectors and this combined effect on European competitiveness is likely to be significant.

The statistical picture

The complex nature of e-skills and the dynamics through which they affect the economy and all labour market segments are challenging the traditional ways of analysing and forecasting as well as the use of existing statistics and classifications to describe ICT and its impact on society, the economy, and the supply and demand of skills.

Official national and international statistics have so far not sufficiently clarified attributes and concepts in this area, and so do not directly provide the data needed to describe e-skills shortages, gaps or mismatches. All attempts to forecast the supply and demand of ICT skills face difficulties because of differences in statistics and classifications between different Member States. User skills are impossible to gather from the statistics only. During the last few years there have been several attempts (using different methodologies and statistical approaches) to measure e-skills shortages in Europe.

The IDC study in 2000 estimated that the Western Europe ICT workers skills shortage would reach 1.7 million by 2003. The estimate was based on a broad skill definition: from Internet working to technology-neutral skills. The European Information and Communication Technology Association (EICTA) and the Career Space consortium (using occupational statistics) concentrated their efforts on "ICT core practitioner skills" and estimated the number of people in ICT jobs having exceeded 6 million in Western Europe in 2001. The demand for people possessing core ICT practitioner skills was estimated to rise by 1.3 million during the next four years. The European Information Technology Observatory (EITO) 2001 report classified user skills as "e-business skills with intensive use of Internet and requiring a variety of non-technical skills", drawing on the IDC definitions. ICT user needs for ICT expertise are believed to be rising steadily.

The strong growth of ICT activity in most industrial societies has resulted in swings in economic activity more pronounced than for most other industrial activity. There has been an element of boom-then-bust over several decades, culminating in the greatest double swing of all in the last five years – unprecedented growth at the end of the last century and widespread and serious loss of confidence and activity downturn at the beginning of this.

The situation of the supply and demand of e-skills in European countries varies significantly: there are differences in both quantitative and qualitative aspects, depending on the state of the economy and national higher education and vocational education systems[5]. Demand for labour having ICT skills is driven by levels of business activity; employment levels of ICT practitioners have followed the ICT activity curve with a greater or lesser lag.

Chronic significant shortages of ICT practitioner skills have been endemic in most advanced economies, due largely to the very fast growth of ICT activity in comparison with the relatively low supply of new entrants with a relevant tertiary education qualification. Shortages have come and gone and there appears to be some evidence of a cycle of some ten years.

Describing the complex nature of supply and demand of e-skills from the available information and official statistics remains a major challenge. Although very difficult to perform in a consistent and robust way, the need is great since there is a profound relationship between economic development and investments on education and research.

Traditional manpower surveys or employment statistics are comparatively weak tools on which to base policy decisions at either government or business level. Official statistics consolidated at European level are generally a year or more old and contain information based on traditional classifications. This is why they do not meet all the strategic needs of the industry. Eurostat has initiated an effort to define e-skills and e-security conceptual frameworks and statistics. This will constitute a sound basis for the future development of European level statistics and indicators, but the active role of Member States in statistics gathering remains crucial.

Managing the continuous change

New thinking has to be introduced both towards longer-term scenario and foresight work as well as shorter-term "weak signal monitoring" by innovative barometer studies.

The Council of European Professional Informatics Societies (CEPIS) in its ICT employment forecasts[6] estimated the impact of different growth rates on the expected development of the ICT workforce within four Member States and the European Union as a whole. The European employment scenario study by the ICT related associations in Finland based its results on scenario-building processes and several national ICT statistics. Both approaches are valuable and would constitute a basis for defining the overall picture and options for actions and interventions needed for future decision making.

According to a Cedefop study[7] released in 2004, the number of current ICT practitioners in Europe is 3.7 million and is estimated to reach 5.1 million by 2010. The total demand for ICT practitioners in Europe has been roughly estimated at about 0.23 million persons per year including replacement demand. In correspondence to this demand the estimated number of European ICT students and trainees today may well meet the demand quantitatively. But certain gaps of ICT practitioners are recognisable at specific skill levels because the numbers of ICT students and trainees especially at Bachelor degree and higher vocational levels are not sufficient.

The recent stagnation within the ICT sector (within its highly cyclical growth path) has also produced a certain loss of confidence in high-tech development. The layoffs of ICT practitioners have caused the signalling from the labour market to young people considering their future careers, and in some Member States this has resulted in a fall in applications for ICT courses at universities and, in others, in cuts in funding for these institutions. However, in the long-term, the lack of both quantitative and qualitative competence will rise if measures are not undertaken to counteract these trends.

