Collaboration@Work

The 2004 Report
on new working environments and practices

September 2004

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Luxembourg: Office for Official Publications of the European Communities, 2004

ISBN 92-894-8029-7

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Printed in Belgium

PRINTED ON WHITE CHLORINE-FREE PAPER

Foreword

This report, *Collaboration@Work 2004* is a publication illustrating developments towards new information and communication technology supported working environments and processes.

I am glad to see major developments during the past year :
- IST research has been advanced by a set of new pan-European projects, including new Integrated Projects, which cover the innovation process more widely than previous ones.
- The new working environments and work processes are bearing fruit in many new application areas, and the key ideas from the research are being widely taken up. The overall understanding of the new working paradigms for economy and for societal sustainable growth is increasing rapidly.
- The topic of "collaboration" is now the core of many organisational development processes and the word itself has become an integral part of the vocabulary of many consulting enterprises. This shows us the importance of integrating the most modern technology into organisational behaviour to achieve full competitiveness.
- IST research has been able to create a large multidisciplinary community for innovation and uptake of the new working environments and processes, the AMI@work community. The report illustrates its current state and the development scenario for it to achieve full impact.

However, there is still a major mental shift to be made. The ICT technologies are maturing, the convergence of devices and communications is seen in our environments, but many of the work and collaboration oriented developments are still too strongly based on incremental improvements, and are still organisation centric.

We should capture the essence of the *networking phenomenon* which is breaking boundaries and questioning current approaches. How can we embed the value creation process in the knowledge economy? What kind of interactions, competencies and connections are required, and at what level? And most importantly, how can we foster *systemic innovation* and creativity in the knowledge society.

This suggests that the right approach should be strongly human-centric, supporting, by technology, the connectivity of citizens in their multiple and simultaneous roles, whether private or professional, whether part of an organisation or of a community. This ubiquitous or ambient connectivity supported by creative and innovative environments has the potential to increase European productivity, so essential for achieving the Lisbon goals.

Collaboration@Work will not only increase productivity but also bring job opportunities to more citizens, through supporting atypical job relations in the knowledge economy. We can tackle location and time independency far better than ever before by using ICT, coupled with the cultural and organisational changes which reflect the networked society.

I look very positively towards a future Europe which has achieved the Lisbon goals of increased productivity, sustainable growth and job creation by entering into the era of true collaboration@work.

I wish you all very good reading when having a closer look at this report for collaboration@work 2004.

Bror Salmelin

Acknowledgements

This document is the result of the collective effort of the IST projects in the area of new working environments and practices, and the important national contributors in the area of eWork in their countries (European and others).

Their time and effort to come to an open and informative presentation of activities in the area of Collaboration@Work are gratefully acknowledged.

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Many people contributed to the successful completion of the challenging and complex activities on which this report is based. The identification of sources of information was also very much appreciated, especially for the illustrative examples as well as their constructive feedback on work in progress.

Thanks also to all contributions from the European Commission staff[1] who participated in the preparation of this report. Mainly to the editorial team : Jacques Babot, Paul Hearn, Jean Kelly, Elena Leibbrand and John Nolan.

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1. INTRODUCTION

Once more, as in 2003, this year's report gives a view of collaboration in the working environment in Europe and in the world.

This year, we welcome ten new member states which strengthen the Union. The Lisbon Strategy to give Europe leadership in international competitiveness is still at the top of the agenda and the eEurope 2005 action plan is taking further steps in this direction. A set of fifteen actions have been added to complement the existing plan in order to achieve the specific objectives of eEurope and to speed up its progress.

The most fundamental objective of the European Union, however, remains unchanged: to help raise the living standards and the quality of life of its citizens. This implies improving the growth performance of the EU economy on a sustainable basis; pursuing the way back to full employment in Europe; enhancing productivity and quality in work (better jobs); and fostering social cohesion and inclusion.

During the last five years Europe has been better than the U.S. at creating jobs, and the EU's employment rate has climbed while America's has declined, according to a recent report on Employment in Europe 2004. Contrary to the general view, it is Europe which has been a job machine, US industry lost almost 2,5m jobs in the five-year period while EU industry added 380.000 thanks to booming activities in some countries. The findings could also help dispel growing concerns in Europe about the relocation of jobs to other countries.

However, the increasing importance for employment of ICT and related services might further accelerate restructuring activities and the potential for global job sharing. ICT is at the heart of new business models and working practices. Several targets have largely been met : at the European level, the new European regulatory framework for electronic communications services is in place; the European Social and Regional development funds have been re-oriented to support re-skilling and information society developments at the regional level. The challenges of the knowledge economy have been addressed at national and European level, and effective synergy between all these efforts will be realised.

This report puts together information from Member States, in the context of common European policies and of new research and technology developments supported at the EU level.

Sections 3 and 4 summarise the extent to which collaboration at work has been introduced in Member States, and has contributions from Russia and Japan. Section 5 summarises the directions and priorities for future research and technology development (RTD) in the 6th Framework Programme. Section 6 includes new research results from some of the current EU research activities and those now underway in the European 6th Framework Programme. An updated set of current RTD projects are described in Annex 1.

2. EUROPEAN POLICY FRAMEWORK

2.1. EEUROPE 2002/2005 ACTION PLANS

2.1.1. eEurope 2002

In 1999, the European Commission proposed a new *e*Europe initiative, accelerating Europe's entry into the digital age, and ensuring coherence in the pace of progress of its Member States. The objective of the *e*Europe initiative was an ambitious one: to bring every citizen, school and business online and to exploit the potential of the new economy for growth, employment, and inclusion. The initiative was presented by the Commission to the Lisbon European Council in March 2000.

The eEurope 2002 Action Plan, endorsed at the Feira European Council in June 2000, includes as a key action to "encourage SMEs to Go Digital". As a follow-up to the *e*Europe 2002 Action Plan, the Commission's Communication and Action Plan "Helping SMEs to *Go Digital*"[2] was launched in March 2001.

During the duration of the 'Go Digital' initiative, from the beginning of 2001 till the end of 2002, European SMEs started to gradually move from the simple use of e-mail and websites as enabling tools towards a more holistic approach of integrating ICT in all areas of their business, including advanced Business-to-Business tools. The main achievements were:

- The launch of a benchmarking initiative to assess national and regional public sector policies in support of *e*Business for SMEs
- The establishment of an *e*Business market watch function, to develop and regularly publish a number of quantitative indicators related to the take-up of *e*Business by SMEs
- The launch of an "*e*Business legal portal" to provide an on-line information service, with an overview of relevant *e*Commerce legislation and self-regulatory initiatives
- The Go Digital awareness campaign with more than 70 events all over Europe, aiming to demonstrate the potential benefits of adopting *e*Business and to promote the efficient use of *e*Business by SMEs
- Some 70 take-up projects under the IST programme – the project portfolio received a positive evaluation with respect to its likely impact on encouraging greater ICT take-up by European SMEs

The establishment of an "ICT skills monitoring group" with representatives of all Member States, in order to analyse and monitor the demand for ICT and *e*Business skills.

[2] COM(2001) 136

2.1.2. eEurope 2005

Stimulating use and creating new services therefore became the central goal of the new *e*Europe 2005 Action Plan, which was endorsed by the Seville European Council[3]. By the end of 2005, Europe should have modern online public services (*e*Government, *e*Learning, *e*Health) and a dynamic *e*Business environment, based on the widespread availability of broadband access at competitive prices and a secure information infrastructure.
The Member States gave their commitment to implement the *e*Europe 2005 Action Plan in a resolution of February 2003.
The actions are focusing on the main challenges which have been identified in this area. Although many of these actions comprise aspects which could be classified also otherwise, they have been grouped here under following headings:

- Policy and information actions in the field of law: identifying and removing barriers
- Interoperability and standards: developing interoperable, yet flexible solutions
- Human resources and skills
- Awareness and support

The Commission's communication "Adapting eBusiness policies in a changing environment : the lessons of the Go Digital initiative and the challenges ahead" reviewed for the period 2001-2002, growth in the use of information and communication technologies and *e*Business tools by European business, and notably small and medium-sized enterprises, and the policy challenges that arise from this picture. The first wave of SME policies to promote the use of ICT and *e*Business were mainly based on general targets, such as the "number of SMEs to be connected to the Internet", the "number of employees to be trained", or the "number of consultancy days to be provided to SMEs". As policies move on to promote more sophisticated usage of *e*Business and eventually the full integration of *e*Business into regular business practices, the definition of *e*Business policy objectives and appropriate quantitative and qualitative targets becomes more difficult but at the same time more relevant. *e*Business policies have to move up the "maturity ladder" along with the organisations that constitute the target group.

The new policy challenges for SMEs are :

- To improve the managerial understanding and skills for eBusiness in SMEs
- To promote the availability of SME friendly eBusiness solutions, and
- To facilitate effective participation of SMEs in electronic marketplaces and business networks.

Between 1998 and 2002, under the umbrella of the key action "New Methods of Work and Electronic Commerce" of the FP5 IST programme, more than 70 take-up projects were launched to support the transfer of leading-edge technologies to industry and other end-users. These projects demonstrated the relevance of eBusiness, eCommerce and eWork for the hundreds of participating SMEs throughout Europe. A sample of 22 showcases was published in a book[4]. The contributing showcases make the book a testimony of successful European eBusiness technology take-up funded under the IST programme of the 5th Framework Programme. They have been included in the *e*Europe 2005 Action Plan, showing the benefit of linking policy and technology developments.

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[3] COM(2002) 263

[4] European *e*Business Showcases, ISBN 92-894-5057-6, European Commission, 2003

A major challenge is the lack of mutual recognition of eSkills certifications in Europe. In March 2004 the Competitiveness Council once again stressed the need to promote continuous learning and updating of skills of the labour force and stimulate the integration of ICT into business processes in order to improve productivity.

The European eSkills Forum (eSF), established by the Commission in March 2003, brings together the Commission, Member States, Accessing Countries, Industry, and Social Partners on an open platform to promote consensus building on eSkills issues, such as measurement of the eSkills gap or official recognition of industry training certificates.

The Forum released a report in June 2004 to European and national decision and policy-makers, drawing concrete policy recommendations and proposals for actions. A major conference – European eSkills Conference 2004 – has been organised on 20-21 September in Thessalonica.

The private sector should, supported by the Commission and Member States, develop interoperable eBusiness solutions for transactions, security, signatures, procurement and payments. This will facilitate services enabling seamless, secure and easy cross-border electronic business and mobile commerce. This eEurope 2005 action comprises the consolidation of research results on interoperability for uptake in industry, particularly SMEs, a conference on interoperability followed by recommendations and eventually actions to support the establishment of an Interoperability Institute. In addition, the publication of the Final Blueprint on Mobile Payments, where a preliminary analysis of the existing initiatives, activities and issues is carried out in conjunction with a comprehensive presentation of the current state-of-the-art, is imminent.

2.1.3. Beyond eEurope

The main challenges for European Information Society to 2010 are

- The employment challenge of Europe is reflected in the productivity gap between the US and Europe. The key issue is to apply ICT in the workplace in ways that raise efficiency and the quality of work. Part of the Lisbon agenda was to increase participation in the workforce. ICTs can help in reaching this objective by making work more accessible, for instance to part-time workers and home workers, and possibly by delaying retirement.

- The new research area should be focusing on simultaneous, systemic ICT and application innovation. EU funding together with the EU policy instruments can both speed up the development and more importantly share the risk in the transition towards the new societal and entrepreneurial paradigms.

- Concretely it is suggested that the issues of the Single European Electronic Market (SEEM, in the same sense as the common European Single Market) is fostered as a policy concept for e-employment and high skilled knowledge workers, enabling networked work paradigms to flourish across the sectorial and the national boundaries.

- For the moment the process has been strongly launched from an organisational perspective, but the outstanding IST research issue is how to capture the human centric perspective in an organisation-independent way, to support entirely new network-based methods.

- The suggestion is to focus the research on the productivity and work issue related to the Lisbon objectives as follows: The focus suggested is on ***Global 24/7 collaboration@work application platforms, systems and technologies which support productivity by creative and innovative person-centric working environments***. It is proposed that there is a knowledge worker centric approach, which is applicable in a generic way both in public and private sector; within, across and outside organisations.

- The Lisbon area of employment and productivity can be partially addressed by the research objectives in DG INFSO. Issues such as global outsourcing, which happens especially in ICT and other knowledge based industry needs to be tackled in a coherent way by DG INFSO as well. This requires a strong policy position in the eEurope initiative, backing up the integration of research priorities within FP7 with the policy objectives of the DG. To have the full consensus on the need for the area being strengthened in research a communication is proposed for 2005 on ***ICT drivers for employment***.

2.2. ICTs ACCESS AND USE IN THE EU 2001 - 2003

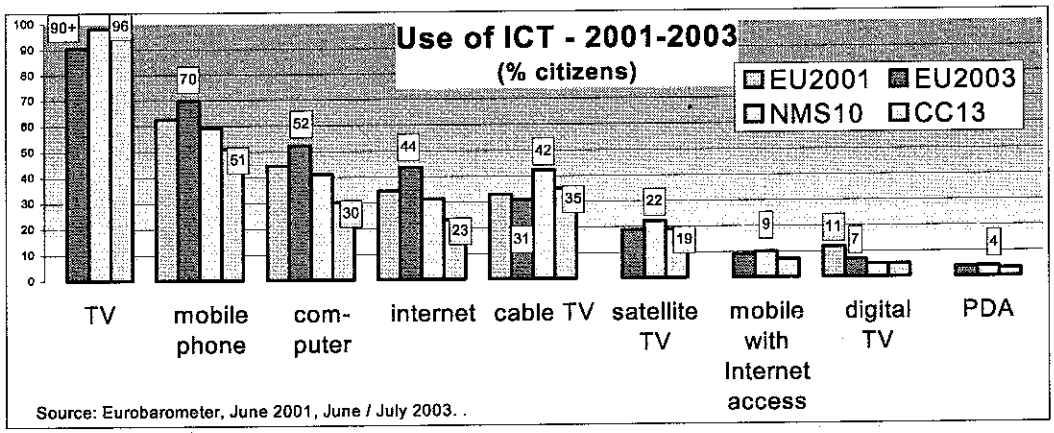
The statistical data presented in this section are mostly based on the Eurobarometer 59.2 / 2003 survey (face-to-face interviews) and have been cross-referenced with national and European data and have been checked by ESDIS. Possible differences in methods of data collection among European and national surveys can lead to some differences in results.

The statistical tables provide a brief overview of the statistical material obtained in the EuroBarometer survey 2003. The data and graphs most relevant to eInclusion and to the Lisbon Process have been included.

2.2.1. A snapshot of the "new media" landscape in an enlarged Europe

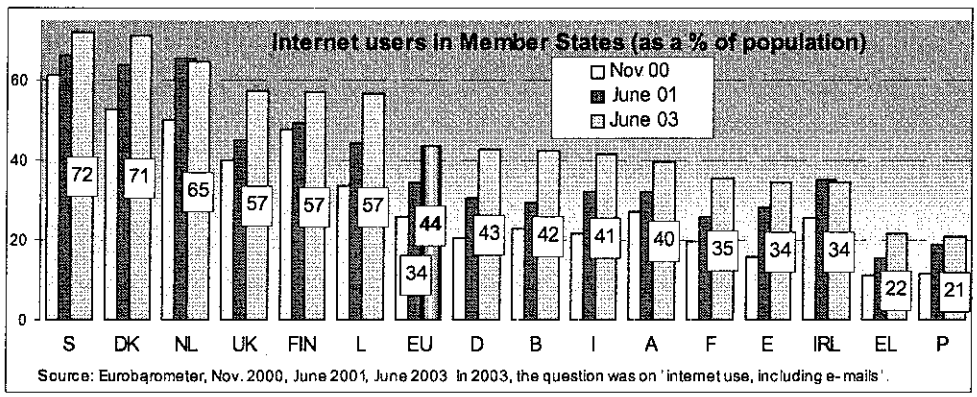
According to the latest Eurobarometer data (59,2 - Summer 2003), **television** is an almost ubiquitous medium in all Member States, Accession and Candidate Countries. The penetration of **mobile phones** is very high in the EU 15 (70%), probably not far from saturation, while still growing in the CC 10 and CC 13 areas. Given the potential of advanced mobile services, this indicates a promising avenue for the expansion of the Information Society.

Slightly more than half of the EU 15 population uses a **computer** in 2003, while only 30% of the CC 13 citizens do. With respect to 2001, **internet penetration in the EU 15** - when measured in terms of internet users as percentage of the total population - has **globally increased from 34,3% to 43,5%**; this trend has affected all considered age groups and socio-economic categories, although to different extents (see section below).

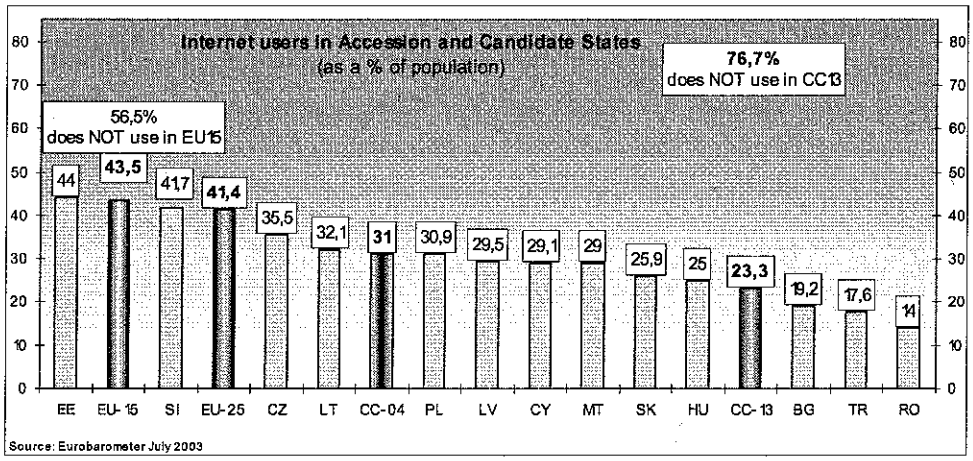


The picture is obviously much more diversified if statistics at country level, and especially at regional level and along the rural/urban divide are considered. In fact, **big disparities** characterise the **"geographical" distribution of access and use of ICT** across Europe.

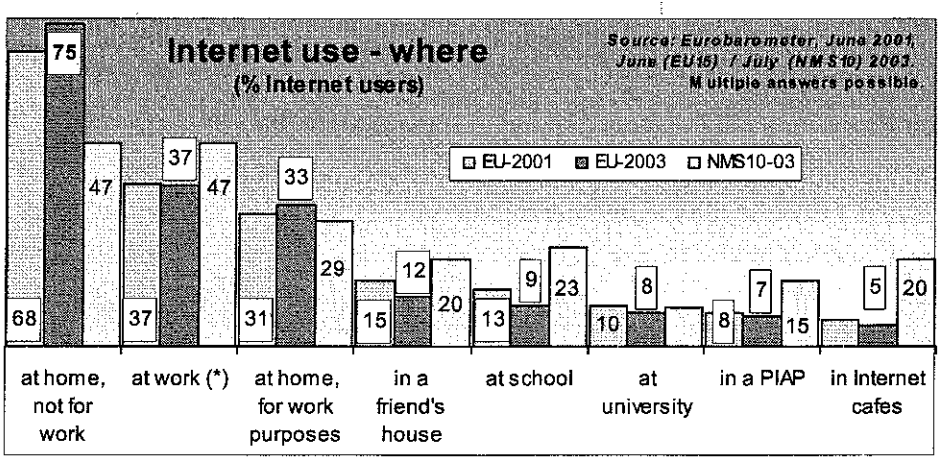
Luxembourg and the UK now join the Nordic countries and Netherlands in scoring an Internet access rate above – or much above - the 50% threshold. A group of countries – such as Italy, Belgium, Austria, Germany are positioned around the EU average; Ireland, Spain and France still have a lower than average access rate (~35%), together with Portugal and Greece (~21%). Between 2001 and 2003, the growth in Internet penetration in the UK, Luxembourg, Germany, Belgium and France has been higher than the European average (+ 10-12% points).



Regarding Internet access in Candidate and Accession Countries, Estonians score with 44% the highest penetration rate - comparable to the EU 15 average - closely followed by Slovenia with 41%. **Thirty-one percent of respondents** from the **2004 new Members** States- and **23% of those from CC-13 countries - use the Internet** in 2003; lowest internet access is found in Bulgaria, Turkey and Romania.

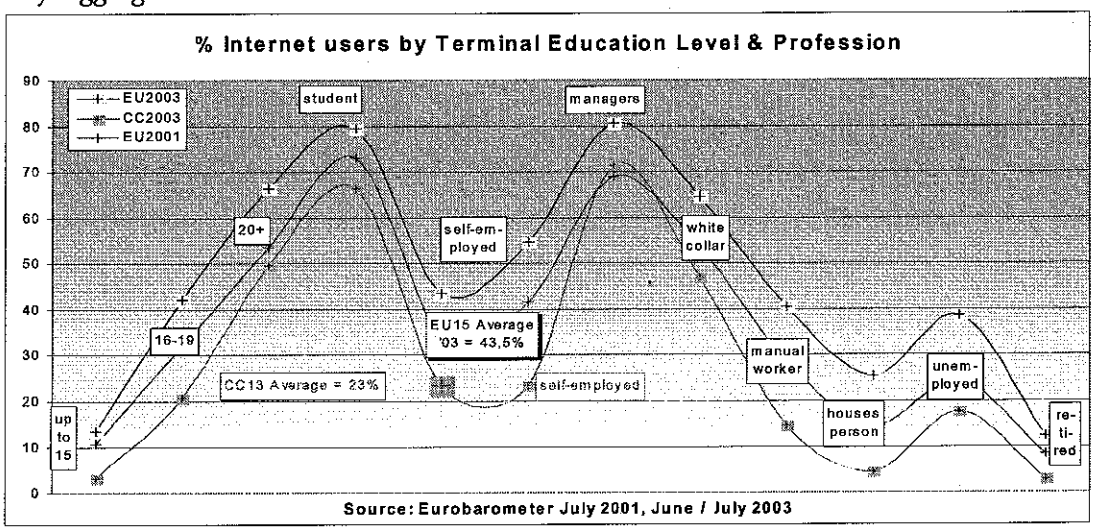


Penetration of **Internet use "at home"** is still **growing in the EU 15** area, affecting **75%** of the citizens online. 33% of them use Internet at home for work purposes, while "only" **37% use Internet at work** (figure unchanged with respect to 2001). Conversely, 47% of Internet users in the new Member States – and 40% in the Candidate Countries – go online at home; 47% and 40% of them, respectively, do it at work: the pattern is considerably different than in the EU 15. As a matter of fact, lower access rates at home are partly counterbalanced by higher use "in a friend's house", at school, at PIAPs and in Internet cafes.

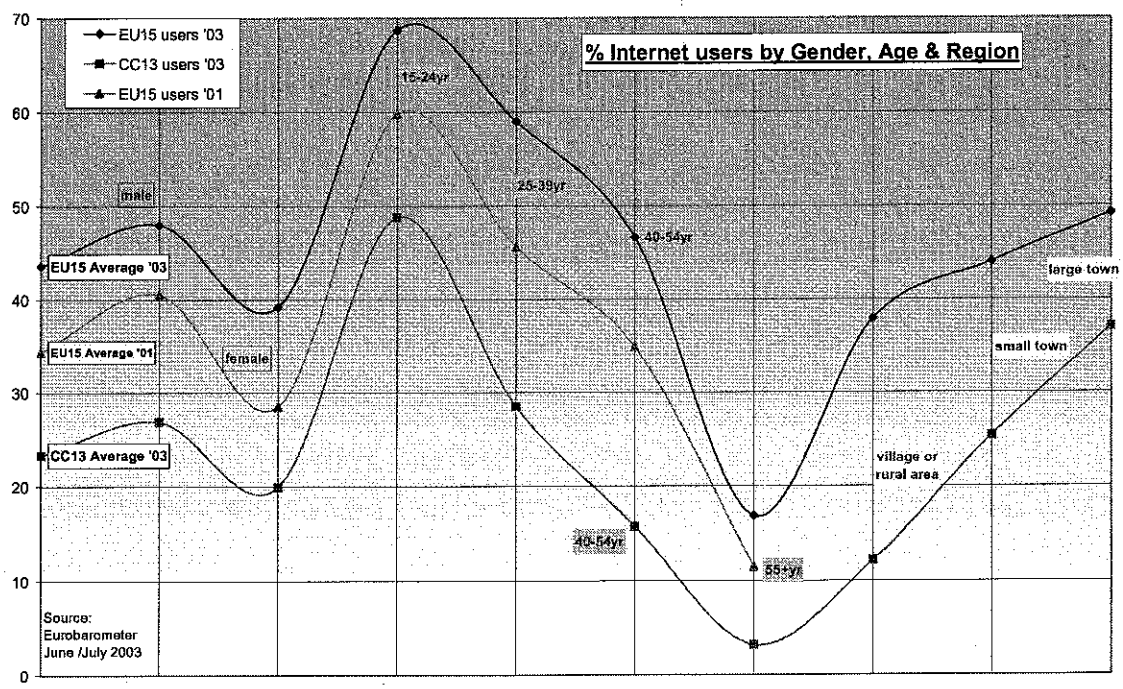


2.2.2. Evolution of Internet use: the trends (by socioeconomic& demographic criteria)

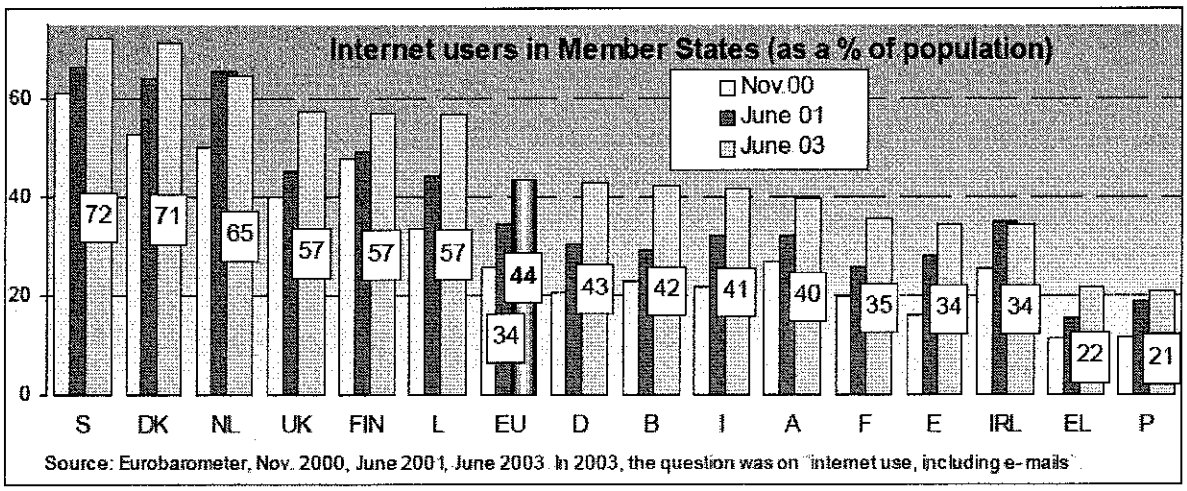
As seen in the previous section, **Internet penetration is rapidly increasing** in the EU 15; this **trend has affected all considered age groups and socio-economic categories**, although **to different extents**. In particular, the increase in access rate has been higher for women than for men, thus showing a trend toward bridging the existing "**gender divide**" within the digital divide. Moreover, access has proportionally increased more among unemployed and self-employed people with respect to populations belonging to other occupation-related categories. On the other side, Internet penetration among **housepersons**, especially women, **older citizens, retired people** and in **rural areas** is clearly lagging behind.

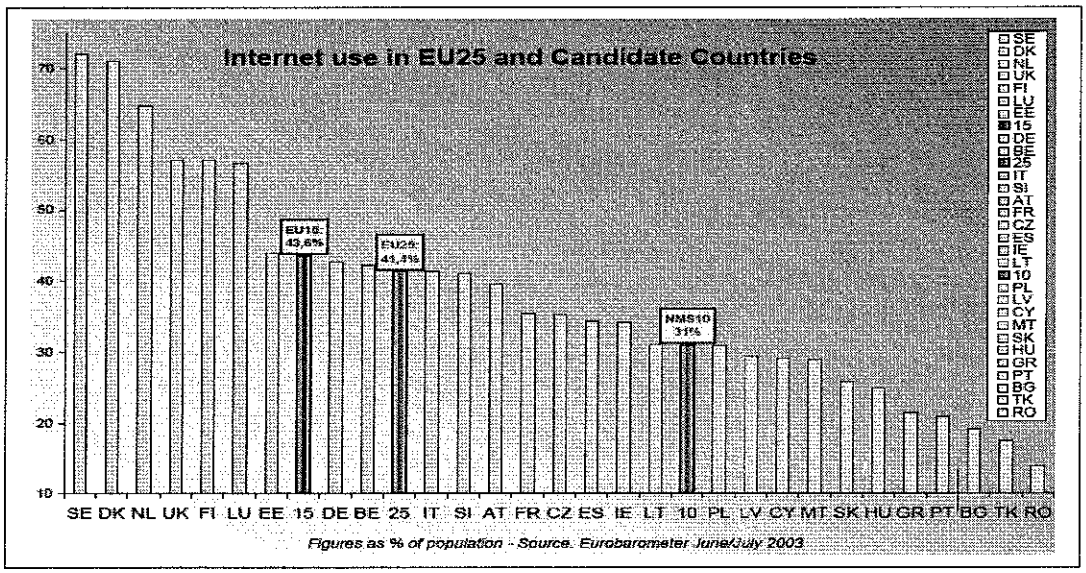


However, in general terms, higher **Internet use** seems to remain clearly and consistently **related to higher educational level and occupational status**. **Gender, age and rural vs. urban location** are other important determinants of access to the "cyberspace". The socio-economic and demographic patterns are similar across the EU 25 zone and over time, even if average penetration rates are higher in the EU 15.