STRENGTHENING SOCIAL COHESION

Europe needs a sense of vision, which places economic growth and performance within a broader framework aiming to strengthen social cohesion and improve the quality of life for all. Whilst initial interest in e-skills at the European level was stimulated by the evident shortage of adequately trained practitioners in the ICT industry in the late 1990s, the issue reaches down much more broadly to the whole population.

The task of broadening and deepening people's e-skills is an important objective: to help each individual realise their full potential and to participate in the democratic life of their communities at a time when all aspects of life are increasingly becoming reliant on ICT-technologies. Individuals must be enabled to engage in and steer their own lifelong learning. The task must be to find new approaches through which each person actively participates as an active citizen in the process of lifelong learning - where indeed there is a thirst for learning.

There is a need to ensure that acquiring e-skills emphasises not only the technological skills required but also the value of communication, creativity and imagination in the use of ICT. An effective information society requires new forms of networking and

collaboration, in an age where value resides less in fixed capital equipment and much more in intangible form, including human knowledge and know-how. Europe's citizens must be encouraged to understand that improving their e-skills means much more than learning new software techniques.

Moving beyond the current base for e-skills training

The level of competence in ICT user skills in Europe remains too low.

Only about 27% of the European Union workforce has received job-related computer training. The figures are lower for those on lower incomes: only 4% of low-income earners have ever received any ICT training paid for by their employer. For women, the figure is just 3%[8].

Obtaining e-skills is not a one-off event – the speed of technological change requires that skills need continually to be kept up-to-date and relevant. In addition, learning objectives tend to be increasingly individual in character. Due to this, ICT training has to be based on a methodological approach suitable to empower learners to define their skill needs themselves and be able to steer learning processes to a large extent on their own. Lifelong learning has to lie at the heart of Europe's path forward. This has already been taken into account by for instance the European employment strategy and a range of activities launched by the Commission on education and training.

In this respect, the finding in 2003 of a Eurobarometer survey that nine in ten European citizens think that lifelong learning is important, can be seen as encouraging. Nevertheless the same survey points out that on average over two-thirds of European citizens do not currently take part in education and training[9]. Improving e-skills must be a collaborative process, in which employers accept their share of the responsibility, with their employees, for each individual's career development and training needs.

Women make up about 43% of the European Union workforce but nothing like that amount of ICT practitioners: only 18% of computing professionals are women. In the category of computer associate professionals, women comprise just 20% of the total[10]. They 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 has become the career of choice for many women. In terms of competency in using ICT tools, the 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%).

Many women seem to perceive work in ICT as "nerdy" and "too technical" and a lack of strong female role models discourages many young women from entering the industry[11]. Only around one in five ICT students are women.

Enterprises and society are losing out on a valuable resource. To meet this challenge we need to provide the right incentives and focus to invest in education, skills and competencies. A more holistic approach to e-skills training is needed which seeks to empower the individual and to help enrich the quality of life of Europe's citizens. It is appropriate therefore to tackle e-skills further development within a framework which

stresses the need for work/life balance. Gender issues need to be mainstreamed within the e-skills debate.

Enterprises often appear to be more inclined to recruit new workers with the required skills than to ensure that their current workers are adequately retrained with those skills. Older workers generally receive significantly less training than prime-age workers, particularly so if they are low-skilled. Measures to increase training for older workers and to keep them in the labour force longer would need to go hand-in-hand.

Young people seem less and less interested in studying mathematics, sciences and technology, the subjects that are generally assumed to constitute the basis of most qualified ICT jobs. Still too many of them break off their studies early. Given the fascination which so many young people show for ICT applications, this suggests a problem with many existing curricula and calls for the development of new forms of education and training which help empower individuals in or at least parallel to their work and personal lives.

Linking e-skills training and social inclusion

Europe's path forward to the information society has repeatedly stressed the importance of striving for social inclusion and working to counteract the digital divide. Market forces on their own will not close the digital divide and indeed may in fact widen it. Innovative public measures and multi-stakeholder activities are required.

Equality of access to ICT infrastructure is an important issue: however, access is in itself not enough. An approach to e-skills which is rooted in a desire for social inclusion and greater social cohesion will be reflected in the need to take measures to assist those sectors of the community who suffer disadvantage and discrimination, including minority groups, those with disabilities and those suffering from unemployment and poverty to make effective use of ICT.

More, and more effective e-skills training should also help create better, safer and more efficient jobs and workplaces.

New forms of work organisation enabled by ICT may make it harder to define clear boundaries between work life and private social life. Telework for instance can be introduced in ways which are helpful to all and encourage a healthy work/life balance allowing to cope with family obligations alongside employment.