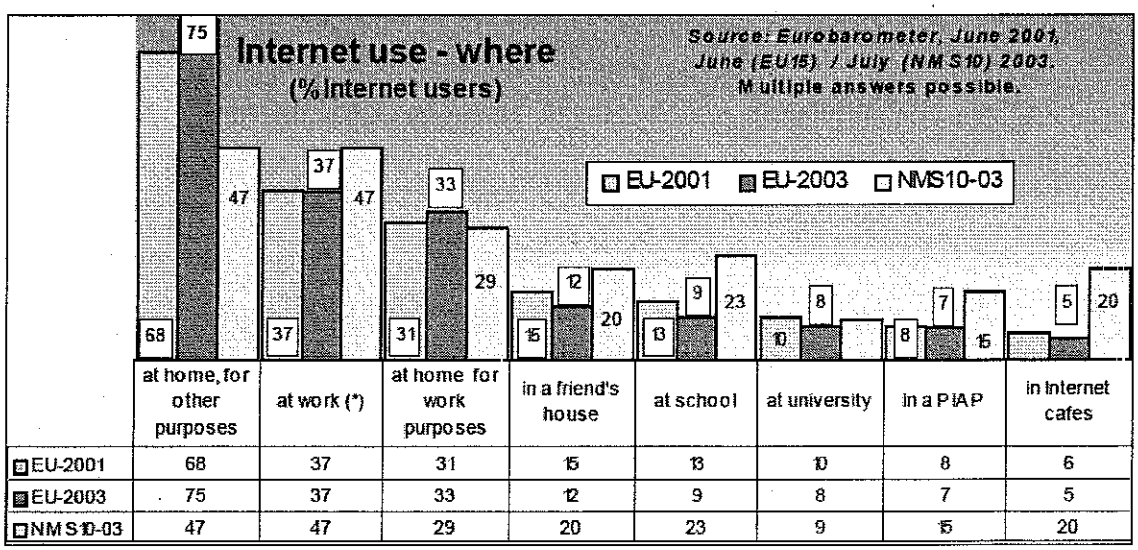


Internet users in Member States and Candidate States (as a % of population)



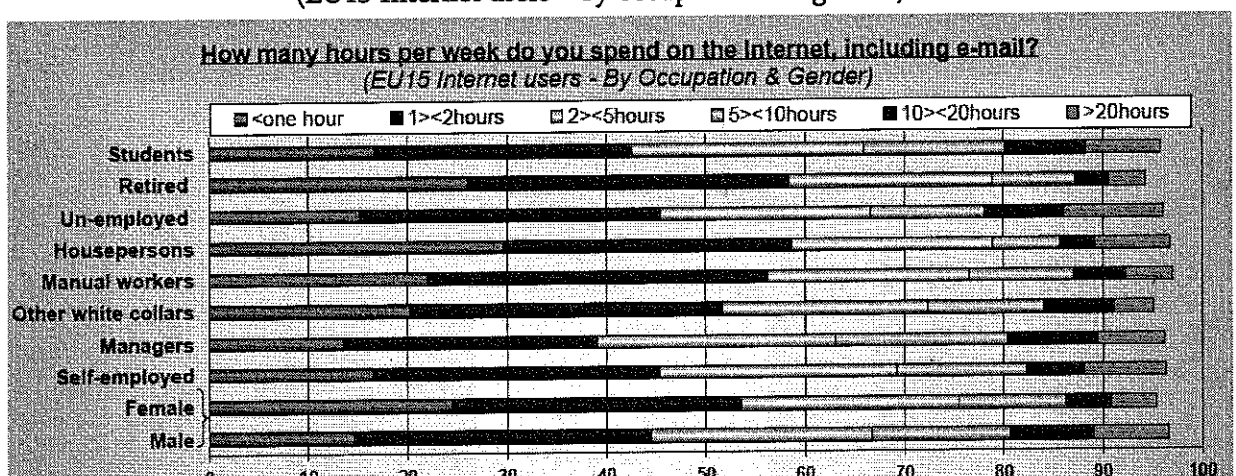


Where do you use Internet, including e-mail ?



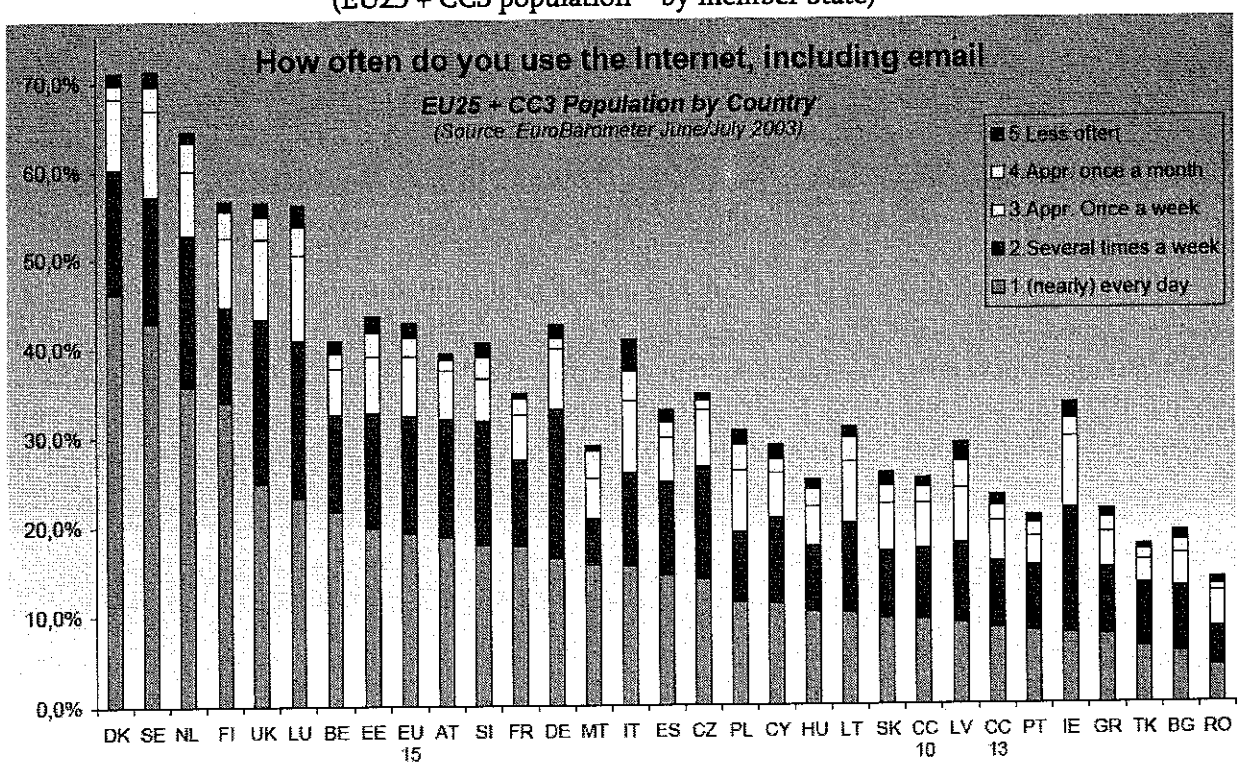
	at home, for other purposes	at work (*)	at home for work purposes	in a friend's house	at school	at university	in a PIAP	in Internet cafes
EU-2001	68	37	31	15	13	10	8	6
EU-2003	75	37	33	12	9	8	7	5
NMS10-03	47	47	29	20	23	9	15	20

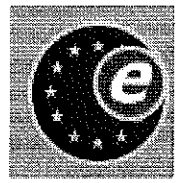
How many hours per week do you spend on the Internet, including e-mail ?
(EU15 Internet users – by occupation and gender)



% EU15 Internet users (EuroBarometer June 2003)	Male	Female	Self-employed	Managers	Other white collars	Manual workers	Housepersons	Un-employed	Retired	Students
>20hours	7,5	4,6	8,2	6,7	4	4,8	7,6	10	3,7	7,5
10><20hours	8,5	4,6	5,8	9,1	7,1	5,2	3,5	8	3,4	8,2
5><10hours	13,9	10,8	13,2	17,3	11,7	10,4	6,9	11,5	8,4	14,2
2><5hours	22,2	21,7	23,8	24,1	20,6	20,4	20,1	21,2	20,4	23,3
1><2hours	29,9	29,3	28,8	25,5	31,5	34,2	29,1	30,2	32,3	25,9
<one hour	14,6	24,4	16,5	13,5	20,2	22	29,6	15,2	26,1	16,7

How often do you use Internet, including e-mail ?
(EU25 + CC3 population – by member State)





2.3. EUROPEAN ESKILLS FORUM

The European eSkills Forum has been established by the European Commission[5] in March 2003 with a view to foster an open dialogue between all relevant stakeholders and to trigger actions to help to narrow the eSkills gap and to address eSkills mismatches.
Some of the key points arising from the work of the forum are reported in the following section. The full synthesis report is available online[6].

2.3.1. eSkills for Europe : towards 2010 and beyond

2.3.1.1. Introduction

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 eBusiness skills (eSkills) are fundamental for the further enhancement and development of productivity and knowledge-intensive products and services.

2.3.1.2. The importance of eSkills

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.

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[5] For further information contact the Enterprise and Industry Directorate-General : http://europa.eu.int/comm/enterprise/index_en.htm

[6] eSkills in Europe: Towards 2010 and Beyond » Synthesis Report of the European eSkills Forum, final, September 2004 See: http://europa.eu.int/comm/enterprise/ict/policy/doc/eSkills-forum-2004-09-fsr.pdf

The term "eSkills" encompasses a wide range of capabilities (knowledge, skills and competences) and issues with an eSkills 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 eSkills covers mainly three categories[7]:

- 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;

- eBusiness 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.

eBusiness 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.

ESkills 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 complex nature of eSkills 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.

During the last few years there have been several attempts to measure eSkills shortages in Europe.

[7] 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.

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. ICT user needs for ICT expertise are believed to be rising steadily.

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.

According to a Cedefop study[8] 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.

2.3.1.3. Strengthening Social Cohesion

The task of broadening and deepening people's eSkills 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 eSkills 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 eSkills means much more than learning new software techniques. 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%[9].

[8] Cedefop 2004 (editor): Towards a Comprehensive European eSkills 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.

[9] European Commission. Final report of the ICT Skills Monitoring Group: "eBusiness and ICT skills in Europe, Benchmarking Member State policy initiatives", December 2002.

Improving eSkills 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%).

Only around one in five ICT students are women. Enterprises and society are losing out on a valuable resource. A more holistic approach to eSkills 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 eSkills further development within a framework which stresses the need for work/life balance. Gender issues need to be mainstreamed within the eSkills debate. 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. 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.

Equality of access to ICT infrastructure is an important issue: however, access is in itself not enough. An approach to eSkills 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 eSkills 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 teleWork, agreed between the social partners in 2002, is a model of the way such issues can be tackled and resolved.

[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 eSkills Forum December 2003.

2.3.1.4. International Aspects of eSkills

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. 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[11] 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.

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 eSkills 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 lie. The longer-term impact of significant international outsourcing is still to be discovered.

The European Union must remain an attractive place to do business, and 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.

2.3.1.5. Future perspectives for eSkills development

Efforts need to be taken to ensure a seamless framework linking basic level eSkills 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.

[11] The Impact of Global Sourcing on the U K Economy, 2003-2010: a study by Evalueserve, commissioned by NASSCOM.

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 eSkills UK and now supported by the SFIA Foundation[12];

- The "Advanced IT Training System (AITTS)"[13] 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[14].

In the United States, the National Workforce Centre for Emerging Technologies (NWCET) "IT Skills Standards" developed standards for the National Skills Standards Board (NSSB)[15].

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[16] 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 eSkills could be an establishment of a European eSkills meta- or reference framework.

A European eSkills 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 could also support European Union public policy goals such as workforce mobility, increased employment security and the creation of a knowledgebased society for all.

2.3.2. 2004 Conference Final Declaration

The European eSkills Forum conference, held in Thessalonica, Greece 20 – 21 September 2004 agreed the following declaration :

The success of the Lisbon strategy and the competitiveness of European industry are dependent on both the effective use of information and communication technology (ICT) for industrial and business processes and the knowledge, skills and competences of existing and new employees. At the same time, it is necessary for Member States and the European Union to respond to global competitive pressure by clarifying the strategic implications of global sourcing and focusing – more strongly than before – on their strengths and assets. This includes a thriving research and development base and the availability of a breadth and depth of skilled labour, performing well with the latest ICT tools and services.

[12] http://www sfia org.uk
[13] http://www bmbf de/pub/the_german_advanced_it_training_system pdf
[14] http://www career-space com
[15] http://www nssb.org
[16] http://www cenorm.be/cenorm/businessdomains/businessdomains/isss/activity/wsict-skills.asp

Efforts need to be made to increase investments in education and training, improve the co-operation between the public and the private sectors, and ensure a seamless framework linking basic eSkills training and more advanced vocational training, higher education and professional development. To enable more people, including women and unemployed people, to have better opportunities to advance their careers in ICT, a European ICT skills and qualifications meta- or reference framework supporting transparency and encouraging upward mobility in skills acquisition would be particularly valuable. Focused multi-stakeholder partnerships offer a potential to strengthen cooperation on education, training and certification between educational or training establishments and enterprises. These partnerships could facilitate adaptation to industrial change.

THE EUROPEAN eSKILLS 2004 CONFERENCE :

Welcomes the Synthesis Report of the European eSkills Forum "eSkills for Europe: Towards 2010 and Beyond"[17] and supports its analysis and recommendations;

Invites the EU to adopt a comprehensive strategy for improving ICT skills and training across all sectors, at all levels and for all citizens and to assist Member States to achieve its full implementation;

Invites stakeholders to work actively together and with EU institutions to ensure that a mechanism for collaboration and dialogue initiated in the European eSkills Forum continues in the coming years;

Recognises that the way forward towards the widening and deepening of eSkills within the EU is through multi-stakeholder dialogue and partnerships for action;

Calls upon all relevant stakeholders to support the following priority actions in 2005 :

- The development of a long-term strategic approach

The importance of the ICT sector and of ICT skills for all sectors should be further promoted taking into account international developments 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, monitor the competitiveness of the ICT sector 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.

- The improvement of data availability about the ICT labour market

The Commission should support the development of eSkills foresight scenarios in co-operation notably with industry, OECD and Cedefop as well as the establishment of a European network of experts. The Commission (Eurostat) and the national statistical institutes should contribute to the assessment and evaluation of eSkills by further developing the methods of measuring eSkills and by collecting, where appropriate, the respective data in line with stakeholders' needs. These

[17] "eSkills in Europe: Towards 2010 and Beyond" Synthesis Report of the European eSkills Forum, final, September 2004. http://europa.eu.int/comm/enterprise/ict/policy/doc/eSkills-forum-2004-09-fsr.pdf

should be made available to help the training providers and enterprises in their strategic and competence or skills planning.

- The promotion of multi-stakeholder partnerships

Dialogue and co-operation between industry, professional associations, social partners, the Commission and Member States should be further improved, and research undertaken into appropriate legal, financial and institutional frameworks for multi-stakeholder partnerships. The development of a European ICT skills and career portal, the networking at the European level of learning centres and the promotion of role models could serve to deliver the benefits of multi-stakeholder partnerships.

- The design of innovative learning solutions

University-Industry co-operation should be encouraged by policy makers and stakeholders to design innovative learning solutions and 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, accreditation and assessment of eSkills at degree and sub-degree levels should be researched with a view to bridge the universes of formal and non-formal education and training.

- The development of a European ICT skills meta-framework

Member States and the Commission should further explore the development of a European ICT skills meta- or reference framework and in this context of European-wide certification standards in ICT in co-operation with the social partners and with the assistance of multi-stakeholder partnerships. They should also encourage and support efforts to increase the transparency of eskills industry certifications and promote appropriate quality standards for public and private certifications and the training industry.

- The reduction of the digital divide

Member States, the Commission together with industry and social partners should further encourage training and promote targeted education resources for the European workforce in basic ICT skills so that it will be "digitally literate". In order to achieve true eGovernment the concept of an eCitizen should be embraced if we want to narrow the existing "digital divide".

3. COUNTRY REPORTS FROM THE EUROPEAN UNION

3.1. AUSTRIA

3.1.1. Background on general economic and employment status

Most relevant information to highlight the current status of economy and employment in Austria comprise data on growth, competitiveness, stability and unemployment.

Following a sharp downturn of economic growth from 3.2% in 2000 to 0.8% (2001), 1.4% (2002) and 0.7% in 2003, expectations are moderate also for this and for the next year:

> *"Economic growth in Austria is set to accelerate to 1.7 percent in real terms in 2004 and 2.4 percent in 2005. In Austria, several indicators point to a pick-up in merchandise exports and manufacturing output Growth of private household spending is reverting only gradually to its long-term trend."*[18]

Since 1995 EU membership is reported to have contributed annualy an average of 0.42% growth of GDP per year – a strong argument in domestic political debates. During this period exports increased by 10.5% per year, a rate surpassed in EU15 comparison only by Ireland (11.2).[19] According to the World Competitiveness Scorebored (IMD, Fraser Institute) Austria ranked 28 in 1995, yet gradually improved its position to number 13 world-wide last year. Relevant economic thrust stems from developments in central and Eastern Europe. Service and industrial businesses from Austria are among the most active investors in the new Member States that accessed the EU on May 1, 2004. New opportunities in extended European markets compensate for rising oil prices and sluggish developments particularly in Germany – a market that tends to become less dominant than it was by tradition.

Overall stability prevails if the Maastricht-criteria are applied: A fiscal surplus of 0.2% in 2001 turned into relatively minor fiscal deficits of 0.3% (2002) and 1.0% (2003), with a forecast of 1.2% in 2004. However, these results primarily derive from three sources: sharp increases of tax revenues, one-time revenues from privatisation of state-owned corporations, and cuts in public contributions to social transfer income. Public debts are decreasing and were at 64.9% of GDP in 2003, a proportion thus very close to the relevant benchmark. Inflation was at 1.8% in 2002, at 1.2 in 2003, but up to 2% in the first half of 2004[20].

EUROSTAT data rate unemployment in Austria at any year since 2001 by 3.4 – 3.8 percentage-pts lower than the EU average. According to Austrian standards unemployment has risen to a long time high of 4.6% (predicted for 2004; 4.5% in 2003, 4.3% in 2002, 3.6% in 2001). „The cyclical recovery will not lead to a turnaround on the labour market towards lower unemployment, because of a marked increase in foreign labour supply. The improvement in private incomes and employment will boost tax revenues and narrow the general government deficit."[21]

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[18] Markus Marterbauer, Business Cycle Recovery Gaining Shape. Economic Outlook for 2004 and 2005

[19] austria perspektiv, 2004: 10 Jahre EU-Referendum. Hintergründe, Fakten, Argumente; Vienna. http://www austriaperspektiv.at

[20] Source : Wirtschaftsforschungsinstitut, Vienna, http://www.wifo.ac.at

[21] Markus Marterbauer, Business Cycle Recovery Gaining Shape. Economic Outlook for 2004 and 2005

3.1.2. Changing patterns of work

Concluding long debates over telework, ecommerce and eEconomy etc., political debate, social partners committees, media and the broad public turn to the core issues of labour market development: Flexibility, mobility, working time regulations and the topics of dependent or independent work as employees, employers or self employed. Within a wide variety of emerging non-standardised and more flexible work-forms, what has been coined „ework" is on the verge of becoming mainstream in more and growing sectors of private and public services and industries.

Numerous measures have been initiated that elevate flexibility and mobility of the work force. Those include employment regimes in public adminstration and the civil service, education and training, trade and commerce, as well as transformations of labour laws and institutions governing labour market developments. Because of such trends one may expect higher degrees of availability of large parts of the Austrian work force to embark on ework in employed and self-employed positions of many kinds.

There is no particular legislation established in Austria concerning ework. However, since 2002 the term „Telearbeit" can be found in decisions ruled by the Supreme Court, and an increasing number of labour laws address the issue, incorporating topics of ework in the framework of the respective competencies (labour protection, homeWork, social security laws etc.). New laws (on eCommerce, 2001; telecommunications, 2003) respond to dynamic changes concerning the establishment and conduct of businesses.

Unprecedented developments of working conditions lead to the formation of new interest groupings in and partly across existing boundaries of employer's and employee's associations (Chambers of Commerce, Trade Unions). Such groupings include organisations addressing specified professional or business interests, all labelled by attributing the "new speak" term, work@ (in English, not in German): work@flex (self employed flexible workers, free lancers), work@professional (managers), work@social (social services), work@education (trainer, teachers), work@IT (ICT experts), work@external (mobile workers), work@migration (immigrants, ethnic businesses).[22]

Meanwhile, based on strong links between social partner's organisations a total of thirteen Collective Agreements address „Telearbeit" (ework of various kinds) among other topics, covering a significant number of some plus/minus 15 percent of the labour force. Draft Work Contracts and tools for the implementation of ework in private businesses and in public administration are available.[23]

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[22] An overview is provided in a new report : Doppel Lena et al , 2003: Status–Bericht. Auf dem Weg von Telearbeit zu eWork, Vienna
http://www.bmwa.gv.at/BMWA/Themen/Arbeitsrecht/Publikationen/Studien/default.htm - on legislation and laws : pp. 46ff; on new interest groupings : p 64 (cf http://www interesse at) The Austrian Trade Union's Congress, OeGB, offers a platform to serve discussion and consultation of self employed and classical freelancers : http://www.oegb at/flexpower

[23] e.g http://www.gpa.at/international/aktuelles/telearbeit.htm - a sample is included in the report mentioned above by Doppel et al., pp 1991ff.; for official recommendations for implementation of eWork in public administration cf. http://www goed.at/tirol/archiv/TelearbeitimBD.doc - more links: http://www.telearbeit at

3.1.3. eWork figures

Statistics on ework, provided by micro-census data from 2002, report a percentage of 3.9% of the total work force performing work according to a strict definition of alternating ework dis-located from the company's premises[24]. Based on definitions of the EMERGENCE employer's survey, a (weighted) total of 53% of the work force applies some kind of eWorking (using IST networks, whether or not working in offices or at dislocated workstations), slightly above the European average of 49%[25]. Only minorities of about 1% of employees are working in telecentres, telecottages or other office premises owned by third parties. Home-based eworking employees make up only roughly 1.5% of the respective work force: the stereotypical employee eworker based solely at home is in fact one of the least popular forms of ework.

3.1.4. IST affecting eWork development

Technical prerequisites in terms of availability of mobile communications technologies and internet access have gone way beyond critical mass and density. In the first quarter of the year 2004 a total of 62% of the Austrian population aged older than 14 had internet access; real users are 56%, and intensive users (several times a week) are 46%. Among the young population (14-19) 91% are internet users. Of people aged between 20 and 49 years an average of 75% are internet users. 50% of Austrians between 50 and 59 use the internet, yet until now only 12% of those 60 or older do so. Private use of the internet still increases; this figure already doubles professional usage from offices or from schools and universities. Online shopping and particularly internetbanking continues to grow at a fast pace and is used now by half of all internet users (AIM, 2004)[26].

Austria has four GSM networks with 87% market penetration. Six UMTS-licences have been sold. According to the authority TKC (Telecommunications Control) all six providers have reached 25% net coverage as required by the end of 2003.[27] The previously (until 2000) broad range of prices narrowed remarkably at lower price segments by the end of 2003 (TKC, Kommunikationsbericht 2003). It appears that in private households fixed line telephones are increasingly used to connect to the internet, whereas mobile phones become the main device for personal tele-communications.

3.1.5. Examples of key projects on eWork

Studies provide evidence that in industry ework is spreading fast: according to a local survey in Vienna already 20% of the companies located here employ what they call "teleworker".[28] According to international comparative research Vienna is one of the top 12 regions in terms of ITC-related occupations in Europe[29].

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[24] There is a broad consensus that in Austria teleworking is understood as alternating teleworking, from 1-2 days a week upwards; cf. Weißbach H.J.,Euro-telework, 2000: Report on telework regulation and social dialogue; http://www.euro-telework.org

[25] http://www.emergence.nu/news/employer.html - for publications particulary referring to Austria, cf. Flecker J., Kirschenhofer S., 2002: Jobs on the move: European Case Studies in Relocating eWork, IES Report 386; Brighton & Flecker, Kirschenhofer, Krenn, Papouschek, 2003: Perceptions of Changes in Working Life and the Impact on Political Orientations. Interim Country Report on Qualitative Findings: Austria; FORBA-Forschungsbericht 01/2003; Vienna

[26] AIM: Austrian Internet Monitor (sample: 18.000 interviews / year; 4 500 quarterly); http://www.integral.co.at

[27] Telekom-Control Austria; http://www.tkc.at

[28] Unternehmensberatung Markant, National Report; http://www.euro-telework.org

[29] U. Huws, N. Jagger, P. Bates, 2001 : Where the Butterfly Alights. The Global Location of eWork; Brighton: IES Report 378 (ISBN 1-85184-307-8).

The concept of ework is not yet as widespread in the public sector. The most advanced eworking schemes in Austrian public administration have been implemented in the provincial government of Upper Austria and in the municipality of Vienna[30]. On federal level two ministries - Ministry of Education, Science and Culture, and Ministry of Transport, Innovation and Technology - are running ework schemes, enabling civil servants to ework from home or to practice mobile eworking. Model contracts as well as a "General Framework Agreement" have been adopted.

Along with many other measures facilitating employment and innovations in labour market stimulation, Territorial Employment Pacts (http://www.pakte.at) support the provision of training for ework and assistance concerning the implementation of ework opportunities. Such projects contributed to the creation and adaptation of tele-cottages (information accessible at http://www.telehaus.at).

Contact	
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[30] Goetzl Ingrid, 2002 : Versuchsprojekt „Telearbeit" im Magistrat der Stadt Wien. Report; Magistratsdirektion Wien - EDV- und Informationsangelegenheiten; Vienna

3.2. ESTONIA

3.2.1. Background

According to the World Economic Forum, Estonia is the most competitive country today among the new EU member states with its competitiveness index of 4.64 points. Due to its liberal tax policy Estonian economy has continued to catch up with the developed European countries with 5.1% GDP increase in 2003 compared with 2002 and with a record low inflation of 1.3%. The Estonian telecommunications sector is one of the most developed in Central and Eastern Europe. The current e-Estonia is characterized by the following statistics:

- All the governmental institutions are computerized and all the schools are provided with an access to the Internet.
- The Internet penetration into the population has gone up to 47% and 87% of the Estonian adult population (age 20 – 74) take advantage of the Internet banking service.
- Up to 38% of the population has a computer at home, 71% of home computers are connected to the Internet and two thirds of children in the age of 6-14 are already Internet users.
- There are 77 mobile connections, compared to 33 fixed telephone lines, per 100 inhabitants and up to 84% of the population uses mobile phones in their every day business.

3.2.2. Information Policy

In Estonia the availability of data communication for all its inhabitants has been declared one of the human rights. The main task of the Estonian information policy is to give a green light to the sustainable information society with the basic block of legislation serving this end already in place (*Personal Data Protection Act, Public Information Act, Digital Signatures Act, Databases Act, Telecommunications Act*). One of the cornerstones of the policy is the principle that a real information society can develop only from initiatives at the grassroots level. The State has two priority fields for developing ICT: education in the native language and public administration. Currently, the following programs (the main projects are highlighted) are under way:

1. Programs for educational development:

    - Project *Tiger Leap Plus* as a follow up of the *Tiger Leap* project, is dedicated to proceed with the development of information and communication technology in Estonian secondary and high schools up to the year 2005.

2. Programs for developing public administration and promoting public management according to the requirements of the information society:

    - *Estonian eGovernment* project is meant to upgrade governmental offices with advanced information technology.
    - *X-Road* project is focused on development of an IT environment for the entire Estonian population to securely interact with the databases of the governmental offices, local municipalities, private enterprises and the third sector institutions.

3. Programs that grow out of the regional policy initiatives and create equal development opportunities everywhere in Estonia:

   - Project *Village Road II* is a national project for the establishment of Internet connection in Estonian public libraries, the establishment of Public Internet Accession Points in them, and provision with workplace computers and software.
   - *eCounty* is a project focused on making all the relevant information about the local county handy to the population by means of advanced ICT following the principle that there is no need for people to move if the problem can be handled by moving the information concerned instead.

4. Research and development programmes necessary for the information society:

   - The *Estonian eVikings* project aims to integrate Estonian leading ICT research and development labs and companies through the everyday collaborative RTD projects much better with European research, industry and innovation networks.

3.2.3. eSociety

Though the ID card was inaugurated in 2002, the large scale application of these IT documents started only in 2003. By the end of the 2003 the number of cards issued reached up to 350 000 which makes almost one quarter of the Estonian entire population in numbers. But the ambitious plan is to reach one million ID cards by the end of 2007 which means that the bulk of the Estonian population would be provided with the integrated electronic identification for their every day business by this date. The first of the governmental offices to put into use the digital signature for the public service was the Estonian Tax Board, recognizing that an eDocument is legally tantamount to the common hard copy one. The second very significant application area of the digital signature was its recognition by the Estonian Ministry of Justice. It means that from now on there is no need to use hard copy documents with the corresponding verification but it can be done to the same effect by eDocuments with a digital signature. The year 2003 was also the incipient year for the use of the ID card in the public transport system to replace the common ticket system in the two main towns in Estonia: Tallinn and Tartu. In work-out stage is the *ePolice* project resulting in using the ID card instead of all other documents needed for one to be in the driving seat of a vehicle.

3.2.4. Internet

Estonia is considered to be the leader in Eastern Europe for broadband DSL access. The Estonian telecom firm Elion has made the ADSL broadband Internet installation kit a common commodity to be self-installed by users and thus available for everyone interested either in business or at home. The number of ADSL Internet connections has grown up to 59,000 by the end of May 2004 (4.4 lines per 100 people). Up to 60% of Estonian enterprises have either ADSL or SDSL Internet access. In addition to the physical Internet access points, there are 297 free wireless Internet zones around the country. There are already about 550 Public Internet Access Points in Estonia and rather soon 200 more Points would be added when all the Estonian libraries will be provided with an access to the Internet.

3.2.5. eWork

The percentage of eWorkers in Estonia is about 4% and one quarter of Estonian firms have some employees with the status of an eWorker. The Estonian telecom firm *ELION* has put on the market a new service EWORK, which provides up to 10 eWorkers with the opportunity of secure communication with the computer network of their firm via the Internet. As Estonia is provided by now all the needed advanced ICT for eWork, one cannot but be optimistic that in the near future the number of eWorkers would rocket up.

Contact	
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relevant Estonian websites	
http://www.riik.ee/en/	the *Estonian State Web Centre* with all the official information about Estonia
http://www.estonica.org/	*Encyclopedia about Estonia*, providing comprehensive information about Estonia
http://www.ee/www/welcome.html	*Estonia Wide Web* is a catalogue of documents related to Estonia in the Internet

3.3. FINLAND

3.3.1. Multi-locational and mobile eWork

eWork as a phenomenon increased much in Finland in the 1990s, when the focus was mostly on telework and especially teleworking at home. Since the turn of the decade (2000), however, the trend of eWork has been an increase in the take-up of mobile eWork and multi-locational eWork, while traditional home based telework has lost somewhat in importance.

According to Statistics Finland (Quality of Work Life Survey 2003), roughly 6% of employees are teleworkers in Finland. The definition of telework used in this survey presumes that employee and employer have made an agreement on telework. The same survey also shows that about 32% of employees say that they spend part of their working time at home. Working for only a very limited number of hours at home seems to have become a very common practice for a large share of workers. EWork clearly exists, but it is not always recognised as such. In any case, there is much evidence that eWork today is more about multi-locational working than working from a home base only.

The result of the Statistics Finland survey match rather well the data from the European SIBIS survey (2002)[31] with regard to home based eWork for more than one day per week. According to SIBIS, traditional home based eWork (more than one workday per week spent at home) in Finland has decreased slightly to 4.7% of all employees, while eWorking for less than one day per week has increased significantly (to 11% of all employees). Mobile eWork has increased in recent years, too, and has involved 6.2% of total employment in 2002.

Only few people define themselves as teleworkers or have made an agreement about eWork with their employer, but the majority of upper white-collar workers are spending some working time at home. On average, these employees work approx. seven hours per week at a computer in their home. Moreover, about 20% of upper white collar workers carry out some work on the premises of customers, 20% while travelling, and many also work at other locations, still[32].

eWork is linked to general flexibility of working time. The use of ICT has created a working culture which is characterised by "being connected all the time". According to the Working Life Barometer (a representative survey of people in employment which is conducted annually) from 2002, there is quite some amount of uncompensated overtime work in Finnish working life. This is partly related to the habit of bringing work home on voluntary basis. Such working at home has, however, changed its character because today, most employees can be reached at any time via the Internet and mobile phones, at least in principle. In a typical week, 39% of Finnish employees overall, and even 62% of upper white collar workers, are in contact with their workplace outside of normal working hours, via mobile phones or a data network such as the Internet[33].

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[31] SIBIS Statistical Indicators Benchmarking the Information Society, Empirica, www.sibis-eu.org

[32] Raija Julkunen, Jouko Nätti ja Timo Anttila; Aikanyrjähdys Keskiluokka tietotyön puristuksessa, Vastapaino 2004.

[33] Ylöstalo Pekka; Työolobarometri, Lokakuu 2002. Työministeriö, Työpoliittinen tutkimus 250

3.3.2. eWork potential is centre-oriented

In Finland the implementation of eWork has often been linked to decentralisation of business and public organisations. Nevertheless, there is evidence that 40% of all eWorkers in Finland locate in the capital region. The greatest amount, both proportionately and absolutely, of jobs which can be organised as eWork locate in the capital city of Helsinki.[34] Already in 1998, a study "The analysis of the Finnish telework potential" had shown that the telework potential in Finland is very much concentrated in the country's most dynamic regions. The great majority of potential teleworkers are to be found in Finland's five biggest cities.[35]

3.3.3. Legislation and agreements between the social partners

While labour legislation is setting the parameters in which the conditions for work develop in a country, the take-up of eWork is also affected by the type of labour market agreements, by company policy and by the development of professional skills of employees. The motives for implementing eWork are linked to job requirements, time management, and efficiency. This can be interpreted as an effort to manage the working process by modifying the working space and interspersing and prioritising working and personal activities.

In Finland there is no special labour legislation for eWork. Rather, telework is regulated by an application of existing labour legislation and collective agreements. In some sectors, such as in banking and insurance, joint recommendations for telework practices have been agreed on between employer and employee representatives. For the IT sector, a number of telework agreements have been reached at company level. Meanwhile, the social partners are currently negotiating the implementation of the European Framework Agreement on Telework. The outcome of this process is expected by summer 2005.

Experience has shown that the main problems with regard to eWork implementation do not have to do with legislation, but rather with the management of time, especially the threat of fragmented but holistic and prolonged working hours. Therefore, today there is a need to focus the discussion on eWork not only on labour market issues but also on lifestyle choices and personal preferences in order to improve time management and work-life balance.

3.3.4. Government initiatives

The public sector in Finland is in a process of extending the use of electronic applications across all areas of services. In the context of a new approach to governance, the Finnish Government has launched broad, intersectoral policy programmes aiming at the horizontal coordination and implementation of public actions promoting employment, entrepreneurship, an inclusive information society and civil participation. The Information Society Programme of the Finnish Government aims to boost competitiveness and productivity, to promote social and regional

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[34] Helminen, Ristimäki, Oinonen 2003, Etätyö ja työmatkat Suomessa. Ympäristöministeriö KESTY. Suomen Ympäristö 611. Edita Prima Oy, Helsinki

[35] Heinonen, S. Analysis of the Finnish Telework Potential – Calculation model, ESF publication 34/98, Helsinki: Edita Helsinki. 1998.

equality and to improve citizens' well-being and quality of life through effective utilisation of information and communications technologies in all sectors of society.

The national co-operation group on eWork, founded in April 2002 based on a government decision on principles for co-operation, has been very active in 2003 and the first half of 2004. It has published a report[36] on eWork in Finland 2003, and has produced action guidelines for improving the preconditions for spreading eWork. The group has also organised seminars and financed dedicated research on eWork. The co-operation group supports the systematic implementation of eWork and decentralised work, and pushes forward the formation of an eWork skills network. All ministries, which have a stake in the development of eWork are summoned as members of the co-operation body. The co-operation also involves the representatives of the social partners. The group is co-operating with the European Social Fund (ESF). In spring 2003 a new ESF coordinating project on eWork was launched in Finland.

3.3.5. Development of working life and sustainability

The Technical Research Centre of Finland (VTT) has developed a globally unique technology barometer, or Economic Barometer, that measures the state of technological and scientific expertise in a given country. For this purpose, VTT collected comparable measurement data from seven countries. Taking into account all of the 12 indicators included in the barometer, in a country ranking Finland holds second position after Sweden.[37]

However, technology is only one of the conditions for economic progress and the development of working life. Other important factors include the ability to harness and generate human and network based know-how and to achieve sustainable productivity increases. At company level, innovation is of crucial importance, since only innovative activity leads to new products and improved business processes. In this respect the nature of work organisation is a relevant issue. The implementation of eWork is very much linked to the management and business cultures to be found in organisations. A comprehensive development of work organisations with the aim to improve productivity and increase quality of working life can be seen as a vital tool for promoting a supportive culture for eWork, too.

In future there will be a great deal of technological diversity, which will probably lead to different kinds of tools and content/equipment that is individually tailored to personal needs and abilities. Such technological progress will help us to create a sustainable future – but only if we use high technology to build better social machinery – what may be called "social high tech". The task of socially sustainable technology will then be to help people, communities and nations to avoid inequalities and diminish digital divides. In the near future, better decision-making and planning processes, better information, better education systems, and much technological innovation will be needed to help in this social task. Technology is a tool, not the target. In practice this means

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[36] Hanhike Iiina (ed.): EWork in Finland 2003, Report and action guidelines of eWork co-operation group (In Finnish) Ministry of Labour, Edita Prima Oy, Helsinki 2004
http://www.mol.fi/julkaisut/etyosuomessa2003.pdf

[37] Naumanen, Mika; Knowledge society barometer, 2004. European Foundation for the Improvement of Living and Working Conditions, Dublin. http://www.eurofound.eu.int/publications/files/EF0416EN.pdf

that we need new types of social innovations such as eWork, immaterial products and eServices, and new local and global markets to be created through networking.[38]

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relevant Finnish eWork publications in 2004	
Hanhike Tiina (ed.): EWork in Finland 2003, Report and action guidelines of eWork co-operation group (In Finnish)	Ministry of Labour, Edita Prima Oy, Helsinki 2004 http://www.mol.fi/julkaisut/etyosuomessa2003.pdf
Helle Minna: Etätyö	Edita Publishing Oy, Helsinki 2004

[38] Hietanen Olli (2003) Eight challenges for the creation of a sustainable information society. Complied and edited from the Finland Futures Research Centre's research reports by Olli Hietanen. Turku School of Economics and Business Administration. Finland Futures Research Centre http://www.tukkk.fi/tutu/. Presented by poster in WSIS – conference, Geneva 9. – 12.12.2003. The Eco-Information society: Criteria and operational possibilities. http://www.tukkk.fi/tutu/etieto/english.htm

3.4. FRANCE

The last few months have been very busy from a legal point of view in France as actions are taken to boost the progress of the country into the information society. France is well known for being generally late in transposing EU directives; but, on the other hand, France is a forerunner in many legal aspects related to privacy with respect to ICT.

3.4.1. Legal and regulatory context

Two major laws were recently voted in after long debates and are the new basis for regulation of the digital economy in France. The first one called "Loi pour la confiance dans l'économie numérique or LEN"[39] was published on June 22, 2004 and the second one called "loi sur les communications électroniques ou paquet telecom"[40] was published on July 10, 2004.

The LEN law of which the full text can be found at[41] regulates all aspects of the new national digital environment and redefines all major items of the digital economy such as providers and their responsibilities, electronic commerce, etc. The major headlines of the law are :

- Freedom of online communication
- Electronic commerce
- Security in the digital economy
- Satellite systems
- ICT development
- Final arrangements

The preparation and voting on this fundamental law has been a long process that took months and a good summary of the debate can be found on the Internet Rights Forum's website[42].
A key issue handled by this new law is the responsibility of the internet provider towards the content.

The second law or "telecom pack" is the result of the transposition of a set of six EU directives voted by the European parliament on March 7, 2002. The consultation and the voting processes have been quite long due to the fact that the transposition affected existing laws and organisations such as the CNIL (Commission Nationale de l'Informatique et des Libertés) created in January 1978[43]. This lead to a special consultation with the constitutional council; the detailed recommendation can be found at http://www.conseil-constitutionnel.fr/decision/2004/2004497/index.htm.

[39] Law for trust in the digital economy
[40] Law for digital communication or «telecom pack»
[41] LEN law : http://www.legifrance.gouv.fr/WAspad/UnTexteDeJorf?numjo=ECOX0200175L
[42] Internet Rights Forum website : http://www.foruminternet.org/publications/lire.phtml?id=734
[43] CNIL : www.cnil.fr

Globally speaking to find out about legislative and regulation aspects in the digital economy in France, visit three websites :

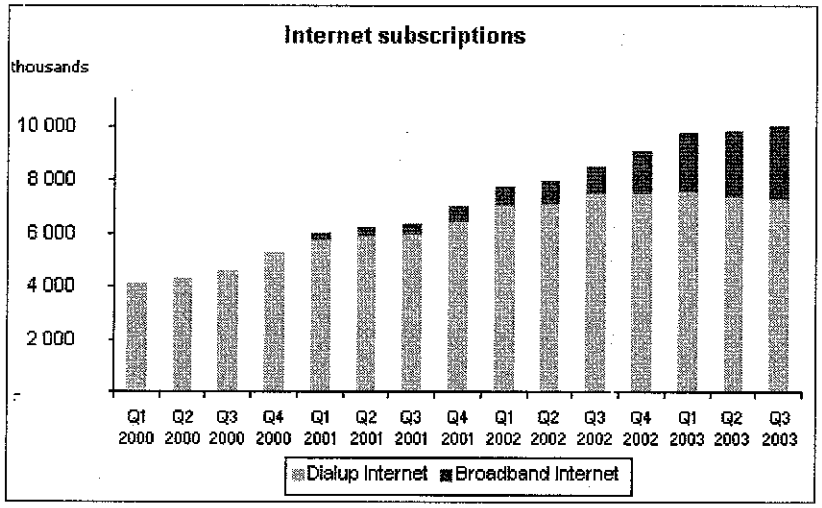
- ART : Autorité de Régulation des Télécommunication[44] : www.art-telecom.fr
- CNIL : www.cnil.fr
- Forum des Droits sur l'Internet : www.foruminternet.org

3.4.2. Information Society figures

As did all the EU member states, France provided the EU Commission, 2004 with it's broadband strategy in the framework of eEurope on March 22. All details can be found at http://www.telecom.gouv.fr/internet/index.htm. Further, the French Telecommunications regulator has opened a number of observatories where one can follow the evolution of the major figures related to the information society. Those are available in an English version at the site : http://www.art-telecom.fr/eng/index.htm.

3.4.2.1. Internet

At the end of March 2004 there were close to 11 million internet connections out of which 4,5 million are broadband (DSL and cable) as shown on the table provided by ART.



3.4.2.2. Mobile phones

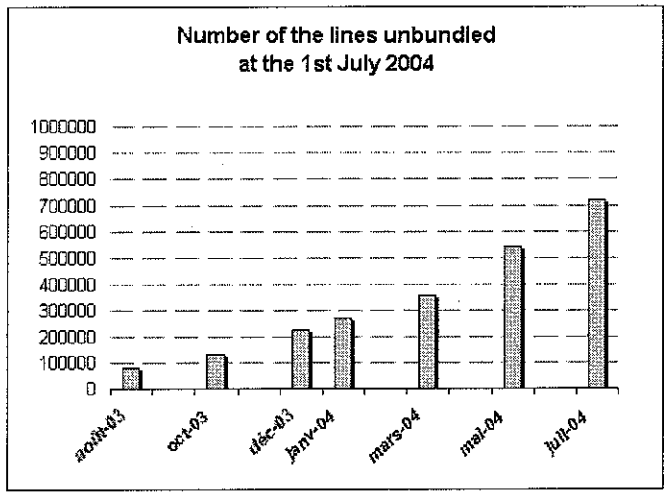
ART provides the following figures for the evolution of mobile telephony in France. In 2003, there were 41,7 million users and the negative growth of fixed lines started in 2002 to the advantage of mobile phones. The SMS phenomenon which started in 2000, has reached 8490 millions of units in 2003 with a growth rate of 53,7%.

Units	31/12/99	31/12/00	31/12/01	31/12/02	Change
Mobile telephony	20.619.563	29.644.771	36.997.400	38.585.200	+ 4,29%
Flat-rate packages	13.261.159	15.838.312	18.936.800	21.479.700	+13,43%
Prepaid cards	7.279.489	13.806.459	18.060.600	17.105.500	- 5,29%

[44] ART = French Telecommunications Regulator

3.4.2.3. Unbundling

At 1st July 2004, 730 720 lines had been unbundled (717 654 partially unbundled and 13 066 fully unbundled)[45]. During the first half year 2004, partial unbundling continued its strong growth, which had been observed since mid 2003, with the number of accesses multiplied by a factor of 2.5. During the same period, full unbundling really took off, with the number of accesses quadrupling.



3.4.3. eWork and Collaborative work

New methods of organising work has never been a major topic for debate in France. Working time reduction has been at the forefront in recent years with an indirect impact on work organisation as in many cases the number of employees remained the same, but working less time and having to produce the same quantity of output.

But the topic regained some interest in July 2003 when the Minister of Labour and Social Affairs entrusted the Forum des Droits sur l'Internet with an "eWork Mission"[46] and asking to :

- Study those new methods of organising work
- Measure their impact, benchmarking international experiences
- Make legal recommendations

A working group47 has been appointed for one year and the recommendations will be presented to the Minister early October 2004. This was the opportunity to organise hearings with all the social bodies who unanimously recognise the interest of the European Telework Framework agreement.

But a lot of work has been dedicated to a directly eWork related topic which is cybermonitoring or eMonitoring of employees by the CNIL. An updated version of the specialised report was published in 2004 and the Supreme Court of Appeal made it clear last April by deciding that

[45] Source is ARI : http://www art-telecom.fr/eng/index htm

[46] Mission letter : http://www foruminternet.org/telechargement/forum/ltmission-etravail.pdf

[47] Composition of the working group : http://www foruminternet.org/groupes_travail/lire.phtml?id=656

individual monitoring systems have to be declared to the CNIL and employees must be informed of their existence[48].

If new methods of work develop mainly on an informal basis in the country, some companies have very pro-active actions to favour new methods of work. This is the case of IBM France which has developed neighbourhood offices owned by the company.

IBM France - neighbourhood offices

In 1994 , IBM France started a reflection on the reorganization of its real estate strategy. This was based on two facts : the increasing price of the space and a strong concern from employees about their work/life balance and increasing workload.
With the continuous evolution of technology and equipment enabling work from different locations , the Company set up the Mobility Project.

As a first step this was put in place for the already nomadic sales staff. As these employees spend much time at customer sites, it was decided to share the office space, meaning to have less desks than people as they never are all together at the same time in the office. Each employee was then equipped with a portable computer and a "bip-bop" , the ancestor of mobile phone.

Further reflections on work from home were stopped by serious non acceptance by employees, mainly due to their own space availability and to the fact that they didn't really want to mix private life and work. Beside that, it must be mentioned that there was, and still is, no real legal status for home working employees (accidents / insurance /expenses etc.). Therefore a more innovative project took over the nomad approach.

With "MOBILITY" IBM started to put the Company closer to the employees, by creating satellite buildings (also called Proximity locations) based on the mapping of the commuting density of IBM'ers living in the Parisian suburbs starting in 1999. In total 8 satellite buildings were opened by mid 2000 . The Enterprise is now close to the employees.

The satellite buildings

The satellite buildings are nothing more than spaces , equipped with all the same technical facilities as the main IBM building at La Défense, of course shared spaces where no identified department is located. This means that they are open to any employee who has chosen to use them. Becoming mobile is voluntary. To do so an employee just has to get his management approval to work from 1 to 3 days a week in any of these locations. That approval is reversible on employee or manager decision. They continue to meet at the main location in the space dedicated to their department. In that case they don't have a dedicated desk anymore at that main location.

Important : a phone facility has been implemented to allow these employees to keep their number wherever they are. So they never have to specify in advance where they will be and can be reached anytime.

[48] More can be found at :
http://www.cnil.fr/index.php?id=1549&encryptionKey=&news[cur]=2&news[uid]=127&cHash=e80a61e788.

Mentality changes become necessary

This kind of working organisation supposes that the employees have a great autonomy in the way they work. Trust , from management about employee as well as the reverse, is the key condition to work in a mobile environment. Mentality and culture must evolve. This kind of mobility is in fact very structuring for work , both for managers and employees, as it implies to stop working in a constant interruptive way and obliges them to have a more planned way of working.

Some results :

Success factors - To implement such a system, the satellite buildings must be attractive to compensate for the natural tendency to go and join the team and management at the main location. This is why there is a person in each location, secretarial type, in charge of all the logistics to make sure the employees have all they need to accomplish their tasks. This is also why parking and food facilities have been thoroughly checked. Advantages must be clear versus the main location.

Inhibitors - One comes from the managers who are not always happy about not seeing their employees close to them. Some are still very attached to the image of their departments in terms of number of people and space allocated to them. Another comes from the employees. They like to identify themselves to a team being close to their colleagues and wanting to be close to management as well.

Some figures - From the 8.000 employees located in the Paris area, 5.000 have jobs compatible with a certain level of mobility. By year end 2000, 1.600 employees have chosen this way of working. End 2001 they were 2.500 reaching 3.500 today. The average duration per week in a satellite building is 1,5 days. Their profile is always : very high autonomy. For the Company the space savings are now under control as several main locations have been closed. Note that the savings usually occur with some delays due to the lease or sale constraints.

Important hints - This type of programme has much more human relation issues than logistic ones. Mindset and relation driven changes are more difficult to manage than material ones. Amongst the reasons why employees choose this mobile environment are :

- Time savings (commuting) of course but also , very strongly appreciated :
- New way of working and organizing
- Far less stress (confirmed by medicals)
- Less agitation in work and more planned approach
- Very improved work/life balance

And just one more point : no mobile employee has chosen to go back to the previous situation.

by Jean Hildbrand, Mobility Program Manager at IBM France

If eWork hasn't developed in a spectacular way in France, collaborative tools are gaining ground and the growing success of solutions like mayeticVillage[49] in large accounts shows that in those companies intranet is evolving towards a services solution based on collaboration. A few words from the two co-founders explains their philosophy about eOrganisation :

eOrganization : myth or fact ?

A fact, obviously! But there's a caveat... although all the necessary technologies are readily available, many employees are resisting the change which they think will infringe on their worker's rights... Why is it so? Why is society unwilling to embrace technological changes more rapidly?

At Mayetic (30 employees), over the past 8 years, we have experimented with a 100% eWork, office-less organization model. And we have implemented what we believe will be at the core of tomorrow's organizations: employees capable of working from any location, a strong and cohesive business, great teamwork, a necessary hierarchical model, a business culture, etc.

In our experience, this can be done successfully. But a few preliminary conditions must be met. We have found four such complimentary, interdependent and critical conditions, which we name the "4 pillars of eOriganization".

First Pillar: **eCollaboation**. A collaborative information system must be widely available. It should be simple enough to be useable without computer knowledge and to allow users to be fully autonomous. Asynchronous functionalities (workspace, forum, information and document publication, versioning, workflow, private spaces, member management, etc...) and synchronous features (awareness, chat, application sharing, survey, whiteboard, etc...) should be available from any location. This requires a rock-solid network infrastructure (within corporate walls or at the worker's homes if needed): an "always-on", high-speed, secure connection must be available at all times. But although eCollaboration is critical, it is not sufficient.

Second Pillar: **eWork**. eCollaboration is an eWork enabler. "eWork" means the capacity to work from any location by accessing the corporate information system. Access should be universally available, from within corporate offices, work-centers, hotels or from home. But eWork also requires a strong management commitment to virtual teams. And above and beyond Mayetic's completely office-less model, employees should become fully mobile even within corporate walls. But that's not all.

Third Pillar: **eManagement**. Many eWork experiences end in failure. The problem generally comes from managers who fail to manage remote employees effectively. EManagement is indeed a lot harder than eWork itself, especially in Latin-type cultures where things rarely get done without the physical presence of a manager. This is the greatest organizational challenge. Quite logically, eManagers at all levels should first be mobile workers themselves. They should be first to experience, understand and integrate eOrganizational methodologies and let them trickle down naturally to the rest of the enterprise.

[49] www.mayeticvillage.com from the company Mayetic : www.mayetic.com

Fourth Pillar: **Team rewards**. The last indispensable pillar of successful eOrganizations, in which members of the same team don't meet as often, is a reward structure based on team performance. For example, members of the sales team should receive a bonus based on the global performance of the team. Cross-functional bonuses (for example, marketing/sales) can also be established to encourage a strong cohesiveness and sense of common purpose. Group performance should be strongly encouraged and over-emphasized.

We believe that these 4 pillars lay the foundations of successful eOrganizations. They are the result of 8 years of concrete daily experimentation by all Mayetic employees. They are therefore pragmatic, applicable to any enterprise, and should be applied in sequence: each pillar is critical to the success of the next pillar.

This type of organization has many benefits: lower turnover, increased productivity of employees and of the company as a whole, increased reliability and commitment of employees, better expression of individual and collective creativity, and many other benefits that we keep discovering every day.

Take the first step and be the first to reap the rewards!

Bruno de Beauregard & Miguel Membrado
Cofounders, Mayetic

The development of better ICT infrastructures throughout France inspires also eWork related initiatives such as the "Village des Télétravailleurs" in Essay (Orne department which is located in the Basse Normandie region)

Village des télétravailleurs

The project «Village des télétravailleurs» was launched in May 2004 in Essay, a small municipality of 530 inhabitants located in the Orne department in Normandy ; 180 km from Paris. The objective is to pull together complementary competences in the same location to boost business solidarity and generate the «network effect»

This «village» is mainly for independent workers, SME managers and SOHOs in the field of graphical arts (such as graphical designers, illustrators, designers, photographers and web designers) as well as complementary professions such as writers, ICT developers, translators, editors, librarians and book related professions.

The team who initiated the «village» cares particularly about the welcome of the new teleworker : «sponsorship» by an elected representative or an inhabitant to help the implementation (coaching, local equipment and resources, etc.), integration in local networks (business associations, local press, political representatives, etc.), information collection about housing for professional and/or private use (renting, purchase, legal issues for property access), availability of a meeting place with a well equipped meeting room (possibility to share with other activities; shared secretary services and equipment) and broadband access based on Wimax technology.

The selection of the candidates (40 in June 2004) is done by the SICLER association, specialised in the implementation of activities in rural zones. The first three candidates should be installed and operational by end of 2004.

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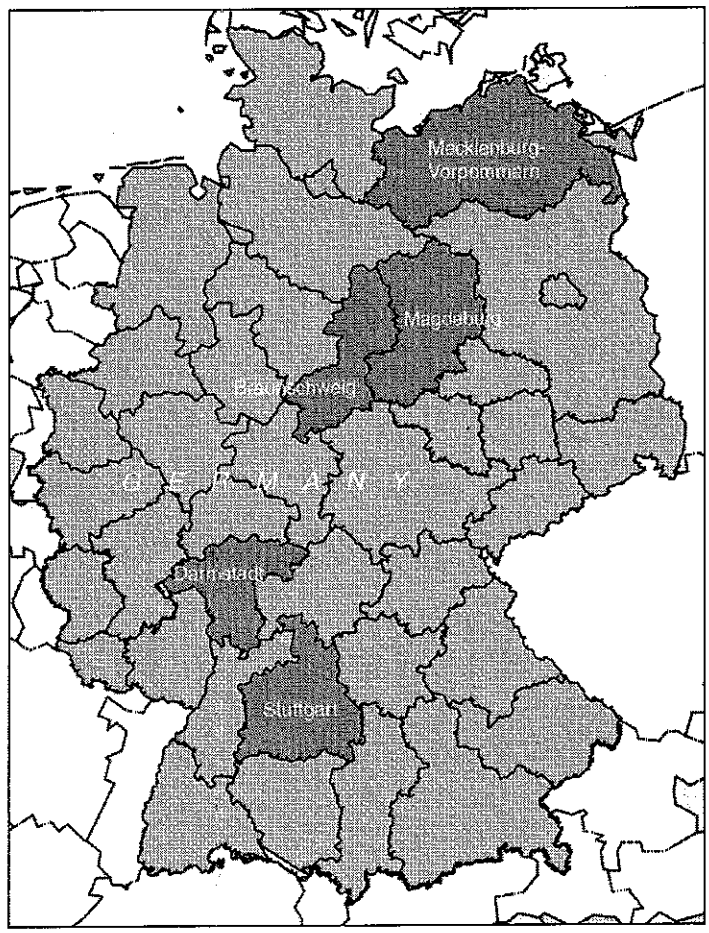
3.5. GERMANY

3.5.1. New data show a high level of uptake compared to the rest of Europe – but strong disparities between regions

Data which was collected in early 2003 in the context of the BISER project show that German regions compare well to the rest of the EU15 with regard to the share of multi-locational eWorkers, and also when looking at people tele-cooperating at their workplace. All five German regions covered in the survey (see figure) have above-average relative numbers of home-based teleworkers.