The social dialogue which led to the European framework agreement on tele-work, agreed between the social partners in 2002, is a model of the way such issues can be tackled and resolved.

INTERNATIONAL ASPECTS OF E-SKILLS

The ICT industry is global. As multinational enterprises, the major ICT players as well as some large user organisations recruit technical staff in a wide range of countries, and need to assure the highest possible competence of their teams wherever they operate. This has led to the emergence of enterprise-wide skills, competence and professional development frameworks, within which ICT practitioners' career development can take place, and against which they are assessed. These frameworks also provide a context

within which recruitment can proceed. Movement of ICT practitioners between countries within such companies and organisations are therefore facilitated.

However such a framework is not available to smaller employers, and this, and the desire to improve the relevance of ICT learning provision, has led public authorities and professional bodies involved with skills policy to seek clarification of the question of what ICT people do through the development of more general occupational or skills frameworks. While there are professional informatics societies[12] in many countries, it cannot be said that an ICT profession has become truly established in the same way as for medicine, the law, accountancy or indeed engineering.

The relentless emergence of powerful new technologies and the speed of ICT industry economic dynamics have for some time moved considerably faster than responses from the public sector institutions that relate to industrial policy issues. In addition, development of the ICT industry has often been dominated by few players. Such market dominance has often led to de facto industry standards.

The very lack of maturity of ICT practitioner professions and occupations has resulted in a lack of commonly agreed and understood structure for education and training requirements, with particular difficulties for recruiting employers' understanding of other countries' qualifications.

Mobility of ICT practitioners

The internal market and mutual recognition of vocational and professional level qualifications increasingly provide a sound starting basis for mobility. Several Member States have reported regional skill shortages. Social issues such as pension portability, mutual recognition of education at levels, spousal job opportunities, day care possibilities and differences in taxation do, however, represent barriers to mobility. Some of the problems can, of course, be met by enterprise-level actions but European Union institutions need to explore European solutions for issues like social insurance and benefit policies.

Mobility can be made easier by the transparency and cross-recognition of qualifications. Hence, measures that increase the openness and clarity of education systems and their learning outcomes in line with the Bologna and Copenhagen processes should be further encouraged. The acceding countries have a different set of problems. There are "generation gaps" between elderly and younger people and their ICT skills. Their capacity to attract new industries is high, but ICT practitioners in these countries might well now look for a higher salary level in other European countries. Besides the need for intra-European mobility there is the need to address the question of extra European mobility of human resources and qualifications.

There are few hard constraints on the international mobility of ICT practitioners, since there is little regulation of practice for the occupations involved. As indicated, where international mobility is within the employer organization, such intra-enterprise transfers happen quite naturally.

However, the individual ICT practitioner desiring to work in another country will be subject to the general visa and immigration requirements operating in that country. Generally, where the individual seeks employment on a formal (employed status) basis, visa and immigration would follow once employment has been arranged, except within common economic areas like the European Union, where this would not be necessary.

Where the individual desires to establish a consultancy or contracting business, the European and national regulations for the setting up of a new business would apply.

More important to acquiring employment in another country is the basis on which the recruiting employer can assess the candidate. While for more mature job-seekers the nature of his or her experience is paramount, the question of awareness of the meaning of a candidate's qualifications becomes more important for younger candidates – for whom international mobility is particularly attractive - in the early years of their careers.

The growth of take-up of ICT industry certificates shows their comparative value in the marketplace. Many job adverts indicate the desirability of a candidate holding one (or sometimes more) of them. As a result of their value in the marketplace, they are often viewed as representing "passports" to ICT jobs, whether within a country or abroad. ICT industry certificates are thus one way of making it easier to move across borders.

Global sourcing

When faced with hard-to-fill vacancies in the late 1990s employers sought support from government. Thus most Western governments attempted around the change of the millennium to identify possible policy responses that could help to strengthen supply.

In a number of cases it was decided to facilitate entry to the domestic labour market by overseas workers, through the streamlining of arrangements for visa and/or work permit approvals for ICT practitioners: for example, the German "green card" procedure, the "official shortage occupation" work permits processes in the United Kingdom and the H1-B visa arrangements in the United States.

But now the debate has shifted to a new fast growing trend: international outsourcing. The moving of production capacity by multinational enterprises to countries with lower labour costs is a phenomenon known over a number of decades. However, the emergence of switches of ICT software and services operations to outsourcing enterprises outside the country of their delivery is a more recent phenomenon, and its potential impact on national employment levels is causing concern in a number of European Union Member States as well as in the United States.