There are, however, considerable differences between regions inside of Germany, especially between the *Regierungsbezirke* from the former East Germany and those from the West. In the Darmstadt region (which comprises Frankfurt, the international financial centre which is also home to a large number of headquarters of multi-national corporations), already one in five workers spends some paid working time at home, and more than 50% cooperate with external work contacts by means of e-mail and the Internet. In Mecklenburg-Western Pomerania, meanwhile, shares of multilocational eWorkers are only half as high.



The BISER analysis showed that this is *not* due to differences in the take-up of ICTs as such: Levels of Internet diffusion and usage in the eastern parts of Germany have nearly reached West German levels. This result has been confirmed by 2004 data published recently as part of the (N)Onliner Atlas 2004[50].

[50] See http://www.nonliner-atlas.de/

Table: Spread of multi-locational eWork and tele-cooperation in German BISER regions (in%)

Region	Multi-locational eWork			Tele-cooperation	Centrality (ASPiRE)[51]
	Teleworking at home	Mobile teleworking	any (excluding overlaps)		
Mecklenburg-Western Pomerania	8.9	4.9	11.3	41.5	89.6
Magdeburg	9.8	2.6	10.8	38.4	158.7
Braunschweig	10.0	3.3	12.2	43.0	195.8
Stuttgart	12.0	7.4	15.7	53.5	229.0
Darmstadt	20.5	4.9	22.7	55.6	264.2
by comparison: BISER EU15 average	*8.7*	*4.7*	*11.6*	*38.9*	-

Base: all persons in paid work. Data source: BISER RPS 2003, weighted.

Regional disparities in the take-up of eWork in Germany may partly be explained by centrality, as measured by the AsPIRE project. In regions which are more central in a geographical sense (at the EU level), eWorking is significantly more wide-spread than in more peripheral regions (see last column in table above). The same pattern was also found in the U.K., in Italy and (somewhat less clearly) in France. The BISER surveys were conducted via CATI (computer aided telephone interviews) in 2003 in 28 EU regions, carefully selected to represent the variety of types of regions to be found in Europe[52]. More information is available from the authors or at www.biser-eu.com.

3.5.2. eWork in German organisations

Until the late 1990s, balancing employees' interests with those of business has often been the spur for introducing eWork in German companies. The opportunity to practise home-based eWork was offered either to appear as a more attractive employer on the labour market or to retain employees. While it was expected from management that costs for investments in eWork equipment and maintenance would at least be covered by savings, calculations were often done in form of rough guesses only. Apart from these primarily socio-politically motivated eWork projects, there have always been those which have been implemented as a result of particular circumstances. There are examples here of expanding businesses which react to an existing shortage of space by introducing multi-locational eWork combined with desk sharing. Others were able to continue employing as teleworkers those workers unwilling to move in case of business relocations.

The last years have seen a change in attitude, mainly caused by the economic downturn which has had a considerable effect on HR strategies of German businesses. Now, considerations of cost effectiveness are very much the main focus. For example, business locations have been given up in order to reduce costs and, within the framework of these reorganisations, home offices have been set up or mobile eWork introduced. The success of eWork projects is measured by whether they

[51] This measures accessibility by car, and regions are weighted by GDP. See www.sac.ac.uk\AsPIRE.

[52] Other regions in the survey were: Salzburg (Austria), Liège (Belgium), Fyns Amt (Denmark), Väli-Suomi (Finland), Ile de France, Bretagne, Nord-Pas-De-Calais, Languedoc-Roussillon (all France), Kentriki Makedonia (Greece), Border, Midland & Western (Ireland), Sicilia, Lazio, Toscana, Lombardia (all Italy), Friesland (Netherlands), Lisboa & Vale do Tejo (Portugal), Castilla- Leon, Cataluna (both Spain), Smaaland Med Oerna (Sweden), Berkshire, Buckinghamshire and Oxfordshire, Leicestershire, Greater Manchester, and Tees Valley and Durhams (all U.K.). It could be shown than taken together, these regions are sufficiently representative of the EU15 average, as indicated by key socio-demographic and structural economic variables.

reclaim costs in the short rather than the medium term. Here they compete with a variety of other organisational investment projects.

Some leading companies have already achieved such a large diffusion rate that now internal expansion of eWork is stagnating. Others have only recognised the advantages of eWork relatively late and today are expanding rather rapidly. Yet others feel that their basic need for flexible work organisation forms has been satisfied by pilot projects, and shy away from extension. Reasons given are a number of other reorganisation measures which are considered more urgent, often having to do with acquisition and merger activities.

In the meantime, the public sector has caught up with eWork developments. The youngest example is the public administration in the Bundesland Hessen. All 150,000 persons who are employed by the Bundesland now have the right to apply for a home-based teleworkplace. This may only be refused if the job is considered unsuitable or business processes would be severely impeded. The agreement was reached in April 2004 between the Hessen Minister of the Interior, the public workers union and the civil servant federation, and came after a two-year pilot turned out to be successful.

3.5.3. How sustainable is eWork? Progress towards measurement

A topic which, although often discussed, remains little researched is that of the sustainability of eWork. Knowledge about how the sustainability of an individual eWork project can be assessed has been missing almost completely. Recently results from new research undertaken in the 5th Framework Programme of the European Commission has become available.

Building on the results of surveys and case studies, the EU project SusTel[53] has developed a software tool which allows the measurement of economic, ecological and social sustainability of eWork in businesses. The tool is available as web-based interactive software in four EU languages (German, English, Italian, Danish and Dutch) and is accessible for free at www.telework-test.org/. The tool assesses if the implementation of eWork is economically beneficial and if desirable social and ecological effects come along with it. Users can identify weak points of their eWork project which they did not consider yet, or whose consequences they did not realise yet, and obtain suggestions for improvement. The tool is targeted, above all, at organisations – for example enterprises and public administrations – that do already practise eWork. However, the tool also offers valuable hints and plenty of support material to those organisations having no experience with this type of work yet.

The application has been taken up with much enthusiasm by user organisations as well as policy-makers who want to promote eWork. Up to now, many organisations flinched from implementing eWork because they could not easily determine its profitability. Scepticism prevails that benefits do not at least cover expenses. However, many enterprises have found eWork to be highly profitable even when introduced across the board and in large numbers – one example being the insurer LVM based in Münster, Germany. Related research was also able to point out in detail, and for the first time, the conditions under which home-based eWorking is ecologically sustainable[54].

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[53] SusTel (Sustainable Teleworking), www.sustel.org

[54] See Schäfer, R.A. (2004): Ökologische Beurteilung von Telearbeit – Konzeption und Realisation eines Bewertungsmodells auf Basis einer Verhaltensbilanz. Aachen: Shaker Verlag

This means that some of the questions which have accompanied the discussion around eWork from the very beginning, such as the issue of whether eWork can effectively reduce the ecological burden caused by present-day work organisation, are finally being answered.

3.5.4. Infrastructure: Rollout and usage of broadband intensify

Germany's "Regulatory Authority for Telecommunications and Posts (RegTP)" reports accelerated migration of users from narrowband to high-speed access, which in Germany usually means DSL[55]. DSL traffic, measured as transmitted data volume, substantially increased in previous years, from 25 GByte in 2001 and 195 GByte in 2002 to 403 GByte in 2003. These numbers include both the traffic volumes of the alternative network operators simultaneously offering Internet access services as ISPs and the broadband volumes generated by the customers of ISPs without their own network.

3.5.5. The political environment for eWork in Germany 2003/2004

While the implementation of multi-locational eWork appears to have slowed down as a result of the economic downturn (see above), political attempts have been undertaken to boost eWork in self-employed status. The latter has received a boost by a number of activities for the promotion of start-ups by unemployed persons. In the past years the number of start-ups supported through the "Überbrückungsgeld" (bridging allowance) has significantly increased (in 2002 by 29%). In order to offer more unemployed persons the opportunity to become self-employed, an additional start-up allowance was introduced in January 2003. The allowance is granted to those who expect a relatively low income for the first years (up to €25,000). The government aims at supporting this target group in becoming self-employed by offering social security. By July 2003 approx. 43,000 persons (of which 40% are women) were given the start-up allowance. Every month approx. 8,000 to 9,000 new businesses are started. No data is available yet about how many of these start-ups are making use of eWork, but it can be expected that the share is significant.

The German government has also strengthened attempts to increase the compatibility of work and family life. Most labour market experts believe that the difficulty to combine both is a major reason for female employment rates in Germany remaining much below the figures in forerunner countries such as the U.K., the Netherlands and the Nordic Member States. Against this background, the German government has realised that it needs to convince employers of the advantages of offering modern ways of working which increase worker-centred flexibility.

One such activity is the Work & Family Audit of the Hertie Foundation which is a "management tool for business enterprises and organisations for the optimisation of a family-oriented employment policy". It aims at ensuring a strong balance between corporate interests and employees' concerns. In early 2004, the federal minister for family, seniors, women and youth, Renate Schmidt, and the minister for economic affairs Wolfgang Clement took over patronage of the scheme, thereby giving it a much higher profile among German businessmen.

[55] See www.regtp.de/imperia/md/content/en/aktuelles/jb2003e.pdf

Other ongoing activities in this area include the "Allianz für Familie" (Alliance for Family) in which the federal government has been co-operating with the trade unions and industry federations in order to increase the availability of flexible working hours, to support business infrastructure such as child care facilities, to boost family-friendly human resources development and to make it easier to start at work after parental leave. For the first time a representative survey has been carried out in conjunction with the Deutsche Gewerkschaftsbund (Federation of German Trade Unions) among workers to find out what their expectations are with regard to a family-friendly enterprise. The Federal contest "Familienfreundlicher Betrieb 2005" (Family-friendly Business 2005) will reward those enterprises that are committed to flexible working hours and in-house child care facilities.

Unfortunately, in reality mothers (and fathers) who want to combine work and family duties still face severe barriers. One such is the lack of places in a child care facilities. Although there is a legal obligation of the State to provide a place in such a facility for every child under the age of three, the supply still is far outnumbered by demand, particularly in the old Länder. In addition, there is a need to set up more child care facilities for children from three until school age (shortage of all-day care facilities). Although the federal government has promised to provide approx. €2 billion in 2004 and approx. €2.5 billion annually as of 2005 for the extension of child care facilities, the current, woeful state of German public finances will make it extremely difficult to put these promises into reality.

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3.6. IRELAND

Measuring Telework, the QNHS experience

3.6.1. Introduction

The Quarterly National Household Survey (QNHS[56]) included a module on teleworking in the third quarter of 2002. This was achieved with collaboration between the STILE[57] project, of which the Central Statistics Office and Cork Teleworking Centre are the Irish partners, and the eWork Action Forum. Also motivated by participation in the STILE project a number of questions on telework were included in the 2003 Information, Communication and Technology (ICT) survey[58], which was carried out in the Irish context in June of 2003.

As there is no general agreed definition for telework, the questions asked in both the q3 2002 QNHS module and in the June 2003 ICT survey were based on questions which have been asked in the British Labour Force Survey since 1997. (see box "Questions asked in surveys" on page 58 for details)

3.6.2. Main results

The results of both the 2002 and 2003 surveys show similar patterns. About one in ten persons aged between 16 and 74 in non-agricultural employment work from home to some extent. Around 60,000 of these persons who work from home use a computer with a telecommunications link to do so. Of these, 32,700 persons were classified in 2003 as home-based teleworkers, i.e. persons for whom a computer with a telecommunications link is essential for them to be able to work from home. This represented 2.0% of all persons in non-agricultural employment. This was a slight decrease from the number of teleworkers estimated in the 2002 survey (39,200). See Background Notes and table below.

	QNHS q3 2002		ICT survey June 2003	
	'000	%	'000	%
Total in non agricultural employment	1,676.5	100.0	1,676.6	100.0
***of which* work from home**	149.5	8.9	192.7	11.5
***of which* use a computer with a telecommunications link**	59.9	3.6	60.9	3.6
of which *need a computer with* a telecommunications link	39.2	2.3	32.7	2.0

[56] See Background Notes on page 58

[57] see annex 7

[58] See Background Notes on page 58

Both surveys highlighted similar trends. Over two thirds of teleworkers are male. Teleworkers tend to be aged between 25 and 54. Teleworkers are also more likely to reside in the Dublin area and have a third level qualification.
The trends in employment characteristics of teleworkers as outlined in both time periods follow. Teleworkers tend to work for 45 hours or more a week and be engaged in the financial and other services sector in a managerial, administrative, professional or technical role. Further details are provided in tables 1 & 2. It should be noted that mobile teleworkers who do not work from home were not covered by either set of questions. It should also be noted that persons engaged in the agricultural sector have been excluded from the analysis presented in these tables.

3.6.3. Comparability of the findings

It should be stressed that the results of the questions asked in the QNHS and in the ICT survey are not strictly comparable for a number of reasons.

(a) Sample size: The questions asked in the q3 2002 QNHS module were asked to the entire QNHS sample (approximately 39,000 households). The questions asked in the 2003 ICT survey were asked to a subset of the QNHS sample (approximately 8,000 households).

(b) Reference period: The questions asked in the q3 2002 module were asked to all relevant respondents during the months of June, July and August. The questions asked in the ICT survey were asked during the month of June only.

(c) Differences in questions: The questions asked in both surveys are outlined in the background notes. The differences in the questions asked gave rise to methodological differences in the identification of persons defined as homeworkers who use a computer with a telecommunications link between the two surveys. In the q3 2002 module these persons were identified by asking a single question outlined below (teleqa) to respondents who had indicated that they were in employment and that they worked from home. In 2003, homeworkers who use a computer with a telecommunications link were identified by asking respondents who indicted that they were in employment and worked from home if they used the internet for work related activities at any time in the three months prior to the survey.

3.6.4. Measuring telework – the future

Following on from the success of the above exercises, plans were made to capture data on telework in the future. A repeat of the q3 2002 telework questions has been scheduled to be asked to approximately three fifths of the QNHS sample in the third quarter of 2004. At the same time, the ICT survey for 2004 will be asked during June to approximately another fifth of the QNHS sample. The additional telework questions have been re-included in the ICT survey.

Table 1 - Profile of all persons in employment[1] (ILO), homeworkers[3] and teleworkers[2] aged 16 to 74, QNHS q3 2002

	'000				%	
Demographic details	Total in employment[1]	Homeworkers[3]	Homeworkers[3] that use a computer[4]	Teleworkers[2]	*Teleworkers[2] as a percentage of homeworkers[3]*	*Teleworkers[2] as a percentage of total in employment[1]*
State	**1,676.5**	**149.5**	**59.9**	**39.2**	**26.2**	**2.3**
Region						
Border	157.2	15.5	5.6	2.9	*18.7*	*1.8*
Midland	89.4	8.0	1.8	1.5	*18.8*	*1.7*
West	148.6	14.5	4.5	3.3	*22.8*	*2.2*
Dublin	546.1	37.7	21.2	14.8	*39.3*	*2.7*
Mid-East	190.3	22.9	9.0	5.5	*24.0*	*2.9*
Mid-West	140.5	13.8	3.4	2.1	*15.2*	*1.5*
South-East	167.3	17.0	6.8	3.5	*20.6*	*2.1*
South-West	237.0	20.1	7.6	5.6	*27.9*	*2.4*
Sex						
Male	936.2	101.1	40.5	26.5	*26.2*	*2.8*
Female	740.3	48.3	19.4	12.7	*26.3*	*1.7*
Age Group						
16-24	323.3	7.1	1.6	1.2	*16.9*	*0.4*
25-34	475.8	31.6	15.8	10.8	*34.2*	*2.3*
35-44	404.2	46.7	21.3	13.6	*29.1*	*3.4*
45-54	308.0	38.2	14.3	9.1	*23.8*	*3.0*
55-64	141.5	20.3	5.6	3.6	*17.7*	*2.5*
65-74	23.7	5.7	1.3	0.7	*12.3*	*3.0*
Marital Status						
Single	751.9	41.4	15.2	10.4	*25.1*	*1.4*
Married	840.9	98.9	41.6	26.8	*27.1*	*3.2*
Separated	62.3	6.6	2.3	1.5	*22.7*	*2.4*
Widowed	21.4	2.6	0.6	0.5	*	*
Composition of household[5]						
Couple, no children	233.0	26.7	12.2	8.1	*30.3*	*3.5*
Couple, with children	662.5	76.2	32.2	20.8	*27.3*	*3.1*
Lone parent	66.8	4.6	1.2	0.8	*17.4*	*1.2*
Not in a family unit/not stated	714.2	42.0	14.3	9.4	*22.4*	*1.3*
Highest Education Level Attained						
Lower secondary or below	472.0	36.2	6.7	3.3	*9.1*	*0.7*
Higher secondary	471.8	31.2	10.6	7.2	*23.1*	*1.5*
Post leaving certificate	212.6	17.0	5.4	2.8	*16.5*	*1.3*
Third level - non degree	179.8	16.4	8.4	5.8	*35.4*	*3.2*
Third level - degree or above	300.9	46.4	27.9	19.5	*42.0*	*6.5*
Not stated	39.4	2.3	1.0	0.5	*21.7*	*1.3*

[1] Excludes workers in the Agriculture, forestry and fishing sector.

[2] Teleworkers refers to all persons who work from home and **need** a computer with a telecommunications link in order to do so.

[3] Consists of persons who work from home usually and sometimes.

[4] Computer refers to computers with a telecommunications link only.

[5] See Background Notes.

* Sample occurrence too small for estimation.

Table 1 continued - Profile of all persons in employment[1] (ILO), homeworkers[3] and teleworkers[2] aged 16 to 74, QNHS q3 2002

	'000				%	
Employment characteristics	Total in employment[1]	Homeworkers[3]	Homeworkers[3] that use a computer[4]	Teleworkers[2]	*Teleworkers[2] as a percentage of homeworkers[3]*	*Teleworkers[2] as a percentage of total in employment[1]*
State	**1,676.5**	**149.5**	**59.9**	**39.2**	**26.2**	**2.3**
ILO Status						
In employment, full-time	1,399 3	129 7	53 1	35.0	*27 0*	*2 5*
In employment, part-time	277 2	19.8	6 8	4 1	*20 7*	*1 5*
Employment Status						
Self employed (with paid employees)	90 7	29 5	12 3	7 5	*25 4*	*8 3*
Self employed (with no paid employees)	117 4	53 9	18 9	12 3	*22 8*	*10 5*
Employee (incl schemes)	1,458.6	62.0	27 8	19.0	*30 6*	*1 3*
Assisting relatives	9 8	4 1	0 9	0.3	*7 3*	*3 1*
Occupational Group						
Managers and Administrators	220 5	41 2	19 9	13.8	*33.5*	*6 3*
Professional	183 7	30 7	16 4	10 1	*32 9*	*5 5*
Associate Professional and Technical	155 9	16 2	10.0	7 1	*43.8*	*4 6*
Clerical and Secretarial	226 1	7 9	4 2	2 9	*36.7*	*1 3*
Craft and Related	233.9	23 2	4 1	2 1	*9 1*	*0 9*
Personal and Protective Service	178 1	8 3	0 7	0 3	*3.6*	*0 2*
Sales	150.6	7 4	2 4	1.6	*21 6*	*1 1*
Plant and Machine Operatives	186 4	9.8	1 2	0 7	*7 1*	*0 4*
Other	141 4	4 8	0 9	0.6	*12 5*	*0 4*
NACE Economic Sector						
C-E Other Production Industries	315 5	17 9	8 8	6 1	*34 1*	*1 9*
F Construction	190 3	22 2	5 9	3.0	*13.5*	*1 6*
G Wholesale and Retail	256 4	18 9	5 6	3.6	*19.0*	*1 4*
H Hotels and Restaurants	114 4	10 2	2 7	1 2	*11 8*	*1 0*
I Transport, Storage, Communication	115 4	11 9	3.0	2.0	*16 8*	*1 7*
J - K Financial and Other Services	229.0	28.8	20 7	15.7	*54.5*	*6 9*
L Public Administration and Defence	91 4	3 4	1 6	1 1	*32.4*	*1 2*
M Education	105 9	13.8	5 4	2.8	*20.3*	*2 6*
N Health	159.8	8 2	2.2	1 3	*15 9*	*0 8*
O Other	98 4	14 1	4 1	2 3	*16 3*	*2 3*
Usual hours worked						
1 - 9 hours	16 7	1 4	0 3	*	*	*
10 - 19 hours	78 4	4 9	1 8	1 2	*24 5*	*1 5*
20 - 29 hours	178.8	10 2	3 4	2 2	*21.6*	*1 2*
30 - 34 hours	58.6	5 5	2.0	1 4	*25.5*	*2 4*
35 - 39 hours	658.2	19 9	9 4	6 5	*32.7*	*1 0*
40 - 44 hours	329 9	23 1	9 3	6 2	*26.8*	*1 9*
45 hours & over	193.2	40 9	17 7	11 9	*29.1*	*6 2*
Variable hours[5]	162 7	43 6	16.0	9.6	*22 0*	*5 9*

[1] Excludes workers in the Agriculture, forestry and fishing sector

[2] Teleworkers refers to all persons who work from home and **need** a computer with a telecommunications link in order to do so

[3] Consists of persons who work from home usually and sometimes

[4] Computer refers to computers with a telecommunications link only.

[5] Includes *'not stated'*

* Sample occurrence too small for estimation

Table 2 - Profile of all persons in employment[1] (ILO), homeworkers[3] and teleworkers[2] aged 16 to 74, ICT survey June 2003

	'000				%	
Demographic details	Total in employment[1]	Homeworkers[3]	Homeworkers[3] that use a computer[4]	Teleworkers[2]	*Teleworkers[2] as a percentage of homeworkers[3]*	*Teleworkers[2] as a percentage of total in employment[1]*
State	**1,676.6**	**192.7**	**60.9**	**32.7**	**17.0**	**2.0**
Region						
Border	170.2	19.8	4.7	1.2	*6.1*	*0.7*
Midland	93.0	5.4	0.8	0.2	*3.7*	*0.2*
West	141.7	16.7	3.4	0.9	*5.4*	*0.6*
Dublin	543.3	70.9	28.7	15.2	*21.4*	*2.8*
Mid-East	194.2	24.2	4.9	4.0	*16.5*	*2.1*
Mid-West	141.3	14.8	4.8	2.7	*18.2*	*1.9*
South-East	164.4	17.5	5.0	2.6	*14.9*	*1.6*
South-West	228.4	23.4	8.6	5.9	*25.2*	*2.6*
Sex						
Male	944.7	130.7	41.9	23.3	*17.8*	*2.5*
Female	731.8	62.1	19.1	9.4	*15.1*	*1.3*
Age Group						
16-24	326.0	10.4	2.6	1.8	*17.3*	*0.6*
25-34	488.2	42.2	19.3	10.2	*24.2*	*2.1*
35-44	413.3	57.2	19.8	11.9	*20.8*	*2.9*
45-54	285.9	50.6	14.7	7.0	*13.8*	*2.4*
55-64	140.5	23.9	3.7	1.4	*5.9*	*1.0*
65-74	22.7	8.4	0.9	0.3	*3.6*	*1.3*
Marital Status						
Single	750.7	52.4	17.8	7.6	*14.5*	*1.0*
Married	825.0	125.6	37.9	22.3	*17.8*	*2.7*
Separated	74.3	11.4	4.4	2.6	*22.8*	*3.5*
Widowed	26.5	3.2	0.8	0.3	*9.4*	*1.1*
Composition of household[6]						
Couple, no children	285.7	44.0	14.1	7.9	*18.0*	*2.8*
Couple, with children	624.6	84.6	25.1	15.1	*17.8*	*2.4*
Lone parent	78.8	5.5	1.7	1.1	*20.0*	*1.4*
Not in a family unit/not stated	687.5	58.6	20.0	8.6	*14.7*	*1.3*
Highest Education Level Attained						
Lower secondary or below	441.3	39.2	2.6	0.5	*1.3*	*0.1*
Higher secondary	460.7	39.6	8.7	5.8	*14.6*	*1.3*
Post leaving certificate	217.0	19.8	4.8	2.3	*11.6*	*1.1*
Third level - non degree	217.8	23.6	10.6	7.1	*30.1*	*3.3*
Third level - degree or above	311.7	67.2	32.2	16.4	*24.4*	*5.3*
Not stated	28.0	3.2	1.7	0.7	*21.9*	*2.5*

[1] Excludes workers in the Agriculture, forestry and fishing sector.

[2] Teleworkers refers to all persons who work from home and **need** a computer with a telecommunications link in order to do so

[3] Consists of persons who work from home usually and sometimes.

[4] Computer refers to computers with a telecommunications link only

[5] See Background Notes.

" Sample occurrence too small for estimation.

Table 2 continued - Profile of all persons in employment[1] (ILO), homeworkers[3] and teleworkers[2] aged 16 to 74, ICT survey June 2003

'000 | %

Employment characteristics	Total in employment[1]	Homeworkers[3]	Homeworkers[3] that use a computer[4]	Teleworkers[2]	*Teleworkers[2] as a percentage of homeworkers[3]*	*Teleworkers[2] as a percentage of total in employment[1]*
State	**1,676.6**	**192.7**	**60.9**	**32.7**	**17.0**	**2.0**
ILO Status						
In employment, full-time	1,386 7	169 2	56 5	30 5	*18.0*	*2 2*
In employment, part-time	289.8	23 6	4 5	2 3	*9 7*	*0 8*
Employment Status						
Self employed (with paid employees)	75 8	29 1	10 4	7 1	*24 4*	*9 4*
Self employed (with no paid employees)	118 8	67 0	15 9	7 6	*11 3*	*6 4*
Employee (incl schemes)	1,474 7	93 4	34 2	18 1	*19 4*	*1 2*
Assisting relatives	7 2	3 3	0 4	*	*	*
Occupational Group						
Managers and Administrators	199 8	45 0	19 3	11 7	*26 0*	*5 9*
Professional	215 3	42 3	17 4	8 4	*19 9*	*3 9*
Associate Professional and Technical	177 0	26 5	11 0	5 8	*21 9*	*3 3*
Clerical and Secretarial	220 6	12 1	2 8	0 6	*5 0*	*0 3*
Craft and Related	238 1	21 8	2 9	1 2	*5 5*	*0 5*
Personal and Protective Service	196 8	15 3	2 3	1 2	*7 8*	*0 6*
Sales	132 7	9 7	3 1	2 3	*23 7*	*1 7*
Plant and Machine Operatives	156 4	14 7	1 7	1 4	*9 5*	*0 9*
Other	139 9	5 3	0 5	0 3	*	*
NACE Economic Sector						
C-E Other Production Industries	311 6	24 3	8 8	7 1	*29 2*	*2 3*
F Construction	179 5	18 9	4 2	0 4	*2 1*	*0 2*
G Wholesale and Retail	246 1	23 8	7 0	4 8	*20 2*	*2 0*
H Hotels and Restaurants	104 6	9 5	1 1	0 3	*3 2*	*0 3*
I Transport, Storage, Communication	115 6	15 6	2 4	1 4	*9 0*	*1 2*
J - K Financial and Other Services	226 8	39 6	16 4	9 0	*22 7*	*4 0*
L Public Administration and Defence	97 3	4 5	0 6	0 3	*6 7*	*0 3*
M Education	127 9	22 3	9 1	4 7	*21 1*	*3 7*
N Health	173 9	13 1	4 2	1 3	*9 9*	*0 7*
O Other	93 2	21 1	7 1	3 5	*16 6*	*3 8*
Usual hours worked						
1 - 9 hours	15 8	1 5	*	*	*	*
10 - 19 hours	78 5	5 7	1 8	1 1	*19 3*	*1 4*
20 - 29 hours	166 2	9 7	2 0	0 7	*7 2*	*0 4*
30 - 34 hours	59 7	4 7	1 8	1 2	*25 5*	*2 0*
35 - 39 hours	663 0	33 6	10 2	4 6	*13 7*	*0 7*
40 - 44 hours	335 0	31 1	11 2	7 2	*23 2*	*2 1*
45 hours & over	167 9	50 4	20 4	12 3	*24 4*	*7 3*
Variable hours[5]	190 4	56 0	13 5	5 6	*10 0*	*2 9*

[1] Excludes workers in the Agriculture, forestry and fishing sector

[2] Teleworkers refers to all persons who work from home and **need** a computer with a telecommunications link in order to do so.

[3] Consists of persons who work from home usually and sometimes.

[4] Computer refers to computers with a telecommunications link only

[5] Includes *'not stated'*

* Sample occurrence too small for estimation.

3.6.5. Questions asked in the Surveys

A - QNHS Q3 2002 telework questions

The questions on telework were inserted after the existing QNHS question on working from home.

HOMEWORK : Do you work from home ? 1. Usually 2. Sometimes 3. Never

If respondent usually or sometimes works from home :

HOMED : (In your main job) have you spent at least one FULL day in the seven days ending Sunday the xxth working
1. in own home
2. in the same grounds or buildings as your home
3. in different places using home as a base
4. not worked at home during reference week

If respondent usually or sometimes works from home :

TELEQA : Do you use a computer with a telecommunications link to carry out your work at home?
1. Yes 2. No

Note: The telecommunications link must be used to receive or convey data / information in the course of work. It is not sufficient for a link to be available on the computer but not used for work purposes.