Both high-level software work and ICT-enabled services such as call centres have already been relocated. The United Kingdom has seen several thousand call centre jobs transferred to India, primarily in the telecoms, finance and commerce sectors. A 2004 study[13] suggested that 272.000 U.K. jobs could move offshore by 2010. The same process can be seen developing in some other European countries and increasingly ICT related jobs are migrating to Central and Eastern European destinations.

Up to now the European jobs most at risk of disappearing are those which are relatively low-skilled and contribute low value-added. Standardised and routine tasks are becoming increasingly likely to be outsourced. This means that there is, more than ever, an urgent imperative to improve the e-skills levels of the population. Concerns arise also from the fact that jobs are beginning to be lost at the more professional levels of occupational activity. The jobs involved are at the higher knowledge economy end of the scale: the very part of the occupational spectrum where common aspirations for future economic activity and so employment growth within the European Union (an area of globally comparatively higher labour costs) lie.

Another dimension of global sourcing relates to the leading edge element of e-skills demand. Where an employer company needs quickly to establish a significant core of people with a very specific emerging high-tech expertise, this must sometimes be built on the expertise present at the state-of-the-art end of the ICT world, often to be found in university computer science or telecommunications engineering departments.

In a global marketplace, an ICT major will sometimes have no option but to seek collaborative arrangements with universities outside the European Union, if the response by universities within Europe to this opportunity is not fast or effective enough, or of adequate scale. Such situations can, particularly in some Asian countries where there are large supplies of science and engineering graduates, establish relationships that could develop at the expense of European e-skills employment.

Governments are faced with a tough choice in developing policy positions in this area. On the one hand the cost reductions that can be won from outsourcing to economies with significantly lower labour costs are important in ensuring the global competitiveness of national businesses. On the other, the likely loss of ICT jobs in this way is a bitter blow in economies where, for the last few decades, ICT has been the flagship sector in the creation of new jobs that is so crucial when employment in traditional sectors has been falling. The longer-term impact of significant international outsourcing is still to be discovered.

Where are the new jobs going to come from?

It is necessary for Member States and the European Union to respond to global competitive pressure by clarifying the strategic implications and focusing – more strongly than before – on identifying the right future global positioning, based on the strengths of their national positions and assets.

At the European level, as well as within Member States it will be important to invest more strongly in our core comparative and competitive advantages, as well as to do what is possible to clarify the actual position in relation to international outsourcing (so that the debate is based as much as possible on facts rather than fears), and to work to bring together the social partners to confront the implications of this trend and elaborate appropriate responses.

Most governments have been working over recent years to make their countries more attractive for foreign investors and to augment national economic activity with inward investments. Besides fiscal and financial incentives, a major element in this relates to the availability of appropriately skilled labour at competitive cost, and to the attractiveness of the country as a place to live, study and work.

The European Union must remain an attractive place to do business, and – as well as the undoubted natural attractions of culture and countryside – Member States will need to continue to work at providing a rich science and technology environment on which investors can draw. This includes both a thriving research and development base and the availability of a breadth and depth of skilled labour performing well in the latest technologies. Most Member State governments and the Commission have this in mind in promoting better quality education & training – and in particular university level education.

MULTI-STAKEHOLDER PARTNERSHIPS FOR E-SKILLS

The rise of "parallel universes"[14] between informal, industry-based education and formal, government-supported education, particularly in ICT, highlights the blurring of what were formerly distinctive realms of learning. With the rise in market penetration of standards embodied in industry-based training and vendor certification there is uncertainty throughout Europe about learning provision by the state and the market, and about what standards to set, how to validate such standards, and how to strengthen coherence between different providers.

Multi-stakeholder partnerships (MSP), a more general concept than public-private partnerships, offer a potential to bridge these parallel universes and to stimulate cooperation on training and certification between educational or training establishments and enterprises. Closer cooperation could facilitate adaptation to industrial change and allow for standards to become more reliable and sustainable. Social dialogue forms an essential component not just of the European model but of corporate social responsibility and could be used more effectively especially in the ICT sector in order to agree on a longer term e-skills policy.

Attainment of the strategic goals set in Lisbon in 2000 depends on the action taken by the economic and social partners. They are well placed to facilitate the management of change which can reconcile the flexibility essential to enterprises with the employment security and career development needed by employees. Social dialogue for the telecom sector was successfully set in motion several years ago between UNI-Europa and the employer's organisation ETNO. A similar process should be launched in 2005 for the IT sector[15].