If uses a telephone with communications link for work at home :

TELEQB : Would it be possible for you to work at home (or use home as a base) without using a computer with a telecommunications link ? 1. Yes 2. No

B - June 2003 ICT telework questions

The questions on telework were inserted following questions on use of the internet for work related purposes

If respondent is in employment and used the internet for work related purposes in the previous three months :

TELEQD : Would it be possible for you to work at home/away from your employers premises without using the Internet ? 1. Yes 2. No

If respondent is in employment and used the internet for work related purposes in the previous three months :

TELEQE : On average, how many hours per week do you use a computer while working away from your employers premises ? Enter hrs [Range 001-140]
00: hours vary, can't give usual hours
140: 140 hours or more

3.6.6. Background Notes

The Quarterly National Household Survey

The primary purpose of the QNHS is the production of quarterly labour force estimates, however modules of special social topics are typically also included on a quarterly basis. The QNHS replaced the annual April Labour Force Survey and meets the requirements of Council Regulation (EC) No. 577/98. Information is collected continuously throughout the year and approximately 3,000 households are surveyed each week to give a total sample of 39,000 households in each quarter. The survey is carried out on laptop computers using computer-assisted personal interview (CAPI) software.

The Information, Communication and Technology survey

The purpose of the 2003 ICT survey was to provide benchmark indicators for the e-Europe 2005 Action Plan which was adopted by the Seville European Council in 2002. In the Irish context the ICT questions were attached to the QNHS in June 2003. Work-related activities on the internet as referred to is defined as having done any of the following activities at home/away from employers premises in the previous 3 months:

5. Finding information relating to your work or business
6. Sending work to work place
7. Accessing files on the employer's server
8. Communication (exchanging and accessing e-mails)
9. Other work-related activities

Note that the employment figures presented calculated using the ICT survey are indicative only. The official employment figures for the third quarter of 2003 are presented in the main QNHS release for that period and are available on the website at www.cso.ie.

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3.7. ITALY

3.7.1. Introduction

The purpose of this report is to describe the current situation in Italy with regard to eWork, highlighting both problem areas and potential areas of development, particularly in the government sectors.

The report describes : Italy's economic situation, with special emphasis on the labour market and other trends influencing eWork, innovation and the uptake of Information Technology in the government, manufacturing and service sectors, special attention is paid to trends in large companies and in SMEs; the current state of ework in Italy and emerging forms of "mobile" work, this section cites concrete examples of eWork projects in the government sector.

3.7.2. The Italian economy in 2003

In 2003 Italy was in a somewhat negative general position with a rather unfavourable climate for innovation. This generally gloomy picture was provoked by an economic downturn – a negative trend mirrored across Europe – as well as by specific obstacles, linked to the structure of the Italian economy and Italian society.

3.7.2.1. The economy

In the global economic recovery that characterized 2003 (world GDP +2.7%, up on 2001 and 2002), the economies of the countries of the European Monetary Union reported stunted growth (+0.4%). In Italy, in particular, the phase of economic stagnation that commenced in the second half of 2001, continued into 2003: in 2002 the GDP rate was up 0.4%, whilst in 2003 it was up only 0.3%. The slowing down of the economy is shown by the downward trend, for the third year running, in the industrial production index (-0.4% on 2002). The slow-down was particularly severe for durable consumer goods (-4.5%).

Italian exports also weakened falling by 4%. This was a bigger drop than that experienced by any other EMU member state. The biggest fall was in exports to the EU (-4.6%) but exports to non-EU member states also registered a significant fall, (-3.4%). These figures are evidence of a crisis in the competitivity of the Italian economy.

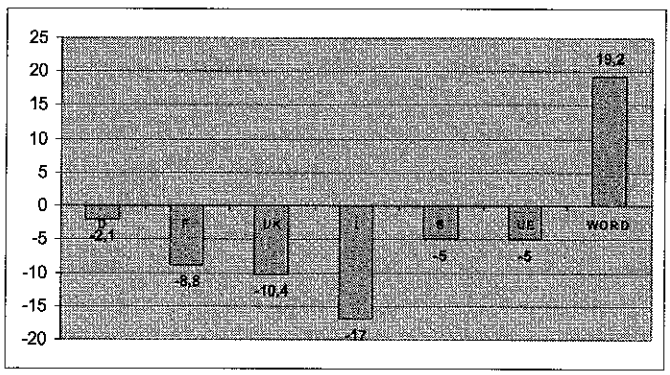

fig. 1: Shifts in the market share of the major European countries (1996-2002) [CENSIS, using data from ICE, 2003]

The decrease in the competitiveness of Italian companies is closely tied to the structure of Italian manufacturing industry which lacks the large-scale industrial capacity needed to drive the market. In 2003, large companies, (just 0.5% of all Italian companies) were marked by negative growth, with a major downturn for the industrial sector (-6.3% with respect to 2002). In addition, Italy's specialist markets (so-called "Made in Italy" goods), suffered sharply due to competition from emerging economies (specifically, Asia), with lower labor costs. In 2003 the slow growth and price competition experienced by major companies created an atmosphere unconducive to investment in R&D or in technological innovation

This situation was made worse by the weakness of SMEs which play a key role in the Italian economy. The rate at which they are created is very high (71,200 new firms in 2002, a figure 14.1% higher than the previous year (20.7% higher in the South). However there is also a high rate of company failure, which is particularly common in the central-southern regions (Puglia, Abruzzo e Campania),

In 2003, SMEs did not invest heavily in innovation. Only 5% of SMEs were involved in "cooperative projects to promote innovation" (source, CENSIS). This is the lowest percentage for any EU member state. The highest rates of innovation are to be found in France, the Netherlands and Germany.

The overall decline in investment in innovative processes and in competitiveness (both in major companies and in SMEs) is apparent in the percentage of GDP invested in research and development: in Italy only 1.1% of GDP goes to R&D activities, barely half the European average and a third of the target level fixed by the EU (Sources: CENSIS and Italian Ministry of Innovation).

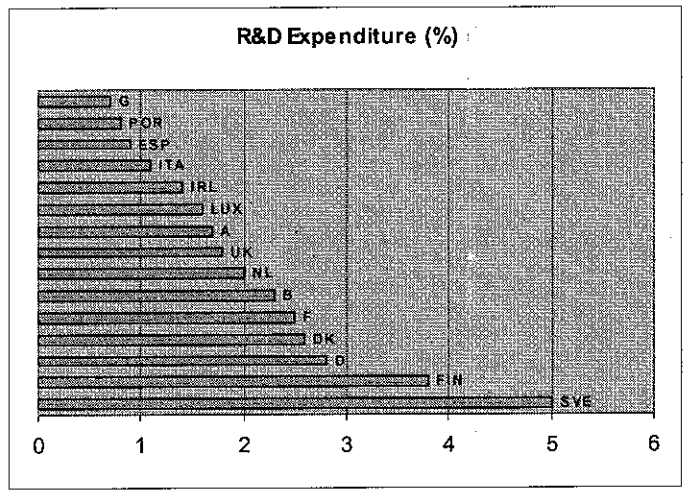

fig. 3 : R&D Expenditure in Europe (2003) [Italian Ministry of Innovation]

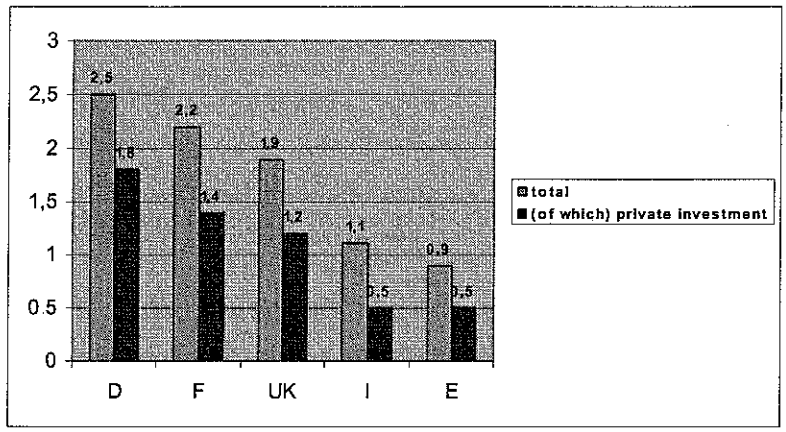

fig. 4 : R&D in the major European countries (as a% of GDP) [CENSIS using data from Banca d'Italia, 2003]

A symptom of inadequate investment is Italy's poor positioning (11th place) in the European Patent Office's league table, which shows the number of patents granted to different European countries.

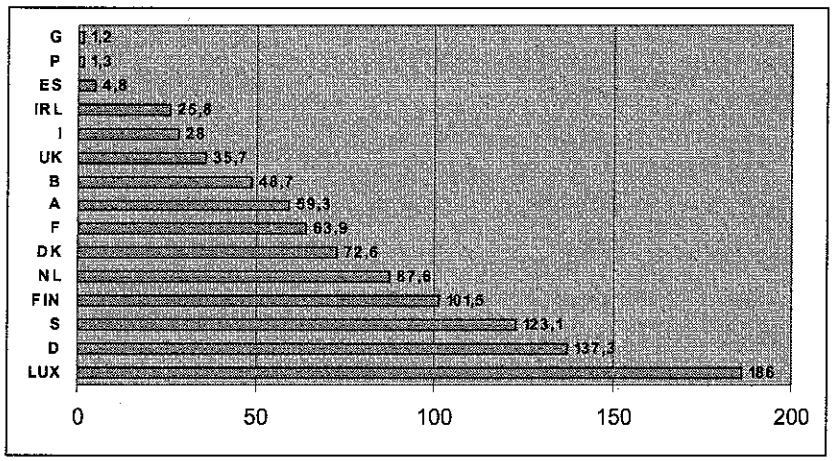

fig. 5 : Patents issued by European Patent Office, 2002 (number of patents/million inhabitants) [CENSIS using data from EPO, 2002]

Investment statistics for R&D in Italy are similar to those for the New Member States, many of which, however, compare favourably with Italy in terms of the quality and quantity of their technical and scientific education. According to indicators proposed by the European Innovation Scoreboard, Italy trails behind the rest of Europe (though one may also note a small improvement on previous years). Italy scores below the EU average for each of the five indicators used by the scoreboard: numbers of recent graduates in Science and Engineering (S&E); population with secondary-school education; number of students in full-time education; employment in medium to high and high-tech manufacturing; and employment in high-tech service industries.

	Italy		EU		USA		Japan		Czechoslovakia		Hungary		Poland	
	Result	Trend	Result	Trend	Result	Trend	Result	Trend	Result	Trend	Result	Trend	Result	Trend
Recent graduates in S&E	5,60	40,00	10,30	13,70	10,20	-6,10	12,50	-	4,00	-	4,49	-14,4	5,90	-
Population with secondary-school education	10.29	14,60	21,22	17.90	36,51	4,60	29,85	-1,80	11,59	7,10	13.96	5,70	11,73	0.40
Number of students in full-time education	5,10	0,70	8,50	21,40	-	-	-	-	-	-	3,00	-1.10	5,20	-
Employment in medium to high and high-tech manufacturing	7,42	-0,90	7,75	-2,10	-	-	-	-	9,16	5,10	8,80	6.60	7,54	-
Employment in high-tech service industries	3,05	16.00	3,61	18,30	-	-	-	-	3 22	-0,10	3,24	17,50	-	-

tab. 1 :% Change in the number of R&D workers (2001-2002). Comparison between Italy, EU, USA, Japan and specific New Member States 2001-2002 (%)
*Trend (%) : * The trend is calculated comparing average values for 2002 with the average for1997-1999.*

Similar results are seen when indicators measuring new knowledge creation are taken into consideration: expenditure in R&D by government bodies/GDP; expenditure in R&D by companies/GDP; applications for patents for high-technology at the European Patents Office (EPO) (per million inhabitants); applications for patents for high-technology at the US Patent and Trademark Office (USPTO) (per million inhabitants). The figures for these indicators are lower than the European Union average, the United States and Japan.

	Italy		EU		USA		Japan		Czecho-slovakia		Hungary		Poland	
	Result	Trend	Result	Trend	Result	Trend	Result	Trend	Result	Trend	Result	Trend	Result	Trend
expenditure in R&D by government bodies/GDP	0 53	8 2	0.67	-2 0	0.66	-2.0	0.87	7.0	0 54	26.0	0 45	10.5	0.45	5 9
expenditure in R&D by companies/GDP	0 53	2.3	1 28	5 4	2.04	7.0	2 11	3.8	0.81	12 9	0 36	26 4	0 25	- 14.0
applications for patents for high-technology at the EPO	6 2	28 0	27.8	97 2	49 5	151 9	36.6	57 1	-	-	1 5	9.6	-	-
applications for patents at the EPO	-	-	-	-	-	-	-	-	12.1	-	16.1	-	2.3	-
applications for patents for high-technology at the US Patent and Trademark Office (USPTO	4 1	25 3	12.4	43 9	91 9	41.9	80 0	21 6	0 58	-	0 3	-39 3	0 05	49 9

tab. 2 : Creation of new knowledge. Comparison between Italy, EU, USA, Japan and specific New Member States 2001-2002 (%)
*Trend (%) : * The trend is calculated comparing average values for 2002 with the average for1997-1999*

These statistics paint a picture of a stagnant economy, struggling to hold onto the ground it has gained in the past and finding it difficult to pioneer new processes of innovation and development.

3.7.2.2. Employment and the labor market

Since reaching a cyclical highpoint in spring 2002, Europe's employment situation has been stagnant. According to an assessment by the Central European Bank, employment remained flat throughout 2003. This situation reflects declining demand for labor from the primary sector and from industry, and low levels of job creation in the service sector. Italy has also witnessed a slowing down in employment. After a small increase in January and April 2003, growth ceased in summer 2003. (source, ISTAT data).

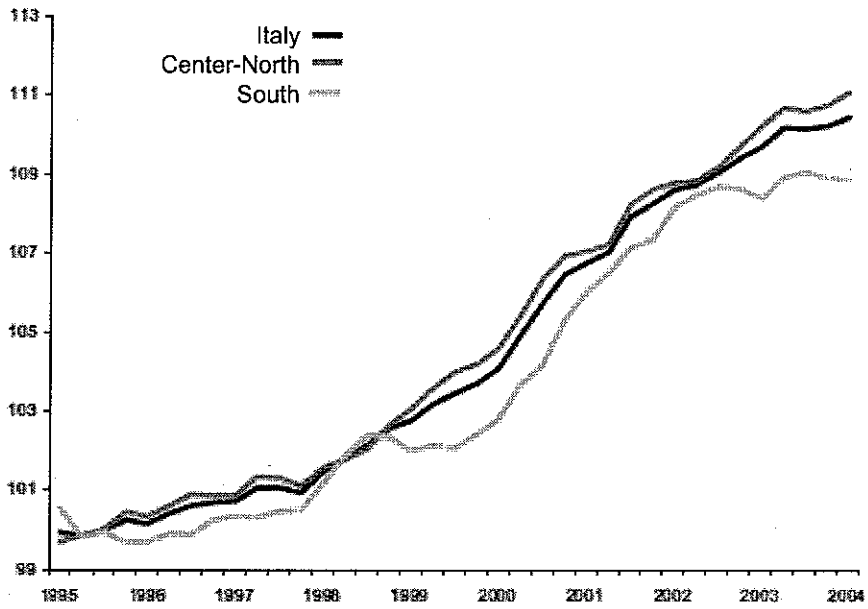

fig. 6 : Regional breakdown of employment, 1995-2004 [ISTAT, Quarterly surveys of the labour force]

Throughout 2003, Italy's employment rate remained consistently lower than the EU average (64.2% in 2002). In 2003, the total number of jobs increased by only 1.2%, the lowest increase since 1999. In the south of Italy, the rate of job creation fell from 3.1% in 2002 to 0.6% in 2003. Falling employment has hit heavy industry and major companies particularly hard. In 2003, the increase in employment in the industrial sector (26,000 jobs, 0.5% of total employment) was half that of 2002. On a more encouraging note, overall employment in very small companies has experienced a slight upturn.

Italian labour law (see for instance the recent "Biagi" reforms which introduced new more 'flexible' forms of labor contract) is moving towards greater flexibility. In recent years there has also been a drastic (and unhealthy) increase in the number of short-term labor contracts (often the only form of employment available for young people). In reality however the labor market seems to be becoming even more rigid than in the past. In 2003, 75% of new jobs were in permanent full-time positions. The key features of the market are strong obstacles to labor mobility (lack of new jobs for workers to move to) and an ever clear demarcation between market participants and non-participants. A survey by CENSIS shows that in 2002 the number of recently employed workers was 8.6%, less than in 1998. Over the last four years the percentage of jobless workers who are permanently unemployed rose from 51.8% to 53.9%.

2003 was marked by an increase in the employment of workers between 50 and 64 years old (20.8% of total employment as opposed to 19.4% of total employment figures for 1999 and 20.2% for 2002) (ISTAT). This is due partly to long-term demographic trends (gradually falling birth rates and increased life expectancy), and partly to changes in pension regulations (a gradual increase in the retirement age, an increase in the minimum number of years an employee has to pay into the state pension fund, to acquire the right to a pension). The increasing age of the working population and the weak influx of young people represent unfavorable circumstances for technological and organizational innovation.

One final statistic, which completes this description of the Italian labor market, concerns remuneration. The period between 1996 and 2002 saw a slowing down in the growth of salaries

(despite a slight increase with respect to other European countries). This slowing down has been accompanied by a loss of purchasing power. This has been particularly noticeable in agriculture, construction, and private services.

3.7.3. Information Technology in Italy

The picture of the Italian economy that emerges from the previous section is overwhelmingly negative. As we have seen, falling growth and exports are associated with a declining ability to innovate, a weak (yet rigid) labor market and falling purchasing power. These trends obviously influence the acceptance and uptake of new Information Technologies – a pre-condition for the spread of eWork.

3.7.3.1. General situation

Between 2000 and 2003, Italian expenditure on information technology amounted to 2% of GDP, lower than expenditure by the new member states (2.5%), Japan (2.6%), France (3.2%), Germany (3.3%), the USA (3.6%) the UK (4%) and the EU average (3%). In 2003, expenditure on modernizing infrastructure and telecommunication systems increased only slowly (+1.8% with respect to 2002). After years of steady growth in demand for ICT, the period between 2001 and 2003 was one of stagnation. In 2003 total demand was barely 0.1% higher than in 2002. The main reason for this was the crisis in Information Technology (-5.3%); demand for telecommunications increased by 2.1%. It should be noted however that the main increase was in services (particularly voice and data transmission, which increased by roughly 7% per annum over this period). The only IT sector to forecast positive growth for 2004 is "services", sustained by growing demand for Broadband Internet access, Housing, Hosting, Virtual Private Networks, etc.).

Nonetheless Italy continues to have a lower level of internet access and fewer broadband connections than other European countries. Only 35% of families own a computer linked to the Internet (+8% on 2002). As regards broadband access, Italy, with 4 connections per 100 inhabitants, lags behind the rest of Europe. In general there is still no broad awareness the potential of the technology. Coverage is far from universal with small urban towns and the South in general at a disadvantage with respect to large cities and the North.

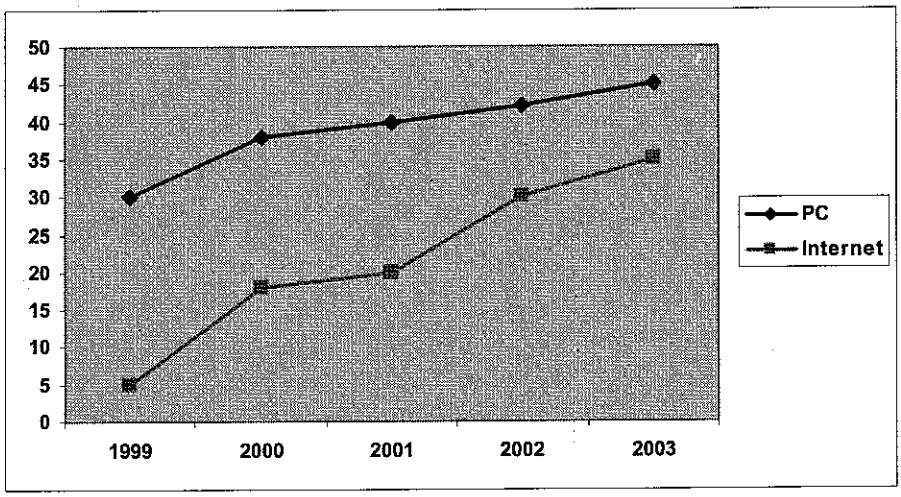

fig. 8 :% of families with PCs and home Internet access [Federcomin, Anee, 2003]

Deeper analysis of the statistics reveals differences between distinct types of user: only 6% of the population over 65 years of age uses a PC and of these, only 2.6% use the Internet. Take-up of IT seems to be restricted to certain social and cultural classes (managers, students and employees rather than housewives and pensioners). There is also a 5% difference in use between North and South, although 2003 saw a slight reduction with respect to the previous year.

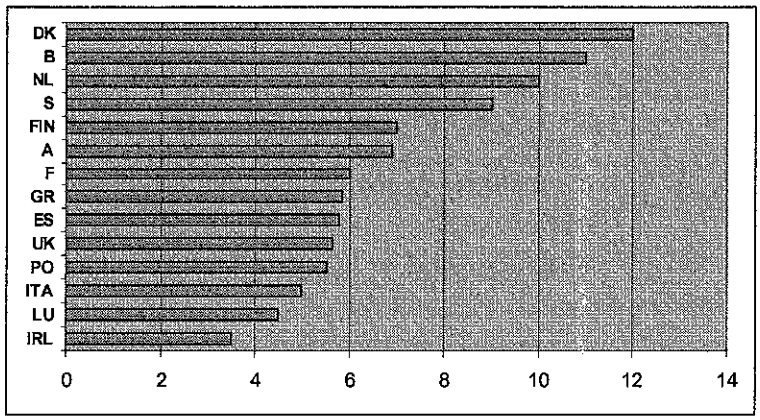

fig. 9 : Broadband access in Italy and in Europe (%) [Italian Ministry of Innovation 2003]

It should be noted however that the general weakness of ICT use does not extend to mobile phones, where Italy has the second highest rate of penetration in the EU (one contract and/or prepaid card per inhabitant). Statistics reveal a strong increase in the use of mobile phones as opposed to fixed-line telecommunications.

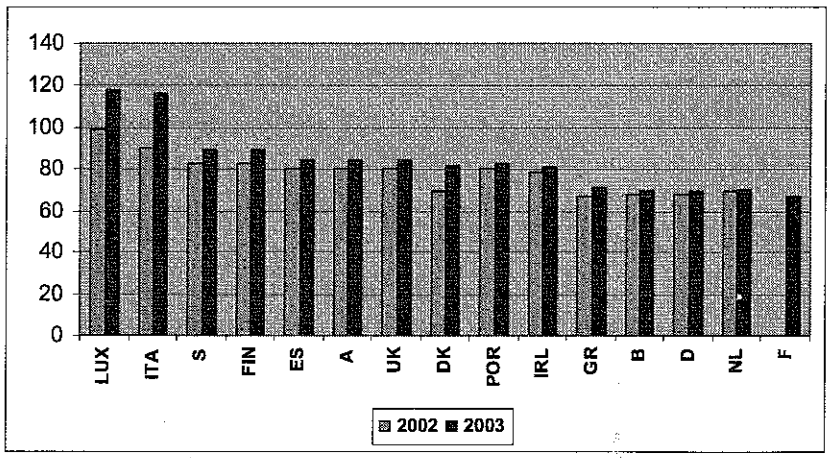

fig.10: Penetration rates for mobile phones in main European countries 2003 [Italian Ministry of Innovation]

In addition to the spread of mobile phones, there is strong growth in mobile services and in value-added services (VAS), based on mobile technology. The Italian mobile communication market appears to be fairly mature and there is now an emerging need for new services and technologies. This implies good development prospects for UMTS-based services.

3.7.3.2. ICT and SMEs

The uptake of ICT by SMEs has been weak, due to the lack of available economic resources and the high costs of many technologies. SMEs are increasingly interested in taking advantage of government and European incentives, which promote technological innovation. The most widely used IT technologies in SMEs are the PC and the Internet (used by 95% of companies). In 2003, the number of broad-band connections installed in SMEs increased significantly (+120% on 2002).

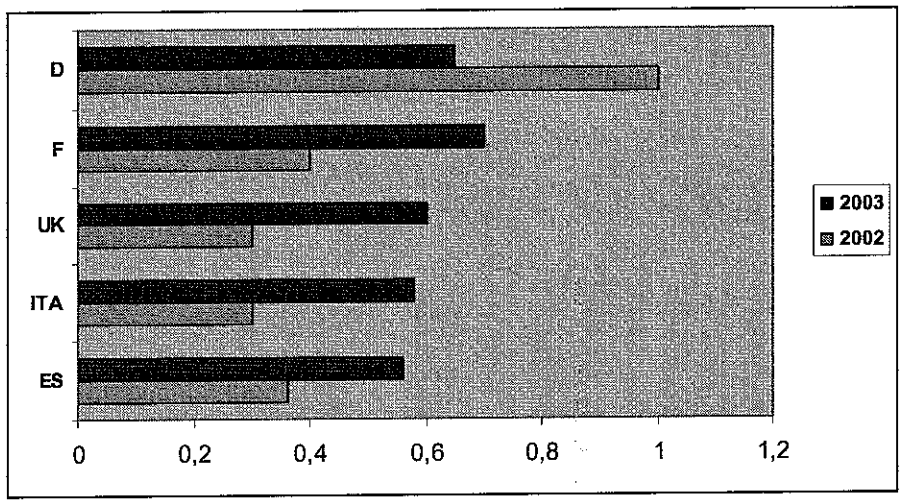

fig. 12 : Broadband access in private businesses (millions) [Italian Ministry of Innovation]

The growth in the use of innovative technology within SMEs continues to be hindered by cultural factors. These companies appear to suffer from an aversion towards innovation, a lack of flexibility and a lack of awareness of the advantages of technological innovation. In an interesting qualitative survey, by CENSIS, it emerges that the principal obstacles preventing a company from going on-line, are a reluctance to share critical information (75%) and the urge to retain management autonomy (73.7%).

If SMEs fail to create national strategies or to push for the creation of networks, the reasons are cultural: the costs of the required investment (cited by 44.7% of respondents), and the cost of training human resources (cited in 42.2% of cases) are less important factors. (tab 2 pag.567, CENSIS). SMEs and industrial areas represent an interesting potential growth market for advanced services, including services in support of eWork.

3.7.3.3. ICT and Major Companies

As has been seen, 2003 was a bad year for Italy's large companies which experienced negative growth. Technology expenditure fell by -3.2% with respect to the previous year, revealing the cautious attitudes of companies towards new IT investment and a tendency to rationalize the use of existing resources.

As with SMEs the most widely used IT technologies are the PC and Internet. The true "divide" between SMEs and major companies concerns the complexity of the activity carried out online: the most sophisticated technologies (CRM, databases, workgroups, intranet, extranet) can be found only within the largest companies.

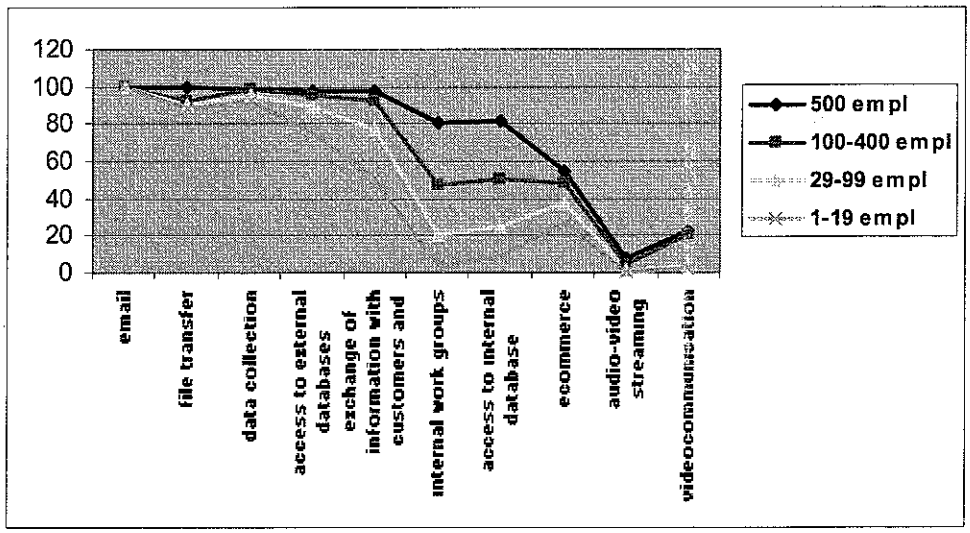

fig. 14 : Online activities in Italian businesses [Italian Ministry of Innovation (2003)]

3.7.3.4. ICT and the Government Sector

In contrast with the situation in SMEs and in large industry, the use of ICT in the government sector is increasing rapidly. Between 2001 and 2003, the availability of eGovernment services increased, pushing Italy from 11th (2001) to 7th place (2003) in the European league table. In the period from September to November 2003 period 53% of all Italian internet users (about nine million users) visited web sites managed by the government sector.

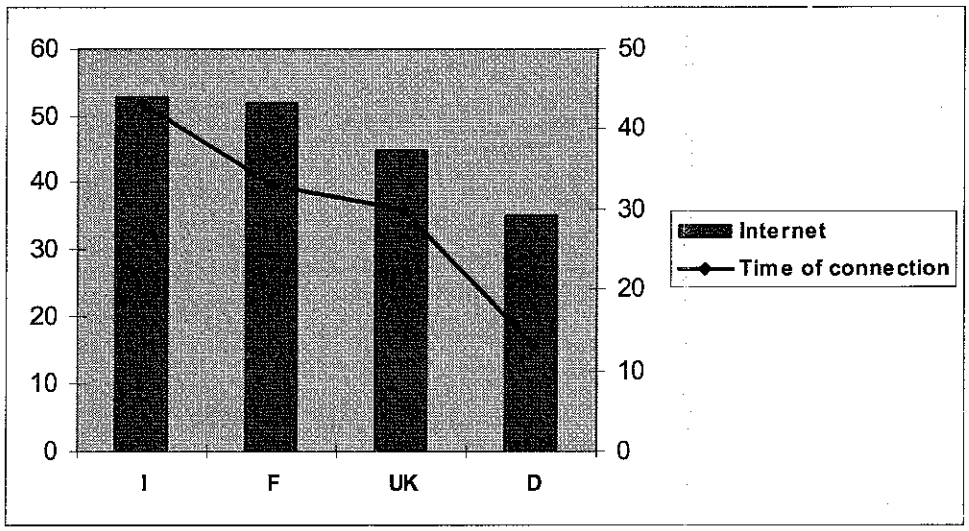

fig. 15 : Visitors to websites in the government sector
left axis are % of internet users; right axis is time of connection in minutes

The number of workstations used by the government sector is increasing rapidly. 88% of employees are now computer-literate, with access to at least a PC. 320,000 workstations are connected to Local Area Networks; there is a rapid increase in the number of workstations connected to the government sector's national network (64%).

Despite these positive trends, even in the government sector, expenditure in technological investment suffered a downturn in 2003. It should be noted however that the second phase of the Italian eGovernment plan (project eDemocracy: promoting democratic projects of a digital democracy), which started in 2004, aims to complete a national network infrastructure to provide access to local government organizations (in particular municipal government in small towns and villages) which are not covered by the current network. This is a major enterprise which will have a significant impact on the use of IT technology in the government sector.

3.7.4. eWork in Italy

3.7.4.1. The current situation

In discussing the situation of eWork in Italy, it is necessary to distinguish between teleworking (remote work from the home) and mobile work (work "on the road" by managers, sales personnel academics, professionals, and technicians). The preceding sections highlight a situation of economic stagnation, in which many pre-requisites for the spread of "traditional" forms of eWork are missing. This finding is confirmed by surveys showing that only 5% of employees in Italian companies actually engage in some form of telework.

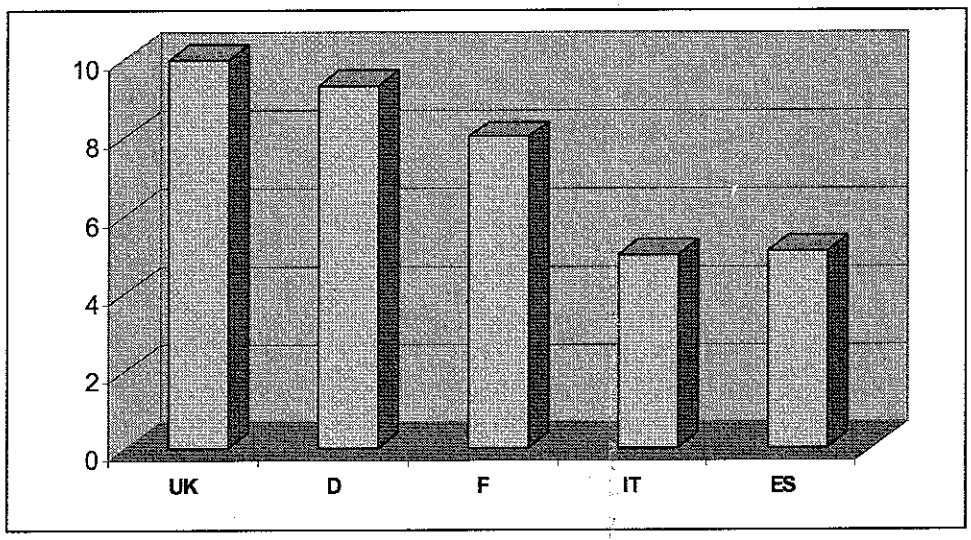

fig. 16 : European teleworkers as a% of the workforce (2003) [Eurobarometer]

The situation changes, however, with regards to so-called mobile work, which has been greatly encouraged by mass penetration of the mobile phone and (to a lesser extent) by the spread of the laptop computers and of internet access.

3.7.4.2. Italian eWorkers

There are many different categories of eWorker. Painting with a broad brush we can trace a key distinction between what we will call knowledge consumers (e.g. Call Center operators, repair/maintenance workers, sales representatives) - workers who use product knowledge within the organization to which they belong to carry out their work - and knowledge producers (professionals, managers, academics, researchers) – who make a direct contribution to the production and processing of knowledge. In what follows we will use this distinction to guide our analysis.

a) Home workers

Most Italian home workers are knowledge consumers. The vast majority of employees are Call Center operators, who make use of the knowledge base made available to them by their company without making more than a minimal contribution, to the knowledge it contains. Up until now in Italy, home work has been a fairly rare phenomenon, found only in major companies (e.g. Telecom Italia). While this method of work may have many benefits for the company and the worker, its use is hindered by a series of factors, which impede its spread on a large scale: first, a lack of investment in technological infrastructure, both in major companies and in SMEs; second, more importantly, company cultures, which are not open to alternative methods of work and which assign great importance to direct control over workers and their work. This situation is made worse by the objective circumstances of many workers, whose homes are often not large enough to accommodate a workstation.

In the short term, developing eWork will be an up-hill struggle, even if it offers high potential for development in the medium to long term. Several studies have predicted that the government sector will turn increasingly to home work as a resource; already in 2003 the government sector launched a series of initiatives in this sense. It is also expected that there will be a spread of initiatives for eInclusion, to promote the employment of people with physical disabilities. In June 2004, the spread of home work was given a new stimulus by the signature of an agreement between Confindustria (Italy's largest employer's association) and the trade unions on the recognition of the pan-European agreement on telework. As a result of this agreement teleworkers are now eligible for the same rights and protection as traditional employees.

b) Low-tech knowledge consumers

These are mobile workers (e.g. sales representatives, repair/maintenance workers), whose work requires a high level of mobility yet who rely for their communications on mobile phones. There can be very little doubt that this is the largest category of eWorker in Italy today. However, an analysis of trends in the number of mobile phones and their use suggests that the market is close to saturation. In the longer term we predict that the number of workers in this category will fall as "low-tech" workers become "high-tech workers" (see below).

c) High-tech knowledge consumers

These eWorkers can be distinguished from their "low-tech" colleagues, not so much by the work they perform (they are again sales representatives, technical support staff etc.) as by the technologies they use. In many cases they work in the IT sector or in other high-tech industries (e.g. pharmaceuticals, advanced manufacturing industry), where laptops and PDAs are widespread. In the short term, the crisis of Italian large industry and the slow development of the IT sector precludes rapid growth in this kind of mobile work. The market could, however, show significant growth, if the telecommunication companies' investments in new technology pay off, generating mass use of innovative technology. One critical element in the development of the market will be the spread of UMTS technology for data transmission and internet access, currently too costly for mass use.

d) Mobile knowledge producers

These are "knowledge workers" in the classical sense of the term: highly mobile, well-educated, professionals (managers, engineers, academics, researchers etc), whose job includes the "production" and/or "processing" of knowledge. The kind of work performed by mobile knowledge producers requires the use of sophisticated mobile technology (PDA, laptops, Wi-Fi),

not only in the office but above all at home and during business trips. As in the case of high-tech knowledge consumers, many of these workers are employed in IT or in other advanced sectors of the economy. Unlike mobile knowledge consumers however this category also includes large numbers of academics, researchers and managers from the public sector. Surveys suggest that the number of workers in this category is growing (as older academics and managers are replaced by younger ones) but is now close to saturation. The slow growth of Italian hi-tech industry suggests that the quantitative expansion of this sector will be relatively slow. It should be noted however this category of worker includes a high proportion of "early adopters" with a high awareness of new technologies and their potential and a strong willingness to use them. Mobile knowledge producers, unlike "knowledge consumers" play an active role in promoting the spread of eWork, with trickle-down effects throughout the economy.

3.7.4.3. New eWork initiatives in the public sector

The analysis of the previous sections suggests that the best short-term prospects for the expansion of eWork in Italy are in the government sector, which in 2003 was the only sector of the economy which saw the launch of new large-scale projects. Some of these are described below.

Formez, under a mandate from the Department of Public Services, is coordinating the project, "*Il Lavoro Pubblico che Cambia*", (Changing work in the Public Sector). The strategic goal of this project is to introduce a new organizational culture to Regional Government organizations eligible for funding from the European Social Fund. The project will introduce telework and online work in regional, provincial and local government organizations, regional ASL (state-run Health Management Organizations) and Universities. The vision guiding the project is to use these new forms of work as a lever to promote innovation and change

This project has the following specific objectives:

- disseminate the concept of eWork ("multi-locational work, online work, cooperative work) at a national level";
- conduct a national survey of eWork in the government sector
- evaluate cases of eWork, identifying example of best practice and using these to guide government sector organizations planning to introduce telework;
- provide support to government sector organizations engaged in the introduction of eWork.

The project, which began in November 2003, will be organized into four phases:

During the *first phase*, which commenced in November 2003 and ended in June 2004, the project surveyed cases of telework creating a database of "best practices" (www.buoniesempi.it);

During the *second phase*, lasting from February to May 2004, the project created a series of "workshops" in which participants in focus groups and remote meetings compared some of the many initiatives already implemented or ongoing within central government, local organizations, universities, ASL and other organizations. On the basis of this work, the project developed draft "Guidelines for the Introduction of Telework in the Government Sector", detailing decision processes, methodologies and practical tools for the implementation of eWork projects.

The *third* and most important *phase* of the project, from April 2004 to February 2005, will see the start up of real-life telework projects;
The *final phase* will be dedicated to dissemination.

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Interesting Websites
http://www.confindustria.it
http://www.funzionepubblica.it/lavoroflessibile
http://www.buoniesempi.it/telelavoro.aspx
http://www.inps.it/Doc/Professionista/Telelavoro/telelav.htm
http://www.mytech.it/mytech/internet/art006010051385.jsp
http://www.uil.it/pol_contrattuali/default.htm
http://www.welfare.gov.it/default
http://www.formez.it

3.8. LATVIA

3.8.1. ICT Policies

The thrust of Latvian regulation is aimed at eliminating obstacles to the effective operation of the single market in telecommunications services and networks and the achievement of universally available modern services. The new regulatory framework is transposed as the new "Law on electronic communications", in force from 1 May 2004.

The National Programme 'Informatics' defines Latvian policy in the information and communication (ICT) sector. The programme for 1999-2005 consists of 13 subprograms focused on building the information society. In 2001 the Socio-Economic Programme 'e-Latvia' was elaborated to follow the principles of the Lisbon Strategy and eEurope+. This programme consists of the three main parts:

- accessibility of internet (a cheaper, faster, more secure internet)
- investing in people and skills (general internet access skills), and
- meaningful use of internet (information services and applications).

One of the most important elements of the programme is the creation of an integrated state information system (mega-system). The kernel of the megasystem consists of: Population Register, Enterprise Register, Tax Payers Register, Cadastral Register and the information system of the Road Traffic Safety Directorate. The Cabinet of Ministers approved the Concept of eGovernment in August 2002, however only 3 out of 21 services are operational.

The government gave impetus to the above mentioned documents by launching several nation wide projects aiming at realising the objectives of creating the information society (Municipal Information System, Latvian Education Information System, Latvian Library Information System, etc).

While competition in the telecommunications market has begun, following market opening in January 2003, local loop unbundling needs to be implemented. The Public Utilities commission approved:

- in May 2003 the "Technical regulations on local loop unbundling"
- in June 2003 "On order on local loop unbundling" regulation and made a decision on implementing local loop unbundling service as from 01.05.2004.

The Information Society Bureau of the State Chancellery has also developed a socio-economic program, e-Latvia. The aim of the program is to promote the creation of the national information infrastructure. The actions defined in this programme fully correspond to the Nordic eDimension action plan approved by the meeting of the IT ministers of the Baltic Sea countries in Riga on 26-28 September, 2001. The socio-economic program e-Latvia contains measures:

- to improve quality and availability of Internet connection;
- to increase the general level of IT knowledge;
- to ensure extensive availability of local and foreign information;
- to create the needed environment for electronic commerce and electronic government applications and transactions.

To create a solid base for the development of eCommerce, the Cabinet of Ministers approved the "Concept on Electronic Commerce" in 2001. The Concept is the basis for a long-term action plan foreseeing a timely and adequate solution of problems related to eCommerce.

In November 2001 the Cabinet approved the "Concept on the united library information system". This concept foresees the united library information system in the state providing computers, software and Internet access to nearly all Latvian libraries.

The Latvian authorities also plan to introduce new personal identity documents (national identity cards), which would comply with international and EU requirements. These documents should form a united and harmonised system with passport-type documents.

3.8.2. Towards the Information Society

There is only one fixed line telecommunication operator providing services to the public at large. These include voice, data and network rental services. Coverage with the fixed telecommunication network is very low, there were less than 30 lines per 100 inhabitants. It is estimated that despite the liberalisation of the fixed telecommunication market in Latvia there will be no substantial fixed infrastructure investment made in rural areas of the country because of the expense.

The mobile telecommunication services market is dominated by two operators. Use of the mobile services is relatively high, on 1 January 2002 25% of the population used the services[59].

Currently there are nearly 40 internet providers, most of them situated in Riga which indicates limited accessibility of ICT services in the rest of the country. Due to the high costs of internet use the accessibility of internet is even more restricted. Around 20% of the households in Latvia have access to internet and the number of the public access points to internet is also low.

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[59] According to Latvia - Draft Single Programming Document Objective 1 Programme 2004-2006. However this number recently increased dramatically reaching the level of 60%, according to the Latvian delegate to ISTC.

3.9. SPAIN

3.9.1. The Spanish economy

The Spanish economy increased its growth over the last year with 2.4%, more than in 2002 (2%), and 1.7 point higher that the average growth of Eurozone (0.7%). This fact helps to diminish the differences between Spain and the more advanced economies within the European Union. The inclusion of new countries in the EU has changed the GDP per capita for Spain relative to the EU, Spanish income in 2003 being about 95% of the Community average.

Concerning employment, the growth in Spain was 1.8%, being one of the countries with the highest increase in employment, this EU rate was practically zero (0.2%). Although the increase was higher than the EU average the employment rate in Spain is still below the Community level (59.18% in Spain against 64.2% in the EU). The number of employed increased 2.7% from 2003 to 2002, the rate decreased in the agricultural sector and increased mainly in service sector. Equal opportunities in the labour market is on the rise as differences between men and women are decreasing: the activity rate for women in 2003 was 43.33% (67.43% in men), but this rate increased 2 point since 2000.

3.9.2. Spain and the Information Society

A study of the Spanish Institute of Statistics shows that 43.3% of all homes have a computer (7.2% more than 2002); The share of PCs users is aproximately 42.7% (among the population older than 15); and the Spanish prefer their home as the place for using the PCs (73.7%). The workplace (48.5%) and study centre (22.2%) are the other preferred places for its utilization. It must be that use can be in several places, for this reason, the amount of places of utilization is higher than 100%.

The number of Internet users is about 34.2% (among the population older than 15), The tendency of small and steady growth is consolidating, and in relation to the PCs users, 80.1% of them, use also internet. The majority of the internet users connect from home (59.7%), but, the workplace is another important place to connect. The access to internet from home is less in Spain than in the EU, in Spain, the share of homes with access to internet is 57.9% of the average share in the EU. This difference is not detected in the Spanish business world where the proportion of the companies with access to internet in Spain is practically the same as in the EU (83.8% in Spain and 84.2% in the EU). The average profile of the Spanish internet user is :

- male, men constitute 60% of the users, against women 40%.
- 25 to 34 years old : the majority of internet users between 25-34 are men (22.70%), but in the age range15-24 are women who use more internet (18.10%).

The study «Internet usage by individuals and enterprises » carried out for EUROSTAT, shows that 79% of the companies with a number of employees between 10-49, have internet, 1% less than in 2002 (EU15=84%). The highest levels of usage of internet in companies is in companies with more than 250 employees, where 98% of them use internet for working, showing a similar ratio as the EU15.

When looking at eCommerce applications by Spanish companies, this is an area which is not much used, as the level of usage of Internet for purchasing is only 3% and 1% for selling, while these rates in the EU are 12% and 7% respectively. In the use of eCommerce services by individuals, the usage of internet for purchasing is 6% and 2% for selling, while the EU, the usage of internet for purchasing and selling are 19 and 5% respectively.

Related to the investment in technology for information society, Spain with a investment of 1.8% of the GDP is still too far from the rate the investment in the EU (3.0%)

3.9.3. National Information Society Policy : España.es

The España.es plan, promoted by the National Government, is a set of actions and concrete projects aimed at stimulating the Information Society, valid for the period 2004-2005. According to analysis, one of the main problems detected is the lack of interest and training of the citizens in their access to the services, a lack of interest due partly to the lack of knowledge and partly due to the lack of attractive services. The plan focuses on the one hand on encouraging the demands for connection to the new technologies by society, and on the other improving the supply of infrastructures, contents and services that provide an incentive for this connection. These two areas, together with the need to connect SMEs to the new technologies, are the three main pillars and action lines of España.es:

- Reinforce the supply and services that promote the demand
- Improve accessibility in the broadest sense, providing public access points, realising an effort in training and communication with reference to the advantages of the Information Society
- "Connecting" SMEs, by increasing their business relations through the internet, so as to accede to information society services.

There are six areas of action:

- administración.es: stimulating and implementing eAdministration in the national government
- educación.es: infrastructures, equipment and contents for schools and public training institutes
- pyme.es: integrate SMEs from those sectors that are less advanced in the application of information society technologies
- navega.es: integrating those citizens that are currently not connected, through the creation of public access points and training actions
- contenidos.es: on the one hand patrimonio.es for the digitalisation of the historic patrimony of Spain and its dissemination and exploitation, and on the other hand seguridad.es: initiatives related to digital contents
- comunicación.es: communication campaign by creating a brand and information and dissemination activities

The plan has an initial funding of 1.029 million Euros, with a 63% participation of the National Government, 26% of the Regional Authorities and 11% of the private sector.

3.9.4. eWorking in Spain

Taking all types of eWork together (home-based and mobile telework as well as self-employed teleworkers, in Spain 5% of the working population can be classified as eWorkers. The Share of employed population who spend at least one full working day per week/ who spend less time teleworking from home is 2%. When looking at mobile workers, i.e. mobile eWorkers as those who spend 10 hours per week or more away from their home and their main place of work, e.g. on business trips, travelling or on customer's premises, and make use of online connections while doing so, less than 1% of the Spanish workforce can be described as "mobile workers".

The figures show that teleworking and mobile working are not solidly established in Spain, this is paradoxical when looking at the number of employees interested in some form of eWorking: the SIBIS study shows that 60% of the working population is interested in some form of eWorking. Other studies indicate that there is a huge potential for eWorking, although in practice it is not used much.

A study of Deloitte on work-life balance among Spanish executives in companies that have already implemented policies in this area, shows that the main policy is related to flexible working hours (43%) while the option of teleworking is only used by 17% of executives, while at the same time they consider it the second best option for a better work-life balance. The study shows also that the time dedicated to the organisation is still a decisive element for promotion, and that this constitutes a barrier for reduced hours and teleworking as an option.

Things are changing for the positive though, and more and more companies, as well as other organisations and public administrations are promoting the use of eWorking, mainly as an option for the reconciliation of professional and private life. The interconfederal conference on collective agreements for 2003 dedicates a whole chapter to teleworking. The conference promoted by the main trade unions and entrepreneurial organisations, states that it is necessary to adapt and develop the contents of the European Agreement to the Spanish reality, taking into account those areas that are of most interest, so that a larger and more adequate application and use of teleworking in a way that is favourable for both enterprises and employees.

Also things are changing in universities, for example the Open University of Cataluña has initiated traineeships, which are realised using teleworking. The objective is to provide the students with the opportunity to work in networks and on-line. The pilot experience started in 2000 and since then over 40 students have participated, with very positive results both from the part of the students, as well as on the part of the participating companies.

When looking at the initiatives at regional level, the following examples of support from the regional administration can be highlighted:

- The Regional Government of the Balearic Islands offers its civil servants the opportunity to work from home in the first year after having a child, this initiative is part of the efforts of the regional government to reconcile professional and private life.

- The Regional Government of Valencia has sent out a call for proposals in which they intend to finance teleworking and eCommerce projects in the rural areas. The telework projects need to include training and promotion and need to respond to the specific needs of the rural areas. A total budget of 400.000 Euros has been made available.

3.9.5. The future of eWork in Spain

A slow but steady growth has been detected in the number of organisations that offer some type of eWork to their employees, increased access from homes to ICT and Internet has helped in promoting this. Still Spain is far behind the EU average, but the developments related to increased flexibility and awareness of the need for reconciliation of professional and private life give a positive impulse to all new types of working. Another development that can positively influence the number of eWorkers, is the increase in autonomous/self-employed workers, they usually use their homes as a basis for their work. The use of ICT is on the increase among this group, as the technologies are more and more accessible and prices are going down.

There are still barriers to eWorking that are related to cultural issues, a still more traditional entrepreneurial culture (the large majority of the Spanish companies are family based SMEs), and the fact that more people are living in the same house than in northern European countries. The increased application and use of eWorking in companies is parallel to the modernisation of the organisations and the increase of flexibility, further developments in the field will lead to a more extensive use and application of new working schemes.

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Websites	
General information	www.teletrabajo.es/ http://deteletrabajo.uji.es/ www.canaltrabajo.com/teletrabajo/
Spanish Association for Teleworking	www.aet.es
resources for companies and workers	www.agoratel.com
mayor trade unions & special chapter on teleworking	www.ugt.es/teletrabajo/menuteletrabajo.html
teleworking for disabled persons	www.discapnet.es/Discapnet/Castellano/Empleo/Teletrabo

Main eWork centres in Spain	
Telecentro De Gordexola http://www. gordexola.net	the first rural eWork centre that opened its doors in Spain
Telecentro De Taramundi http://cfnti.net/telecentros/dicit	eWork centre in a rural area with one of the highest levels of youth employment in Spain
Telecentro Biazipe http://www.biazipe.net	One of the most firmly established eWork centres with a clear focus on labour and less on social aspects of eWorking
Centro De Teletrabajo Del Parque Tecnológico De Andalucía http://www.pta.es/cet/	EWork centre located in the main technological park of Andalucia
Telecentro Cein	http://www.cein.es
Centro De Recursos De Teletrabajo	http://formentera.net/pobox.htm
Centro Telematico Rural En Sierra De Gata	http://agatur.net
Centro Tematico Del Bierzo	http://infored.org

3.10. SWEDEN

3.10.1. Economic and employment status

Swedish economic growth was 1,6% in 2003. Though the market continues to be weak, the growth for 2004 is estimated to be 2,5% [60]. The targeted employment rate of 80% for the age group 20 - 64 years was not attained and ended at 77,9%.
The open unemployment rate in 2003 was 4% while an additional 2,2% of the workforce was included in training programmes and other employment facilitating measures.
High sick leave level and increasing early retirements on pension - and related expenditure – still weigh heavily on the state budget.

3.10.2. Governmental initiatives and taxes [61]

The government's initiative "An Information Society for All", launched in 2000, offers the possibility for individuals and organizations to obtain tax reductions for broadband investments. This option has now been prolonged to 2006. Also the beneficial option remains for enterprises to finance acquisition of personal computers by employees for private use. However, more stringent rules were initiated in 2003 and the tax reduction has been limited.[62]

3.10.3. The Swedish Government's ICT policies [63]

Already in March 1994 the Swedish government established the first national commission for information technologies. The commission outlined visions for a successful information society within seven areas: education, judicial system, public administration, health and medical services, communication network, industry, commerce and research within information technologies. In May 2003 the Government received the final report from the fourth IT-commission. In addition to the report of the current situation it analyses and proposes new outlines for information technology policy. In this respect the Swedish government has established several work groups/delegations to concentrate on the following ICT-issues:

- electronic services that create added value for citizens and enterprises and foster efficiency in the public sector
- information strategy that promotes sustainable growth and the government's ICT policies expressed in the proposal 'Information Society for All'
- standards for electronic administration in order to establish secure and efficient information exchange between authorities and between authorities and citizens. This is an important requirement in providing 24-hour interactive eServices to citizens
- eDemocracy to promote citizens' participation in the political processes, how IT can be used to reduce environmental effects and promote ecologically sustainable development
- ICT in public administrations

[60] Statistics Sweden www scb.se
[61] Riksdag & Departement nr 2, 2004
[62] Nytt från Revisorn nr 11, 2003
[63] Fakta om informations- och kommunikationsteknik i Sverige www sika-institute se

Sweden still is one of the leading ICT countries on the global level. The number of homes connected with broadband increases every year. Sweden is also in the leading position within EU to offer interactive electronic services within the public administration. For example, Lantmäteriverket – the Swedish land surveying authority – was first in the world to offer maps and marine charts to be downloaded into palm computers via mobile phones.

3.10.4. Internet in business

Access to Internet in homes and at work is still higher than in most OECD countries. About 95% of all enterprises with more than 10 employees use Internet and 52% of the work force work with computers connected to Internet[64]. About 68% of all enterprises with more than 10 employees have their own web sites. An increasing number of Swedish enterprises are connected via broadband, 62% of enterprises used ADSL or other high capacity connections in 2003.

3.10.5. Remote eWork in Sweden [65]

More than 1/3 of the enterprises in Sweden have remote eWorkers among their employees. This is the case if remote eWork is defined as regular work carried out outside the ordinary workplace once a week or more often and all enterprises with more than 10 employees are included. The larger the company the more common is eWorking. In companies with 500 employees or more the frequency is 87%, i.e. employees in a great majority of Swedish larger enterprises take advantage of carrying out work from their homes or other premises. Still the frequency varies between industries and business sectors. Remote eWork is most common in the communication sector of which almost ¾ of enterprises have remote eWorkers among their employees. Within the construction and transport industries only 18% of organizations have remote eWork.

There are many indications that remote eWork is common also in large public administrations. One of the best examples of successful implementation of remote eWorking is the Swedish Energy Agency which was established in 1998 and located to Eskilstuna – a city one hour travel from Stockholm. In order to encourage employees to stay with the agency and attract new competent colleagues, all employees were offered the option to work from home two days a week. Today the number of employees is about 180 of which only 25% live in Eskilstuna. About 35% of the staff still lives in Stockholm, but as they work from home two days a week, the commuting is not too hard. Follow-ups show that the way of working is beneficial for both the employees and the agency. Today remote eWorking is an integral part of the work of the agency.

3.10.6. Implementation of the Framework Agreement on Telework

In May 2003 the Swedish social partners signed the Framwork Agreement on Telework, which was agreed in July 2002 by UNICE, UEAPME, CEEP and ETUC. Following the agreement at the European level, the Swedish implementation has the character of a general guideline framework, which is voluntary and can be adjusted by local agreements. The Swedish agreement is signed by the employer's associations: the Confederation of Swedish Enterprise, the Swedish Association of Local Authorities, the Federation of County Councils and the Swedish Agency for Government Employers. Signatories at the union side are: LO – the Swedish Trade Union Confederation, TCO –

[64] Fakta om informations- och kommunikationsteknik i Sverige www sika-institute.se

[65] Fakta om informations- och kommunikationsteknik i Sverige www sika-institute.se

the Swedish Confederation of Professional Employees and SACO – the Swedish Confederation of Professional Associations.

Together, these 7 organisations, representing both the private sector and public administrations, cover a major part of the workplaces and employees in Sweden.

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Useful websites	
Invest in Sweden Agency	www.isa.se
Facts about ICT in Sweden 2004	www.sika-institute.se

3.11. UNITED KINGDOM

3.11.1. The UK experience of eWork

According to recent estimates from the Labour Force Survey (Spring 2004) over 2.3 million people in the UK use ICT to work from home, or from multiple locations using home as a base; this represents 8.1 per cent of total UK employment (see Table 1). Approximately 1.9 million of these workers (6.9 per cent of those employed) can be defined as teleworkers.