The concept of MSP has been attracting increased interest over recent years. The approach can enable governments to define new ways of solving problems for the public good. It builds on the idea that in order to reap the full benefits of ICT, it is necessary to create a new form of collaboration that involves the full range of actors in the public and private sectors in a process that is inclusive, open and participatory[16]. To provide individuals the knowledge they need to participate as partners of economic growth and social cohesion, a potential partnership must also find effective and efficient ways to enable cooperation and information flow.

This overarching need translates into requirements for:

- Defining and agreeing what knowledge, skills and competencies are relevant for industry not only in the short term but primarily in the medium and longer term;
- Defining and agreeing a mechanism for collecting and disseminating information regarding what knowledge and skills are relevant to enterprises, industries, and/or industry clusters;
- A need to provide individuals the opportunity to access and/or signal the need for acquisition of the relevant knowledge and skills;
- To enable individuals to get their prior learning recognized and certified, regardless of how and when or where this was acquired;
- A coherent system or mechanism to steer relevant individual professional and skill development to meet the needs of employers and society.

Rather than focusing on whether there are enough people to fill open jobs (which will come and go depending on the business cycle), framing e-skills issues in terms of high-level skill and performance could provide a way to observe and benchmark e-skills developments in the knowledge-based economy. A more permanent platform at the European level is needed.

MSP strategies are not universal: different countries face different circumstances, priorities and financial means, and should adopt different strategies accordingly. A comprehensive EU-level framework, however, could assist in determining a strategy regardless of what specific goals have been established. Such a structure could be built at every stage of the value chain for continuous learning.

This platform would need to put in place transitional mechanisms to address trade-offs and create positive incentives for change that leverage the creative potential of the different actors, allowing them to work on the basis of agreed roles and clear responsibilities. The implementation structure may vary from country to country as each attempts to translate the strategic framework into action leading to tangible results.

European Union Member States' ICT and e-skills' strategies should not be pursued in isolation but need to be positioned within the European and global context, while simultaneously addressing the needs and opportunities emerging from the local context. This makes it more critical to identify where the interests and aims of the different actors coincide, and where they diverge.

The notion of MSP implies that multiple public and private partners share the benefits and responsibilities of their collaboration. Thus the private sector should be mindful of its social responsibilities while the public sector should create a legal and regulatory framework which will encourage partnerships between different stakeholders.

Typology of partnerships for e-skills

While public private partnerships are commonly considered an appropriate vehicle for financing long-term relationships involving major infrastructure projects, including ICT equipment, they have so far not been used much to develop the content of e-skills training. This situation reflects the fact that intangible deliverables are more complicated to manage than physical assets. It also reflects lingering sensitivity around the involvement of private e-skills providers (profit or non-profit oriented) in public learning provision.

MSP in the e-skills content domain would therefore offer ways and means to bring together the commercial, informal and formal ICT training sectors, including government education departments and formal learning institutions and processes, in order to allow where convenient and effective the use of relevant ICT industry and other non-formal training and certification within standard education and training frameworks.

The underlying theme of MSP in this area would be to ensure that individuals' commitment to continuous learning is supported by a partnership amongst educational institutions, industry, professional associations and public bodies. Its primary purpose is to assure that individuals get access to, and acquire the most up-to-date knowledge, e-skills and competencies. At the heart of this endeavour are (private or public) educational institutions and training providers, primarily because they serve as a channel for effecting change in individuals' understanding, knowledge and skills in this area.

The MSP model raises important financial issues: there may be wrong expectations of significant transfer of financial resources from the private sector into the public. In

addition, industry-based and other non-formal training providers are seeking recognition from the public sector for their current efforts in training Europe's workforce through their certifications.

Facilitating eligibility for public funding for organisations, employers and employees who choose to provide or to take recognised courses would be an effective contribution to strengthening positive developments in the field of certification. Better allocation of existing resources to tackle the e-skills shortages and gaps would leverage the existing knowledge, experience and energy of the training market in support of the overall strategic objective, and stimulate private and corporate investments that can under certain conditions also help advance public goals.

The importance of industry e-skills certifications

While the range of educational provision has contributed to the wealth of cultural diversity within the European Union that is the essence of the richness of the European identity, this diversity can pose challenges to employers on one country recruiting younger staff whose educational qualifications come from a different Member State.

The Bologna Declaration of commitment to a common higher education area for Europe aims to address this problem for tertiary education, and there is a corresponding process (Bruges-Copenhagen Process) underway for an increasing cooperation on vocational training and lifelong learning. It is important to recognise that mechanisms to clarify the nature and value of different educational qualifications in Europe have value for recruiting employers not only in the Member States but also beyond the European Union.