Table 1: eWorking in the UK, 2004

	Number	%	Percentage of eWorkers
All eWorkers, of which	1,929,135	6.9	100.0
Telehomeworkers	437,737	1.6	22.7
Multilocational eWorkers	887,643	3.2	46.0
Occasional teleworkers	603,755	2.2	31.3
e-enabled homeworkers	343,170	1.2	
Other employed	25,637,798	91.9	
Total	27,910,103	100.0	

Source: UK Labour Force Survey, Spring 2004

Table 2: Teleworking in the UK by economic activity, 2004 (per cent)

	Telehomeworkers	Multilocational eWorkers	Occasional teleworkers	All teleworkers	e-enabled homeworkers	Other employed	Total
Employee	42.5	39.3	84.1	54.1	45.5	90.2	87.2
Self-employed	57.5	60.7	15.9	45.9	54.5	9.8	12.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: UK Labour Force Survey, Spring 2004

When considering the different forms of eWorking, we can see that the common stereotype of an eWorker, as someone who spends most of their time working at home using ICT, still represents a minority among those engaged in this activity. Indeed, the largest group of eWorkers are the Multilocational eWorkers (accounting for nearly half, 46.0 per cent, of all teleworkers), followed by Occasional Teleworkers, who account for 31.3 per cent of all teleworkers.

Dimensions of eWorking

Although there has been much debate regarding the exact scope and definition of eWorking (see, for example, the work of the STILE project[66] for a full discussion on these issues) most commentators are agreed that eWorking has at least three dimensions:

- **Geography** - eWorking relates to the performance of work related tasks away from 'traditional' employment settings (*eg* the office or shop floor).
- **Use of ICT** - eWorking relates to work that has been enabled, *and is dependent upon*, the use of information, computer and telecommunication technology (ICT).
- **Intensity** - A distinction can be drawn between those who use ICT to work away from traditional employment settings on a regular basis, and those who do so occasionally.

Since 1997, the UK Labour Force Survey has collected data that enable us to define eWorking in accordance with the dimensions outlined above. The typology adopted by the UK's Office of National Statistics draws a distinction between those working from home and those working from several locations but using home as a base; it also separates out the regular eWorkers from the occasional ones:

- **Telehomeworkers** — These are people who usually work from home with the support of a computer with a telecommunications link, and require this equipment in order to perform their job.
- **Multilocational eWorkers** — These are people who usually work from multiple locations using home as a base, and who require the support of a computer with a telecommunications link in order to perform their job.
- **Occasional teleworkers** — These are people who do not normally work from home, or use home as a base, but have done so in the week preceding the survey; they also require the support of a computer with a telecommunications link.

In addition to the three categories described above, a fourth category can be defined: people who use ICT to work from home, or use home as a base, but do not require this technology, may be defined as 'e-enabled homeworkers'. The remainder of this article will make a distinction between the three main groups of eWorkers outlined above.
This typology was also used in the EMERGENCE project to derive estimates of eWorkers across the EU [67].

3.11.2. What are eWorkers doing ?

Patterns of eWorking are very much dependent upon the economic status of those employed. Around six out of ten Telehomeworkers and Multilocational eWorkers are self-employed individuals (see Table 2). However, among Occasional Teleworkers the proportion of those who are self-employed is considerably lower, and more closely reflects the proportion of self-employed workers in the workforce as a whole, *ie* 15.9 per cent of Occasional Teleworkers are self-employed, compared to 12.8 per cent self-employment among all workers.

[66] Several publications from the STILE project which discuss this are available for download from www.stile.be See, especially, http://www stile be/Newsletters/Newsletter_no_4.pdf

[67] See Bates P, Huws U, *Modelling eWork in Europe: Estimates, models and forecasts from the EMERGENCE Project, IES Report 388*, 2002, summary downloadable from
http://www.employment-studies co uk/summary/summary.php?id=388

Table 3: Teleworking in the UK by full-time or part-time work, 2004 (per cent)

	Telehomeworkers	Multilocational eWorkers	Occasional teleworkers	All teleworkers	e-enabled homeworkers	Other employed	Total
Full-time	54.7	83.3	90.1	79.1	78.2	74.3	74.7
Part-time	45.3	16.7	9.9	20.9	21.8	25.7	25.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: UK Labour Force Survey, Spring 2004

Nearly 80% of eWorkers and e-enabled homeworkers are engaged in full-time employment; among non-eWorkers the proportion is closer to three-quarters of those employed (see Table 3). However, eWorkers form a very heterogeneous group of workers, and while Occasional Teleworkers are almost universally likely to be full-timers (90%) the proportion of full-time workers among Telehomeworkers is nearer to one-half (54.7%).

Table 4 highlights the occupational profile of eWorkers. Around three-quarters of those eWorking (73%) are from the managerial, professional and associate professional/technical occupations. In the case of Telehomeworkers and eMultilocational workers this may partly be predictable, given the proportion of self-employed workers among these groups. However, the dominance of managerial and professional occupations among occasional eWorkers is more likely to be a reflection of the increased capability of these occupational groups to work outside their office environment, either during standard working hours, *eg* flexible working arrangements, or through out-of-office overtime, ie 'taking work home'.

Table 4: eWorking in the UK by occupation, 2004 (per cent)

	Managers and Senior Officials	Professional occupations	Associate Professional and Technical	Other occupations	Total
Telehomeworking	26.4	15.0	26.4	32.2	100.0
Multilocational	22.0	18.5	24.1	35.4	100.0
Occasional telew.	37.8	32.5	18.9	10.8	100.0
All eWorkers	27.9	22.1	23.0	27.0	100.0
e-enabled	14.0	30.2	14.8	41.0	100.0
Other workers	13.7	11.6	13.1	61.7	100.0
Total	14.6	12.5	13.8	59.0	100.0

Source: UK Labour Force Survey, Spring 2004

Turning now to the sectoral spread of eWorkers, one-third of all eWorkers (32.7%) are employed in the 'Business and Finance' sector, while a further one-quarter (23.7%) are employed in 'Other Private Sector Services' (comprising transport and communication, distribution, and hotel and catering). Of the remainder, another one-quarter (25.4%) work in the 'Primary and Production Sectors' (agriculture, energy, manufacturing and construction) and just under one-fifth (18.1%) are engaged in 'Public Administration' (see Table 5). Relative to the distribution of employment across sectors in the workforce as a whole, eWorkers were more than twice as likely as non-eWorkers to be employed in Business and Finance, but were around 50 per cent less likely to be employed in Public Administration. Once again, there were some clear differences between the

different groups of eWorkers, with over one-third (34.7%) of Occasional Teleworkers employed in Public Administration.

Table 5: eWorking in the UK by sector, 2004 (per cent)

	Primary	Production	Business and finance	Other private services	Public admin	Total
All eWorkers	2.1	23.3	32.7	23.7	18.1	100.0
Telehomeworkers	1.0	18.4	41.5	26.7	12.3	100.0
e-Multilocational workers	2.3	29.8	32.2	26.2	9.5	100.0
Occasional teleworkers	2.7	17.1	27.3	17.9	34.7	100.0
e-enabled teleworkers	4.0	24.5	16.3	22.3	33.0	100.0
Other employed	2.2	21.1	14.2	33.7	28.8	100.0
Total	2.2	21.3	15.5	32.9	28.1	100.0

Source: UK Labour Force Survey, Spring 2004

3.11.3. Who are the eWorkers?

eWorking in the UK is dominated by men, who account for nearly two-thirds of all eWorkers (see Table 6). However, these figures mask a considerable variation in the sex distribution among different forms of eWorkers. Although men account for nearly eight out of ten Multilocational eWorkers (77.1%), and two-thirds of the Occasional Teleworkers (65.0%) they represent a minority among Telehomeworkers (43.7%). One explanation for this is that women are more inclined to take up regular telehomeworking as a method of balancing their work with their commitments to look after dependent young children.

Table 6: Teleworking in the UK by full-time or part-time work, 2004 (per cent)

	Telehomeworkers	Multilocational eWorkers	Occasional teleworkers	All teleworkers	e-enabled homeworkers	Other employed	Total
Male	43.7	77.1	65.0	65.7	58.6	52.8	53.7
Female	56.3	22.9	35.0	34.3	41.4	47.2	46.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

eWorkers are generally older than their non-eWorking counterparts (see Table 7). While one in six workers in the UK are between the ages of 16 and 25, among eWorkers, the proportion is closer to one in every 40. At the other end of the age spectrum, nearly one-half (45.6%) of eWorkers are over the age of 45, compared to one-third (34.9%) of all workers. The older age profile of eWorkers can be explained by their activity. As we have seen, eWorkers are more likely than their non-eWorking counterparts to be engaged in self-employment or to work as managers or senior officials. These are groups that tend to be disproportionately dominated by older workers. It can also be surmised that eWorking can only be successfully carried out by people who have already developed the skills and experience to work without supervision.

Table 7: eWorking in the UK by age, 2004 (per cent)

	16 to 25	26 to 35	36 to 45	46 to 55	56 to 65	66 plus	Total
Telehomeworkers	1.5	17.9	26.6	28.4	20.4	5.2	100
Multilocational eWorkers	2.4	19.8	31.3	27.8	16.6	2.0	100
Occasional teleworkers	3.4	22.3	35.8	27.7	10.0	0.8	100
All eWorkers	2.5	20.2	31.7	27.9	15.4	2.3	100
e-enabled homeworkers	4.7	18.4	26.4	28.3	18.8	3.3	100
Other employed	17.4	23.0	25.7	20.8	11.6	1.4	100
Total	16.2	22.8	26.1	21.4	12.0	1.5	100

Source: UK Labour Force Survey, Spring 2004

eWorking is often actively promoted as a means to promote social inclusion, especially to provide opportunities for disabled people to enter employment when other traditional forms of employment prove restrictive.

The relationship between the different forms of eWorkorking and disability is reviewed in Table 8. The table makes a distinction between three types of disabled people:

- Those with an illness or impairment that falls within the UK's Disability Discrimination Act (DDA) 1995, *ie* "a physical or mental impairment which has a substantial and long-term adverse effect on the ability to carry out normal day-to-day activities'.
- Those with an illness or impairment that affects the ability of an individual to carry out paid work, or affect the amount of paid work they can do.
- Those with an impairment that falls within the DDA definition of disability and affects an individual's ability to do paid work.

Overall, eWorkers were marginally more likely to be disabled, 14,6% of eWorkers were disabled (compared to 13,1% of those who were not eWorkers). However, Telehomeworkers had the highest proportion of disabled workers, and were over one-fifth (22,1%) more likely than non-eWorkers to be disabled, at 16% compared to 13.1%. When we consider those who were classified as being both within the DDA and work-limiting definitions of disability, Telehomeworkers were over one-third (35,1%) more likely than their non-eWorking counterparts to report being disabled.

Table 8: Teleworking in the UK by disability, 2004 (per cent)

	DDA disabled	Work-limiting disabled only	DDA disabled and work-limiting disabled	Not disabled	Total
Telehomeworkers	5.4	3.3	7.3	84.0	100
e-Multilocational workers	5.4	3.6	5.8	85.2	100
Occasional teleworkers	5.3	2.7	5.2	86.7	100
All teleworkers	5.4	3.3	6.0	85.4	100
e-enabled teleworkers	4.7	3.3	7.5	84.5	100
Other employed	4.7	3.1	5.4	86.9	100
Total	4.7	3.1	5.5	86.7	100

Source:UK Labour Force Survey, Spring 2004

Finally, we consider the qualifications obtained by eWorkers. On the whole, eWorkers are very well educated (see Table 9). While one-fifth of the working population in the UK have a degree or equivalent qualification, among eWorkers that proportion is closer to two-fifths (38.3%). Perhaps reflecting the occupational bias of teleworkers, over half (52.1%) of occasional teleworkers have degrees or equivalent qualifications. Conversely, while around one in ten of the working population has no qualifications, among eWorkers the proportion is less than one in every 25, and among Occasional Teleworkers only around one in every 50 reported having no qualifications.

Table 9: Teleworking in the UK by highest qualifications, 2004 (per cent)

	Degree or equivalent	Higher education	GCE 'A' Level or equiv.	GCSE grades A-C or equiv.	Other qualifications	No qualification	Don't know	Total
Telehomeworkers	33.1	13.2	19.2	20.0	9.8	4.4	0.1	100
Multilocational eWorkers	31.5	12.6	29.6	15.2	6.9	4.0	0.2	100
Occasional teleworkers	52.1	14.2	17.4	9.3	4.7	2.0	0.2	100
All teleworkers	38.3	13.3	23.4	14.4	6.9	3.5	0.2	100
e-enabled homeworkers	37.7	9.9	23.6	16.4	7.4	4.8	0.1	100
Other employed	18.4	9.6	24.9	21.9	13.5	11.2	0.5	100
Total	20.0	9.9	24.8	21.3	13.0	10.6	0.5	100

Source: UK Labour Force Survey, Spring 2004

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4. REPORTS FROM COUNTRIES OUTSIDE THE EUROPEAN UNION

4.1. JAPAN

At long last, the general economic climate seems to have climbed out of its prolonged doldrums although optimism is only skin deep. The labour market remains tough, however, with existing employees being let go in still large numbers and companies very cautious about taking on new hires. The greater use of so-called contingency workers continues unabated causing several policy headaches, and there is also a growing policy awareness that work/life balance is taking over from work/family balance as a key issue in labour management.

According to Wendy Spinks[68], probably the biggest eWork related news in Japan during the past year was the July 2003 announcement of the Japanese government's new IT strategy, informally known as "e-Japan Strategy II". The strategy singles out seven key areas including work and labour for cutting-edge programs, setting a provocative eWork target of 20% of the workforce by 2010. More information on this strategy can be found on the Prime Minister Webpage.[69] This has since been followed up by the e-Japan Priority Policy Program announced in June 2004, which includes human resource development.[70]

More specific to telework was the March 2004 announcement of guidelines for the proper introduction and implementation of telework by the Ministry of Health, Labour and Welfare. Stating that the adoption of these new workstyles requires a reassessment of how existing laws apply, the guidelines aim at clarifying labour management issues involved with telework. Of major importance are the following considerations:

- Starting out methods and evaluation systems
- Advanced establishment in writing of responsibility for telecommunications and other costs
- Voluntary employee participation
- Employer provision of extensive skills development and training programs as well as responsible employee work practices.

This is now to be followed up by the compilation of a work-at-home manual by a panel of experts convened in July. The manual will focus on the key points of managing a successful program and include case studies and a specific Q&A section.

Elsewhere in national government, the National Personnel Authority which is in charge of work policy for Japan's public servants, proposed in July 2004 that diverse workstyles including work-at-home be adopted for the public service sectors. Whether such a recommendation leads to actual practice in the near future is doubtful, but it is interesting that the typically conservative Authority has come up with such a proposal.

More examples of public-sector initiatives include the Ministry of Economy and International trade (METI) launch of a venture support project last July called DREAM GATE.[71] Operating

[68] Tokyo University of Science, Chair, Japan Telework Society spinks@ms.kagu.tus.ac.jp

[69] http://www.kantei.go.jp/foreign/policy/it/index_e.html

[70] http://www.kantei.go.jp/foreign/policy/it/040615summary/040615gaiyo_e.pdf

[71] http://www.dreamgate.gr.jp/ (in Japanese only)

centres in both Tokyo and Osaka, it offers a broad range of support services to young entrepreneurs.

The Urban Renaissance Agency, a major public housing authority, announced late in 2003 the availability of SOHO housing in Yokohama.[72] Traditionally, residents of public housing have not been allowed to conduct business activities from their homes. With rents running from 130,000 – 200,000 yen per month, City Court Yamashita Park opened in March 2004 and provides a boosted electrical supply, optical fibre cabling as well as simple office space.

In an interesting move, the chain of Seven-Eleven convenience stores began operating a printout service in conjunction with Fuji Xerox that can be accessed via the Internet.[73] Users are required to pre-register on a dedicated site, which then allows them to print out at any store of their choice. The implications could be quite far-reaching for eWorkers dealing with remote customers not as technically knowledgeable as themselves.

Elsewhere on the SOHO front, we continue to see many movements in regional areas. For example, SOHO Support Centre Toyooka was set up in Hyogo Prefecture (near Osaka) and is a network of three centers offering support to local SOHO workers. Major activities include seminars and business consulting.[74]

Finally, both the Japan Telework Society[75] and the Japan Telework Association[76] continue to play a key role in disseminating research and raising overall awareness.

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[72] http://www.ur-net.go.jp/ (in Japanese only)
[73] http://www.printing.ne.jp/ (in Japanese only)
[74] http://www.soho-toyooka.jp/ (in Japanese only)
[75] http://www.telework-gakkai.jp/ (in Japanese only)
[76] http://www.japan-telework.or.jp (in Japanese only)

4.2. RUSSIA

Electronic Russia Program 2002-2010

4.2.1. Context

Despite fast ICT development tempos in the last decade, Russia failed to reduce the extent to which it lags behind the more industrially developed countries in the level of informatisation of society and economics. This has partially been caused by general economic reasons (long crisis in economics, low level of material well-being of the majority of the population). Simultaneously, the inadequate development of ICT in Russia is aggravated by a number of factors creating obstacles for a broad introduction and effective use of ICT in the economy, and the development of production in the ICT area. The number of such negative factors includes:

- inadequate legal-normative base developed with no account of modern ICT options;
- inadequate development of ICT in state administration area, non-availability of state administration application of effective technologies for management, or organization of interaction with the citizens and businesses;
- absence of integrated information infrastructure and effective information support of the markets for goods and services, including in eCommerce area;
- inadequate level of personnel training in creation and use of ICT;
- barriers appearing as a result of deficiencies in economic activity regulation of the access of Russian enterprises and other ICT companies to Russian and world markets;
- high level of monopolization of communication networks creating barriers for their use and leading to biases in the tariffs policy.

The Federal Program "Electronic Russia 2002-2010" (e-Russia) shall ensure formation of a legal-normative base in ICT area, development of information and TC infrastructure, form conditions for switching onto open information systems (including via the Internet), and ensure effective interaction of the state administration and local self-government structures with the citizens and businesses on the basis of broad introduction of ICT. In the process of the program implementation, general ICT development trends (basic principles, standards and typical solutions on various projects implementation) should be defined.

4.2.2. Purposes and challenges

The basic purposes of the Program are the creation of conditions for democratic development, raising of the effectiveness of economic activity, securing of rights for free search, receipt, transmission, manufacture and distribution of information, expanded training of ICT specialists and qualified users.

The Program implementation should allow :

- effective use of the intellectual and personnel potential of Russia in the ICT area;
- secure Russia's harmonious membership of the world economies on the basis of economic and information openness;
- overcome Russia's lagging behind the developed countries in the level of ICT use and development;

- ensure equal entrance of Russian citizens into the global information community on the basis of observation of human rights, including right for free search, receipt, transmission, manufacture and distribution of information, and right for confidentiality of any information protected by law and available in the information systems (IS).

In order to achieve the program purposes it is necessary to carry out the following tasks :

- to elaborate an effective legal-normative base in the ICT area, regulating among other things the aspects of securing information safety and realization of rights guaranteed by the Russian Federation Constitution;
- to raise effectiveness of interaction of state administration and local self-government structures both between themselves and with businesses and citizens on the basis of the use of modern ICT;
- secure conditions for raising the effectiveness and expanding the use of ICT in economic and social areas;
- to raise the level of personnel training and retraining and improved education on the basis of ICT;
- to promote development of independent mass media by means of stimulating ICT introduction into their activity;
- to promote development of telecommunications infrastructure and options of connecting to open information systems for the citizen and businesses, and to noticeably raise the quality of services rendered in this area;
- to elaborate a single information and telecommunications infrastructure that is necessary for improvement of work of the state administration and local self-government structures, enterprises and other institutions;
- to realize conditions necessary for a broad use in Russia's commodity markets of eCommerce mechanisms accelerating the promotion of goods (services), maintenance of steady production, satisfaction of consumer needs and raising the effectiveness of management of the supply of products for the federal and state needs.

4.2.3. Program resources

The total volume of financial resources required for the Program implementation is 77,179.1 million RUR (in 2002 prices), including the federal budget funds – 39,383 million RUR, budget funds of the RF members – 22,610,10 million RUR (supposedly), extra-budget sources – 15,186 million RUR.

The volume of financing of the Program first phase (2002) will be 2,604.4 million RUR, second phase (2003-2004) – 25,480.5 million RUR, third phase (2005-10) – 49,094.2 million RUR.
For implementation of the Program first phase 350 million RUR will be allocated from the federal budget, which accounts for 13.4% of the total planned volume of this phase financing. It is supposed that 1,259.7 million RUR (or 48.4%) will be allocated from the RF members budgets, and from extra-budget sources – 994.8 million RUR (or 38.2%).

4.2.4. Expected results

The e-Russia Program implementation is expected to affect **all areas of social life**. The upgrading of the legal-normative base in the ICT area aimed at simplification of the order or licensing and certification procedures will promote the acceleration of development tempos in this area of economics.

The implementation of Program measures will boost the number of businesses and the development of competition in ICT area. This will be accompanied by a noticeable increase of the stimuli for the accurate and full observation of all legal norms regulating the activities in ICT and a cut-down on the share of the software "shadow market", which will boost the ICT area profits and tax contributions to the budget.

The increased demand for ICT products brought about by their wide use in operations of the state administration and local self-government structures will secure in the period up to 2005 growth of the national production of goods and services in this area and exports growth of 15-20% annually. It is planned that the volume of IS and software market will go up 2-3-fold by 2005 and 5-6-fold by 2010. The share of ICT sector in the economy will enlarge several-fold and account by 2010 for no less than 2% of the total volume of the Russian market.

The fast development of ICTs and their application in all areas of social life will promote the formation of a more progressive structure of the economy, launch principally new opportunities for growth in production and exports of national hi-tech products.

The Program measures implementation in the area of training of personnel and launching of a legal-normative base for foreign-economic activity in the ICT area will achieve a many-fold boost in exports from Russia of information products and services, which with development of the world market will reach USD 2 billion by 2005.

The measures envisaged by the program for modernization of state administration and local self-government will secure a major acceleration of the information exchange processes in the economy and in society at large, including among citizens and the state administration structures, raising of the effectiveness of the state administration and local self-government, creation of principally new opportunities for monitoring of processes in economics and society, adoption of timely decisions for these processes regulation, and, in result, growth of the number of citizens and institutions using ICT in their interrelations with the state administration and local self-government structures.

Use of modern ICT in the work of the federal executive-power structures, those of the Russian Federation members and local-self-government will reduce the expenses for administration and management, including a release of some technical personnel of these structures. The share of eDocuments turnover in the total documents turnover is planned to reach up to 65% inside the departments and up to 40% of the interdepartmental documents.

The launching of the **eCommerce** system for tendering for product purchases for the federal and state needs will allow savings of up to 20 - 40% of the funds of corresponding budgets that are allocated for the preparation and carrying out of tenders and organization of purchases.

An important role will be played by integration of state and municipal IS into a single IS, which will reduce the opportunities for financial machinations, violation of laws, tax-dodging, etc. As a result of Program implementation, in fact a single order of collection, processing, accumulation, storage, search and distribution of information (information process) will be formed, which will noticeably boost the opportunities for co-ordination of actions of the administrations and will promote improvement of the country's security and defences.

The Program measures envisaged for accelerated distribution of modern means of information transmission and introduction of eDocuments in the business area will lead to a reduction of time involved in making transactions, interaction with the state administration and local self-government structures and, in the final count, a reduction in selling costs and higher competitive ability of national products.

The program implementation will create all necessary conditions for bringing Russia's ICT standards in line with the world system of **standards**, promote the increased presence of Russia in the Internet, and boost the range and scale of Russia's participation in the global market. An indicator of the program effectiveness in this area will be the volumes of the Internet IS produced in Russia, their share in the general global resources and volumes of foreign-economic activity in the ICT area.

Great importance will be given to the launching of a **single information space** in the country's entire territory. Development of ICT will create prerequisites for overcoming the economic lag of some territories, secure for citizens and organizations, independent of their place of living and working, an **equal accessibility** to all national and global open IS.

As a result of a special geographical extension and the central organization of Russia's information resources, it is most important for many regions to have an opportunity of connection to remote IS for provision of necessary information to citizens and businesses. Development of ICI will potentially allow all citizens to receive medical, legal and other kinds of consultation services from highly qualified specialists, considerably increase learning and raising of qualification options by means of a remote learning system, and will become an important step towards development of democracy and actual provision of **equal rights of all citizens in the information area**. An indicator of this kind of demand may be a fast growth of the number of Internet-users and the volume of services received with its help.

The program measures implementation will secure an advanced **growth of the number of computer-network users** and the volumes of transmitted information, as compared to the growth in the number of computers. Forecasts suggest that the number of internet-users will go up more than 8-fold by 2005, compared to the year 2000. Important conditions for Internet proliferation are the tariffs for connection to and use of this network. It is expected that expansion of ICI-services market will reduce these tariffs by 40% by 2005, by approximately 50% by 2010, and reduce the monthly tariff for an unlimited time of connection to the Internet to three times the minimal wage.

A considerable place in the Program is devoted to the measures aimed at development of learning technologies with ICT use and **training of ICT specialists (eSkills)**, as a result of which we will witness improved learning effectiveness, and simplification of citizens education procedure by

means of wide use of information resources in the learning programs area. Apart from that, the Program measures implementation in the learning area will raise the general level of citizens' literacy in modern methods of work with information, and development of the system of training of ICT specialists will be secured. The pace of ICT proliferation envisaged in the Program will boost the need for specialists in this area. By 2005, the annual demand for secondary and higher professional education specialists will account for up to 100 thousand persons and by the end of the Program term – for over 130 thousand persons. The Program envisages securing by 2005 the annual training of no less than 25 thousand ICT specialists with a higher professional education, and no less than 60 thousand specialists in this area with a primary and secondary professional education. The further development of personnel potential will be defined by the needs in the said specialisms. With implementation of FTOP "Development of a single education-informational space, 2001-05", it is planned to connect to IS (including the Internet) all higher education establishment by 2005, and all secondary special education establishments by 2010.

On the whole, the Program implementation will significantly raise the competitive strength of the country's economy at the expense of cutting down on costs and improve products and services quality, the effectiveness of state administration and local self-government, and secure impowerment of the quality of life for citizens, reduce the gap with the more developed countries, avoid information and economic isolation from the world economies and the world community, and secure development of the international integration processes.

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5. NEW RESEARCH DIRECTIONS

"New working environments" embraces high level IST research and development and contributes to policy in new working environments designs and organization of work in the networked knowledge-based economy. The aim is to facilitate creativity and collaboration, and to foster resource-use efficiency, value-creation and extended work opportunities for all in various settings.

The focus is on the areas of: eProfessions and individually driven working, new workplace designs, knowledge management in media-rich working environments, including mobility and multimodality, collaborative work and organizations, ambient organizations and new organization of work. Technical directions include the use of grid technologies in new work environments and organizations, targeting towards integrated applications and platforms.

The next four sections describe major activities within new working environments, and the following chapter lists research results from recent and current projects.

5.1. THE SOCIAL LIFE OF KNOWLEDGE

Research in Knowledge and Capabilities Management

Within the framework of research activities in new working environments, considerable attention is being given to the challenges of effectively leveraging the competencies of people working together. This research necessarily draws on established and emerging theories of *individual capabilities* – on the various traits and features which give individuals their "capacity to act" in a particular situation. Many such theories are grounded in practice within organisational psychology and human resource management, though they continue to evolve as we understand better the various mechanisms which make up the human psyche. What is less well studied, and perhaps surprisingly so, is *what exactly individuals do when they come together to work on common projects*. There are few, if any, robust models of "collective intelligence", and little documented evidence of observation of working practices in the thousands, millions even, of organisational environments in which people work together across an enlarged Europe. A better understanding of the ways individual and collective capabilities are combined to deliver "capacity to act" is central to the challenge of delivering higher productivity and better, more effective and widespread value creation in the working environment. Such an understanding needs to be enriched with a clearer understanding of the different sociocultural and governance models at work in corporate settings throughout Europe, and how such models affect the abilities, desires and motivations of working Europeans to create and share knowledge together.

Europe is not alone in needing to uncover the mysteries of work. *"How people work is the best kept secret in America"*.

The challenge for the knowledge and capabilities management area under the IST programme is to interlink the best established and emerging research in individual and collective intelligence with IST tools and services which can deliver added value to workers and managers of networked work processes. One cannot consider *work* in the 21st century without considering *network*, and network assumes connectivity, virtuality, and sharing across corporate and community work spaces.

The work under supervision belongs to a "people-centric" tradition, and is therefore in line with the challenges of the IST Programme to build the research base for a *user-centred* information society, not one driven primarily by technological considerations with a distorted vision of *"if we build it, they will come"*. The lesson of early knowledge management, hard-learnt by industry and business is that, unfortunately, *"yes, we built it, but unfortunately nobody used it."* First generation knowledge management, based as it was on riding the wave of corporate intranets, produced nice portals which provided information about a range of topics sometimes of interest to the company, its customers and employees. While much of this work had a rather poor return on investment (ROI) it did at least serve to show that knowledge management is actually about something else, *knowledge* as opposed to *information*. And knowledge, defined for the purposes of this text as "capacity to act" is a particularly personal and interpersonal phenomenon. Andy Boyd at Shell summed this up quite nicely when he said *"Knowledge management doesn't work if we need information but we do not need each other"*.