Qualifications developed by some of the major ICT suppliers in the early 1990s are playing an increasingly important role in the global marketplace. Take-up grew steadily at the global scale at least until the ICT downturn in the new century. Secondary markets grew from these developments, with the emergence of related training and testing businesses. The value of these certifications has been confirmed in the marketplace, and they provide a "target" for which to design training provision and a structure via which training providers can strengthen their customers focus. These certifications mostly concentrate on the specifics of the software tools involved, rather than the broader principles that need to be understood for delivery of the complete ICT practitioner. The market realities confirm that both are needed.

Governments and public sector bodies including the social partners continue to review links between their learning processes to the national public sector education and training arrangements to provide effective learning systems with a broad coverage, from the breadth of formal education, through training in the specific ICT practitioner roles, to competence in the use of specific software tools.

The experience in the United Kingdom in embedding proprietary certifications within the National Qualification Framework provides a successful example that could be further reviewed and shared between Member States[17]. Similar approaches aiming at the same objective have been adopted in Hungary and in the Netherlands.

In addition to the contribution of industry-led training and qualifications, it is important to acknowledge the examinations, qualifications and certifications developed and offered by independent bodies, often developed from, or by, associations of ICT professionals. In this respect, the European Computer Driving Licence (ECDL), and the European Certification for Informatics Professionals (EUCIP) constitute good examples.

Future perspectives for e-skills development

Work to ensure portability of qualifications and to create appropriate European-wide skills frameworks at both professional and vocational level is absolutely essential. At present, Europe's citizens who try to improve their e-skills face a wide range of competing qualification and certification schemes, both vendor and non-vendor specific. Steps need to be taken to support current efforts to put in place broadly accepted European-wide certification.

Efforts need also to be taken to ensure a seamless framework linking basic level e-skills training, more advanced vocational training and professional educational development undertaken at university level. To enable more people, including women and currently unemployed people, to have the opportunity to advance their careers in ICT, a transparent skills and qualifications framework which ensures transparency and encourages upward mobility in skills acquisition would be particularly valuable.

In order for public policy to be based on adequate understanding about employers' skills requirements, governments, public sector bodies including the social partners involved with skills policy and professional informatics societies have in several countries over recent years explored the development of occupational competence or skills frameworks.

The most significant skills frameworks within the European Union are:

- The "Skills Framework for the Information Age" (SFIA) developed with United Kingdom government support for e-Skills UK and now supported by the SFIA Foundation[18];
- The "Advanced IT Training System (AITTS)"[19] developed by the social partners in the ICT industry with support of and enacted by the Federal Ministry of Education and Research in Germany;
- The "Generic ICT Skills Profiles" developed by the Career Space consortium[20].

In the United States, the National Workforce Centre for Emerging Technologies (NWCET) "IT Skills Standards" developed standards for the National Skills Standards Board (NSSB)[21].

While there are many similarities between these models, there are also some differences. Since ICT activity is global, it is desirable in principle for these different frameworks to begin to converge. The aspiration for a common set of European standards in this area has been progressed through the work of CEN-ISSS[22] and an initial set of generic skills or job profiles and linked curriculum development guidelines are emerging. A further step towards an improved management of e-skills could be an establishment of a European e-skills meta- or reference framework.

A European e-skills meta-framework developed in close cooperation between and supported by all relevant stakeholders would act as a reference for national and regional frameworks and encourage their convergence, comparability and transparency. Such a meta-framework, within which different national and regional authorities could approve and validate formal and non-formal certifications and qualifications, would ensure that workplace e-skills become a common European Union employment value. In doing so the framework should aim to enhance the e-skilled workforce across Europe by associating formal and non-formal e-skills education channels and ensuring that the most up-to-date and relevant e-skills are taught at school and university. It could constitute an

important step towards the mutual recognition of public and private or industry-based and vendor neutral e-skills certifications across Europe.

Such a meta-framework could also support European Union public policy goals such as workforce mobility, increased employment security and the creation of a knowledge-based society for all. Furthermore, as pedagogy and learning play a crucial role in the development of e-skills, the European e-Skills meta-framework could be extended to include related soft skills and a more general e-competence along the lines of the European employment and lifelong learning strategies.

CONCLUSION AND RECOMMENDATIONS

In recent years employment in the ICT sector has swung wildly between two poles – a time of redundancies in the early 1990s followed by the acute shortage of ICT practitioners at the end of the decade followed again by redundancies in the last three years. Longer-term strategic vision involving scenarios is required in respect of ICT skills developments (supply and demand) in both the ICT sector and the ICT user industries in the European Union.

The goal of ensuring that Europe's workforce and population is adequately e-skilled for the future should be seen within this longer-term strategic framework. e-skills is not an issue which can be dealt with, and then dismissed.

The way forward towards the widening and deepening of e-skills within the European Union is through multi-stakeholder dialogue including social partners and partnerships for action. This is an issue ideally suited for relevant stakeholders to work actively together and it is important that a mechanism for this collaboration, initiated in the European e-Skills Forum, continues in the coming years.

The European e-Skills Forum identified the following main priority actions:

(1) Developing a long-term strategic approach to the ICT sector

The relentless evolutionary change of ICT continues to provide a complex and moving target for policy-makers and education and training providers in relation to e-skills. It is essential to develop a long term strategic approach to the ICT sector and ICT occupations.

- All stakeholders should promote the importance of the ICT sector and the e-skills issue in Europe taking also into account important developments in other countries such as the United States, China and India, in order to ensure that global sourcing is able to reconcile the competitiveness and flexibility essential to businesses with promising career perspectives needed by European citizens;
- The Commission should facilitate this process at the European level, monitor the competitiveness of the ICT industry in the European Union and encourage Member States in their efforts to maintain and enhance the attractiveness of the European Union for inward investment and inward migration of high-tech workers. This process could be facilitated by the European Monitoring Centre on Change.

(2) Improving planning and data availability about the ICT labour market

A multiple scenario-based methodology should be further elaborated and implemented, based on the recommendations made by the supply and demand working group, to elaborate different scenarios which can help assess future demand and long-term developments. EU level estimates must be based on national statistics and jointly agreed economic and industry surveys and analyses. The scenarios should be regularly followed according to the critical "landmark" variables discovered during the process. Data on expected demand levels based on the chosen option should be made available to universities and training providers in order to implement such a long-term vision.

- Stakeholders should nominate relevant experts to participate actively in designing, conducting and evaluating the process. The Commission should support the development of e-skills foresight scenarios in co-operation with the OECD and Cedefop as well as the establishment of a European network of experts in this field;
- More qualitative research is also needed to define future skill needs and the need for new statistics and classification. Eurostat and national statistical offices should work together to clarify, agree on and implement best practices in classifying and gathering the data needed. Supply side statistics, indicators and barometer should be made available to help the training providers and enterprises in their strategic and competence or skills planning.

(3) Promoting European e-skills multi-stakeholder partnerships

In the late 1990s many important initiatives were launched by leading stakeholders, notably ICT companies, in the field of e-skills. However, they were often disconnected and lacked the necessary critical mass to maximise their impact. There is a need to better structure and pool resources for joint activities, the sharing of knowledge, the exchange of best practices and lessons learned from concrete project implementation.

- Co-operation between stakeholders should be strengthened to research appropriate legal, financial and institutional frameworks for multi-stakeholder partnership development and foster the development of innovative initiatives;
- Member States and the Commission should review existing regulations and model contracts and consider amending those regulations that inhibit multi-stakeholder partnerships in e-skills education and training.
- Comprehensive and integrative initiatives, such as projects for developing a European ICT career development system and ICT career portal, could serve to deliver the economic benefits of multi-stakeholder partnerships for e-skills development in Europe and beyond. The networking of learning centres at the European level and the promotion of role models should be supported by the Commission.

(4) Designing innovative e-skills training solutions

The delivery of e-skills training can benefit from the development of work-based training concepts and innovative new education and training channels including e-learning. e-skills training must also take into account the particular needs of women and different age groups and offer effective incentives and apply the most appropriate teaching and pedagogic techniques including a methodological concept for the promotion of lifelong learning.

- New ways of close University-Industry collaboration, including also professional associations working in this area, should be explored and actively supported by stakeholders and policy makers enabling teacher-researcher-practitioner exchange, trainee practice credits to be acknowledged, collaborated course development, regional and local key competence and e-skills identification workshops as well as joint vision and strategy workshops on local levels.
- Co-operation should be strengthened to define standards for the implementation of mutual recognition of modules and units of training and credit transfer, elaboration of vendor or platform-independent certification and skills assessment. New ways for

certification and accreditation and assessment of e-skills should be explored with a view to bridge the parallel universes of formal and non-formal education and training, which is of particular importance for the sub-degree level.

(5) Supporting the development of a European e-Skills meta-framework

The aspiration for a development of a European e-skills meta-framework has been progressed through the recent work undertaken by major stakeholders, Cedefop and CEN/ISSS with the support of the Commission. It was one of the most debated topics at the workshop on e-skills industry certification on 24-25 March 2004 in Brussels.

- Member States and the Commission in close cooperation with CEN/ISSS and Cedefop should further explore and support the development of a European e-Skills meta-framework and of European-wide certification standards in ICT with the assistance of multi-stakeholder partnership;
- They should also encourage and support efforts to increase the transparency of the market for e-skills industry certifications and develop appropriate quality standards for public and private certifications and the training industry. They should also explore the possibility (taking into account the existing Europass initiative) to develop a personal electronic passport (e-portfolio) for ICT workers to make their records of professional achievements transparent and portable if these individuals do wish so.

(6) Fostering e-skills for the workforce and the population at large

As mentioned in the report, the level of competence in ICT-related skills in Europe remains too low. On average, just of half (53%) of the European Union's active population used a computer in their professional life in 2002, ranging from a low of between 30% and 40% in Greece, Spain and Portugal, to a high of more than 70% in Denmark, the Netherlands, Finland and Sweden[23]. At the same time, there are a number of studies which show that with training the productivity in using a computer increases by a minimum of 10% and more likely by in excess of 20%.

- Member States, the Commission together with industry and social partners should encourage training and promote low cost education resources for the European workforce in basic ICT skills so that it will be "digitally literate";
- In 2005, it is anticipated that most Member States will have achieved a high degree of e-Government services. In order to achieve true e-Government the concept of an e-Citizen should be embraced if we are to avoid a significant "digital divide".

This synthesis report and these recommendations will be discussed during the European e-Skills 2004 Conference and a Declaration will be adopted at this occasion.

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Endnotes:

[1] http://www.e-skills-summit.org
[2] http://www.eskills2004.org
[3] http://cedefop.communityzero.com/esf
[4] There are certain overlaps between these categories, but each has sufficient independent core significance to justify its separate consideration. Within each of them there are a number of levels of capability. These levels are occupational skill levels required by employers and not merely levels of initial academic or vocational education or qualifications. The word "user" is sometimes mentioned in relation both to individuals and industries/organisations, and these need to be distinguished.
[5] Cedefop (2004). ICT practitioner skills and training at sub-degree and vocational level in Europe, (in print)
[6] CEPIS (2002): Information Technology Specialist Skills in Europe: Study of the Labour Market Position, in particular for Germany, Ireland, Sweden and the United Kingdom
[7] Cedefop 2004 (editor): Towards a Comprehensive European e-Skills Reference Framework: ICT and e-business skills and training in Europe, Final Synthesis Report, authors: Willi A. Petersen, Peter Revill, Tony Ward and Carsten Wehmeyer (Flensburg University, Germany and York University, UK), Manuscript ca. 140 pp, in print .
[8] European Commission. Final report of the ICT Skills Monitoring Group: "e-Business and ICT skills in Europe, Benchmarking Member State policy initiatives", December 2002.
[9] Lifelong learning – citizens views, European Commission DG Education and Culture/Cedefop, 2003
[10] Source Eurostat: see Matthew Dixon, Key characteristics of IT Specialist employment, DRAFT analysis of Eurostat holdings of national Labour Force Survey data, presented to e-skills Forum December 2003
[11] IDC, Networking skills shortage and how women can narrow the gap, November 2001
[12] The International Federation of Information Processing (IFIP) numbers such members in some 50 countries, plus "regional groupings" - such as CEPIS - incorporating another 10-15 national bodies.
[13] The Impact of Global Sourcing on the U.K. Economy, 2003-2010: a study by Evalueserve, commissioned by NASSCOM.
[14] Adelman, C. A parallel universe, in: Change, v. 32, no. 3, May-June 2000
[15] The Commission will convene a meeting involving representatives from EICTA and UNI to explore how a social dialogue for the IT sector could be developed in Europe.
[16] Creating a Development Dynamic, Final Report of the "Digital Opportunity Initiative" (United Nations/UNDP, Markle Foundation and Accenture), July 2001, section 3.2
[17] Workshop on e-skills industry certifications, 24-25 March 2004, Brussels http://europa.eu.int/comm/enterprise/ict/policy/ict-skills/bru/index.htm
[18] http://www.sfia.org.uk
[19] http://www.bmbf.de/pub/the_german_advanced_it_training_system.pdf
[20] http://www.career-space.com
[21] http://www.nssb.org
[22] http://www.cenorm.be/cenorm/businessdomains/businessdomains/isss/activity/wsict-skills.asp
[23] Eurostat report Labour Force Survey 2002.