The proposed research portfolio sits very strongly in a societal view which sees the first challenge of knowledge management to be "that we need each other". This challenge is not new to Europe.

Socrates was perhaps one of the first modern thinkers to understand that *"in order to know, we need others"*. Other authors have reflected on the fact that the creation and sharing of knowledge are primarily social processes, that knowledge is socially constructed. In the networked economy such social construction happens in places which are not traditionally the focus of the "hierarchical corporate".

"Knowledge is embodied in people gathered in communities and networks. The road to knowledge is via people, conversations, connections and relationships. Knowledge surfaces through dialog, all knowledge is socially mediated and access to knowledge is by connecting to people that know or know who to contact." (Denham Grey, 2003)

Knowledge management is a foundation science which sits astride our old organisational models, and the models of a modern knowledge economy to which we aspire. It is providing insights and materials which are challenging outdated concepts of work organisation, Taylorism included, and reductionist approaches to human creativity and innovation. It is also providing new insights into what it means to lead or manage a 21st century organisation.

Knowledge being what it is - the lifeblood of corporate success - knowledge management throws down the challenge and vision that Europe should offer the best technological and societal environment for collaborative knowledge creation and sharing, supporting in particular self-structured work organisation paradigms. At a workshop to discuss the research challenges ahead[77], a number of clusters were identified, as follows:

- first and foremost is to arrive at a deeper understanding of how knowledge emerges, and what it means for humans to be 'collectively intelligent'. Such research should investigate how knowledge is aggregated and how knowledge from different groups – especially different disciplines - is combined. Such research should also consider how conflict and different perspectives are handled, and how lack of knowledge at the boundaries of disciplines and groups can be made visible as an opportunity for development. There is an associated need for research into the complex interplay between the emergence of knowledge and the emergence of new organisational forms. Research is also required into ways that ICTs could make visible the invisible, and could present and exploit transparently the 'neurophysiology' of groups.

- secondly, knowledge which emerges as a result of collective endeavour can take many different forms and can frequently be - or at least seem to be - contradictory. While much knowledge may be transient, attempts to 'capture' more lasting knowledge must acknowledge this richness: research is required into ways to represent and navigate such emergent, evolving, non-hierarchical knowledge, and to leverage deeper more tacit knowledge beyond the current possibilities for such representation. We must envisage a knowledge space that can accommodate both 'permanent', scholarly, historic informational sources of knowledge and more transient, often tacit knowledge which resides in complex multi-lingual, multi-disciplinary, multi-cultural, political, organisational and interpersonal settings.

[77] Knowledge Anywhere Anytime – Research Consultation Workshop – Brussels, 29-30th April 2004 For further information, please see http://www cordis lu/ist/directorate_f/7fp htm

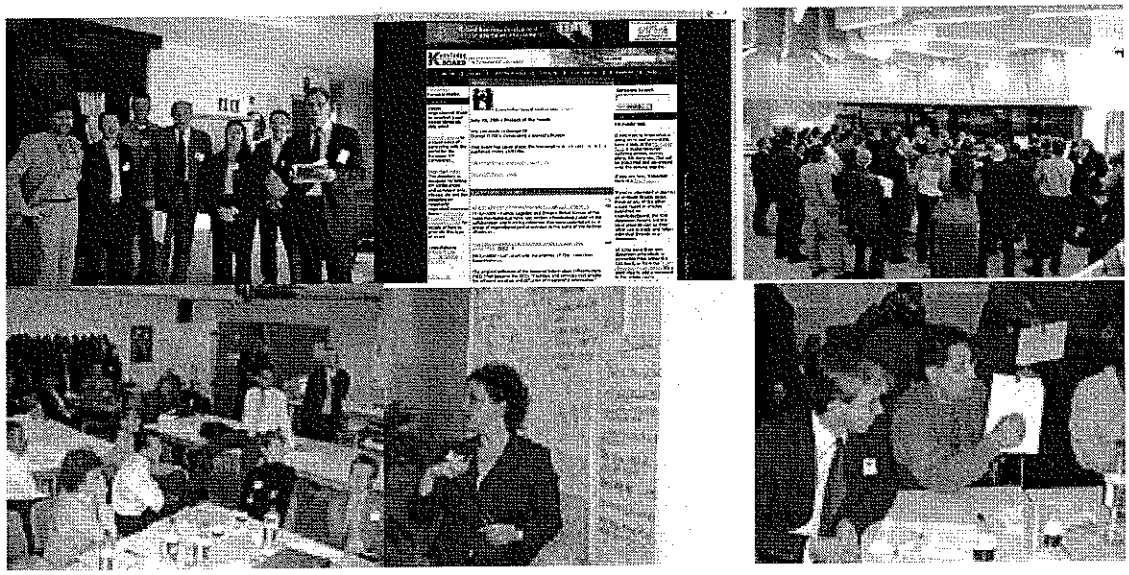
- thirdly, the workshop considered technological research requirements for an 'information grid' that might provide informational and interactional support to groups, communities and networks and provide for enhanced computer-supported collaborative working beyond what is currently available today. The infrastructure should support 'knowledge flow', not just process-oriented 'workflow', and play a role in making visible interpersonal aspects such as the establishment and sustenance of trust, compatibility and confidence relations, accessibility of competences and expertise. Similarly, it must accommodate to the extent possible access to multiple versions of evolving knowledge sources, including tacit knowledge. The infrastructure must ensure all the properties of security, dependability, availability, privacy, etc., but in a way that recognises the much richer view of knowledge in this vision than is generally considered in present 'knowledge management systems', which are typically based on a reductionist view of human knowledge. In parallel, research is required to explore the prospects for a new philosophy of intellectual property rights and their management to accommodate the dynamic and emergent nature of knowledge. The absence of a more satisfactory approach than at present will otherwise constitute a serious barrier to progress. Research is also needed into new governance models - for example, how technology can support the processes of awarding recognition, sharing power and status and encouraging knowledge-friendly behaviour.

- finally, due to changing needs, research is required of a very different nature, with very significant policy implications for society. Such research might explore to what extent and in what way, if any, the process of knowledge emergence may be steered, and in what way the nature of ICT and supported processes implicitly affects the outcome. The ambition is to encourage innovation, but if collaboration is supported with no explicit constraints, results will necessarily be unpredictable. Will we then accept the socio-technological and cultural outcomes whatever they may be? Or should we reflect on what kind of socio-technological and cultural structures we want, and steer towards them? These questions target the very nature of leadership and management in the knowledge society.

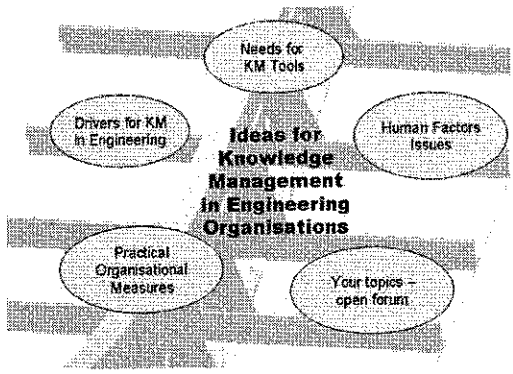
In the following section, there is a short overview of running and recently finished research projects which are attempting to provide answers to some of the above challenges.

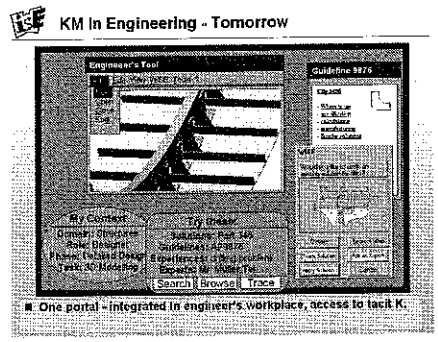
The KnowledgeBoard [78] project has brought together 8,000 research and business professionals to discuss knowledge and capabilities management in its many multi-displinary facets, from individual and organisational psychology through work science, management science, ethnography, anthropology, philosophy, technology, and more recently the natural sciences (mainly biology) to understand better the phenomenon of complexity and non-predictability of outcomes. KnowledgeBoard is also a showcase for the different projects and initiatives launched in this area under the IST Programme. The IST Project Corner on KnowledgeBoard gives a concise overview of many running and finished IST projects in the KM area.

[78] http://www knowledgeboard com



One of the particularly interesting aspects of the WISE[79] project was the fact that it took a cognitive science view on work processes within the aerospace industry, and in particular, with respect to the knowledge management challenges of designing clips for large aircraft.



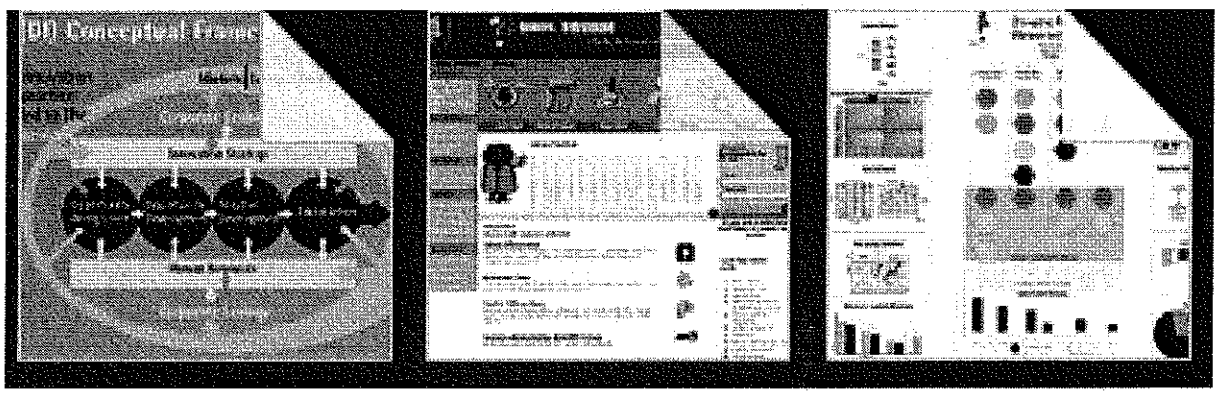


The OPAL[80] project entered new territory by trying to unwrap the challenge of providing resourcing services for finding available expertise online. In particular, it attempted to define a mechanism for representing interpersonal trust in online partnerships, and to provide a toolkit which would allow compatibility of candidates to be assessed.

The DISRUPT-IT[81] project proposed a methodology and toolkit to assist managers in providing an effective strategy for disruptive innovation. Its various toolkit components draw on a number of scanning, idea pipeline and futurising techniques to allow for early identification of potential disruption to current products and services offered by a company. The toolkit takes a wide "ecology" approach to the issue of disruption, considering a wide range of possible factors and

[79] WISE project site : http://www.ist-wise.org
[80] OPAL project site : http://www.opal-tool.net
[81] DISRUPT-IT project site : http://www.disruptit.org

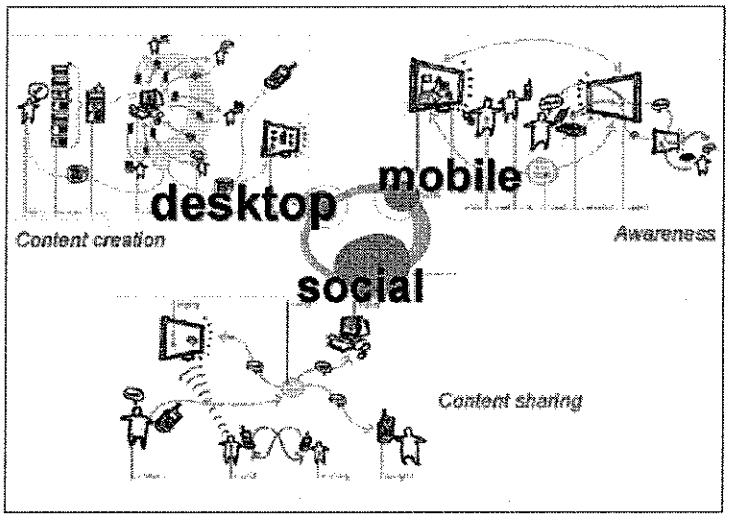
indicators which might enable company leaders and managers to detect the likelihood of disruption and the capabilities of the organisation to react to and manage this.



This project is closely related to the earlier NIMCUBE[82] project which focussed on the issue of identifying and valuing knowledge assets (people and things) and building a management dashboard to manage the balance between reusing and creating knowledge in new product development processes.

Both DISRUPT-IT and NIMCUBE followed a particularly interesting project management approach which maximized opportunities for the research consortium members to interact with each other and with the reviewers during the project lifetime.

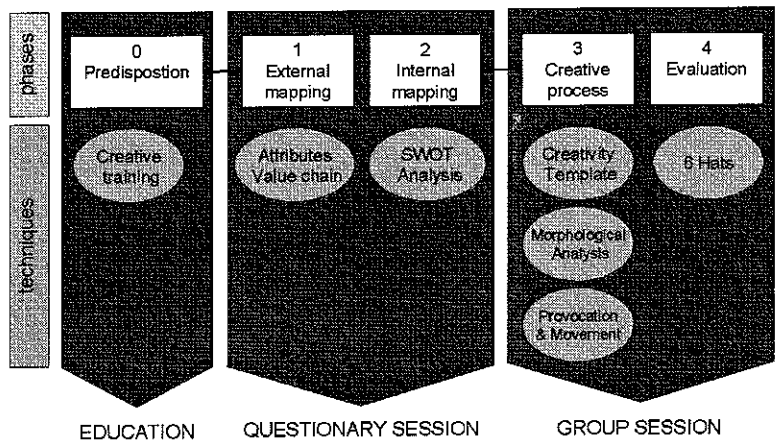
The MILK[83] project is building an integrated knowledge management solution comprising a PC environment, a mobile environment and an innovative *"social environment"* which favours serendipitous interaction between employees and customers through a large wall screen, known as a community wall. Through its exploration of the social interaction mechanisms at work in the corporate environment, MILK is exploring the premise that knowledge is constructed socially, and that it is built (created) and shared in social settings that are at present not well understood, and undervalued in traditional corporate settings. The MILK solution proposes to allow users to "stay aware and keep in touch". The MILK "Community Wall" has been installed and tested in non-traditional or standard working environments, including kitchens, cafeterias, lobbies etc.



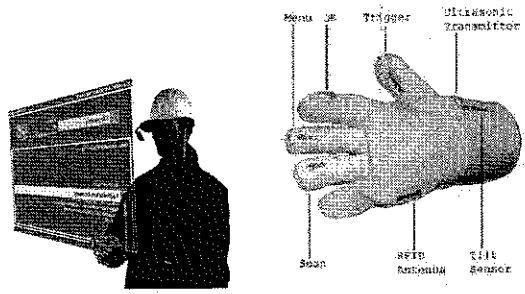
[82] A white paper on the NIMCUBE approach is available at http://www knowledgeboard.com/item/47047.

[83] MILK project site : http://www milkforum.com

The CREATE[84] project is focused on the process of idea generation and creativity. It has built a library of some 80 creativity techniques, a subset of which it is testing through a series of workshops at a mid-sized white goods manufacturing and motorcycle manufacturer , both in Southern Europe. In addition, it is providing a number of creativity workshops to organisations throughout Europe, notably in Norway and Slovenia.



The WEARIT@Work[85] project is developing a European framework for wearable computing, which will provide a basis for the launch of numerous products and services as this technology matures and customer demand for wearable computing devices increases in coming years. From a knowledge and capabilities management perspective, it is noteworthy that the project is developing four use cases, two involving individual work settings, and two involving collaborative work settings, for which it will provide for extensive observation activities to try to develop a realistic impression of what happens in the workplace. The project will also support the idea of "expert looking over your shoulder", which will provide operators with the possibility to interact not only with information necessary for the task at hand, but equally to interact richly with recognised experts through which problems can be solved and issues tackled through dialogue. The project will also assess aspects of human vulnerability in the context of wearable computing, and address the issue of career development of operators of wearables, from a skills/capabilities development perspective.



Contact	
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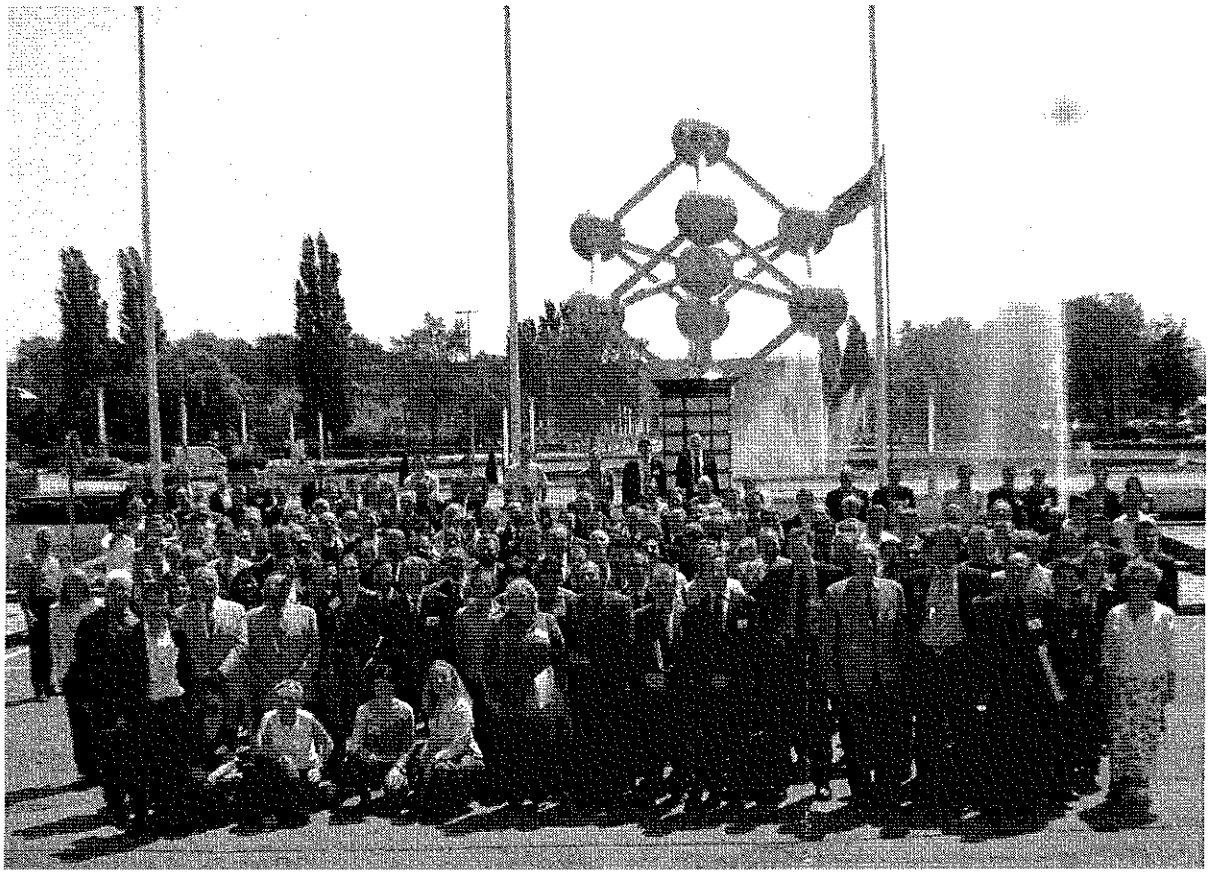
[84] CREATE project website : http://www.diegm.uniud.it/create

[85] WEARIT@Work project website : http://www.tzi.de/wearIT-at-work/

5.2. AMBIENT INTELLIGENCE@WORK

AmI@Work Family of ERA Communities - An Initiative for Systemic Innovation!



AMI@Work communities and Mobile Strategic Objective launch participants joined together for a family picture in front of the 'Atomium'. Overall more than 300 participants attended the 7-9 June 2004 launch event in Brussels

The New Working Environments unit of the European Commission's Information Society Directorate-General fosters Information Society Technologies (IST) research to bring about systemic innovation, in order to enable high-quality and productive person-centric and collaborative new working environments in Europe. To achieve this aim it is necessary to link European 'dream team' communities of research and deployment in a cross disciplinary manner.

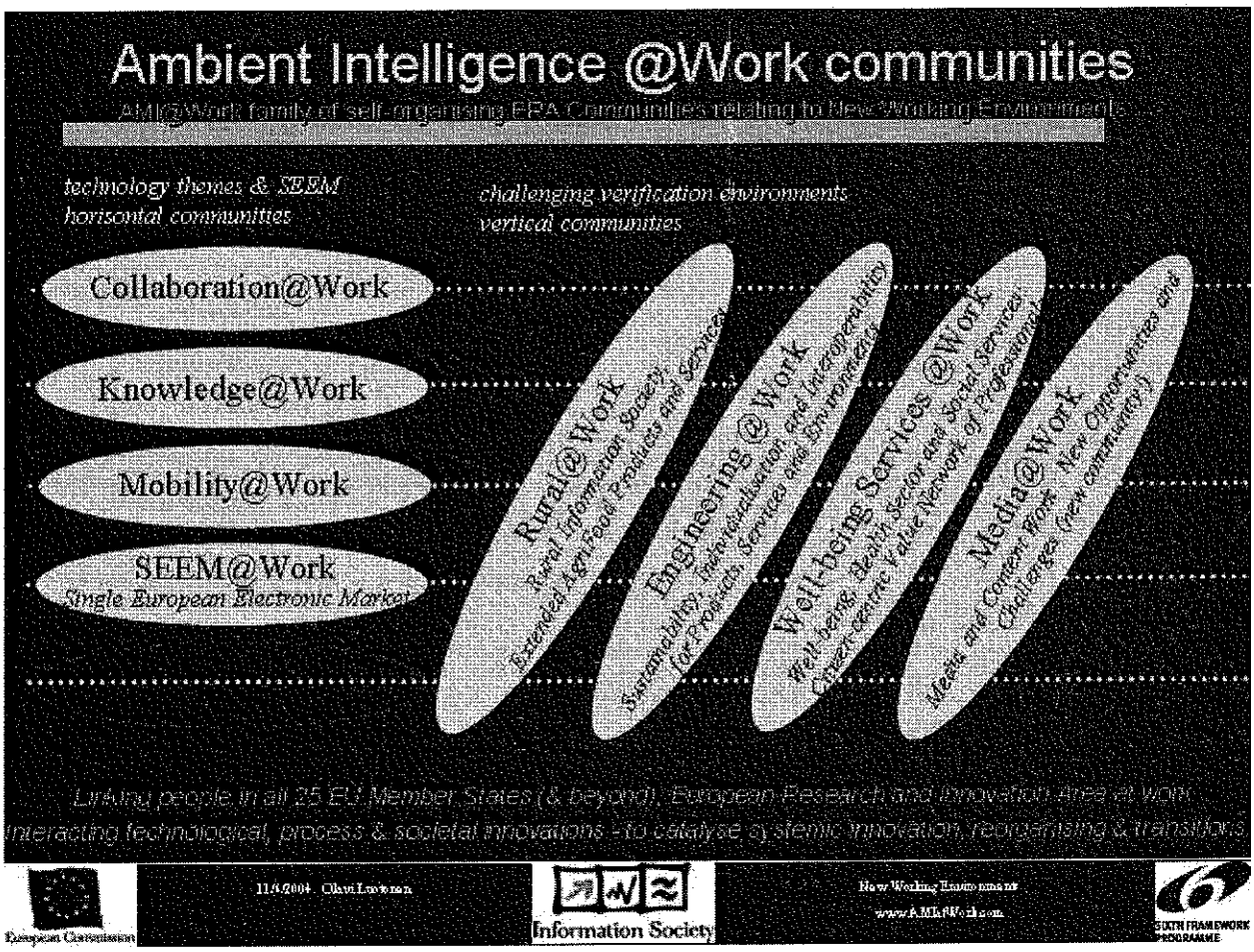
The AMI@Work family of self-organising ERA communities links people in all 25 EU Member States and beyond for a European Research and Innovation Area (ERA) at work. This family facilitates innovation in new working environments, ERA-wide and in EU 6th Framework Programme of research.

The family consists of self-organising communities, facilitated by elected leaders, in collaboration with EU projects MOSAIC and SEEMseed, and the New Working Environments unit of DG INFSO, together with related Commission services. These communities represent potential cross-fertilising technology themes and challenging validation environments with a significant technological, economic and societal impact. The *AMI@Work family of ERA communities* itself is

a real-life collaboration experiment. 'Practice what we preach'. These communities are based on web-based membership registration by *interested individuals*.

Following preparatory workshops in Brussels in March and in Budapest in May, the main launch event was held in Brussels from 7 to 9 June 2004. The first day was dedicated to AMI@Work communities, including leadership elections. On the second day, the plenary session launched the AMI@Work family of ERA communities, as well as EU IST projects related to the Strategic Objective 'Applications and Services for the Mobile User and Worker'. The third day focused on information, networking and partnering for the future EU IST Calls for Proposals as well as AMI@Work Special Interest Groups.

Erkki Liikanen, European Commissioner for Enterprise and the Information Society observed at the launch plenary that "Innovation is not just a matter of buying technology, it is about redesigning businesses processes and the way things are done. Mobile communications, particularly the next generation of mobile services which allow high speed access to the Internet, e-mail or databases while on the move, will deliver a major boost to productivity and help to strengthen our competitiveness. AMI@Work is a highly innovative way to look at how we can make work more interesting, creative and productive".



Many participants, from over 20 European countries, have already registered for this initiative. There are different motivations to join the AMI@Work family of self-organising communities:

- **Collaborate** with other new working environments users, experts and leaders, throughout Europe and beyond. Use synergies, not to 'reinvent the wheel'. Connect your current networks with complementary networks. Cross-fertilise development organisations or transition arenas to reach for crucial systemic changes collaboratively.
- **Co-create** a real working European Research and Innovation Area for users, experts and leaders of corporate, professional, local, regional, national, European or global projects or 'tribes' - where the whole is clearly greater than the sum of the parts, where cross disciplinary value creation thrives, where 'passionate pragmatists', visionary early adopters, create a path to the future, together with technological and societal innovators.
- **Find out** how far collaborative technologies can help us in enabling a Rural Information Society, well-being at work or giving doctors and nurses more support and time to care and cure. How can innovative mobile work environments combine productivity and quality of life? What technologies, processes and societal innovations will sustain global 24-hour collaboration across time zones for product design and service creation?
- **Identify** partners for collaborative European 'dream teams' with joint objectives and complementary competences for future Calls for Proposals of European IST research projects. You already live in an EU of 25 countries and want to link people, create ties and extend your networks to the new Member States. Contribute to the conception of the 7th Framework Programme.

Contact Points	
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5.3. COLLABORATION@WORK

Next Generation Collaborative Working Environments

Collaboration@Work is the name given by the European Commission New Working Environments Unit to next generation collaborative working environments, comprising innovative technical solutions as well as socioeconomic and policy-related aspects. Collaboration@Work aims at improving human abilities to work collaboratively, thereby increasing creativity which, in turn, will boost innovation and productivity as well as support new value creation forms. The enabling systems and platforms will provide advanced services to act as a catalyst to the development of worker-centric, flexible, scalable and adaptable tools and applications to boost seamless and natural collaboration amongst a diversity of agents (humans, machines, etc) within knowledge-rich virtualized environments and with any devices available anywhere anytime.

The work to be carried out in the framework of this initiative will receive funds from the Strategic Objective "Collaborative working environments" of the Sixth EU Framework Programme for Research and Technological Development (FP6) IST priority Work Programme 2005/2006. This Strategic Objective will develop next generation collaborative working environments, which will provide collaboration services to make possible the development of worker-centric, flexible, scalable and adaptable tools and applications. This S.O. will focus on three layered tasks following a systems approach. The first task will centre on the design and development of innovative concepts, methods and core services for distributed collaboration at work. The second task will support research on tools for collaborative work in rich virtualised environments, building on top of the core services developed in the lower layer. The upper focal point will develop innovative validating applications for collaborative work in content-rich, mobile and fixed collaborative environments, testing and integrating the core services and tools developed in the previous focal points.

5.3.1. European advantage for innovation: cultural diversity

The reason for launching the Collaboration@Work initiative is the need to turn European cultural diversity into a competitive advantage for European companies. This will help increase European competitiveness in the new era where collaboration and self-organising organisations[86] will play a key role in the global economy. There are several research studies suggesting that when a team is made up of a group of people from very diverse backgrounds it is more likely to achieve breakthroughs in innovation. Therefore teams made up of workers from every part of Europe will likely develop innovative products, thereby increasing European competitiveness by opening new markets and increasing productivity.

Lee Fleming's research[87] suggests that when a creative team is made up of people from very similar disciplines, the average value of its innovations will be high, but it will be unlikely to achieve a breakthrough. On the other hand, it suggests that a group of people from very diverse disciplines is more likely to achieve breakthroughs – but will also produce more low-value innovations, see picture below. However this study misses the cultural diversity as another way to enrich

[86] Ticoll, David. "Get self-organised". Harvard Business Review 82, no 9 (September 2004): 18-19

[87] Fleming, Lee. "Perfecting Cross-Pollination" Harvard Business Review 82, no 9 (September 2004): 22-24

background diversity of working teams, as it mainly considers diverse discipline as unique source of diversity.

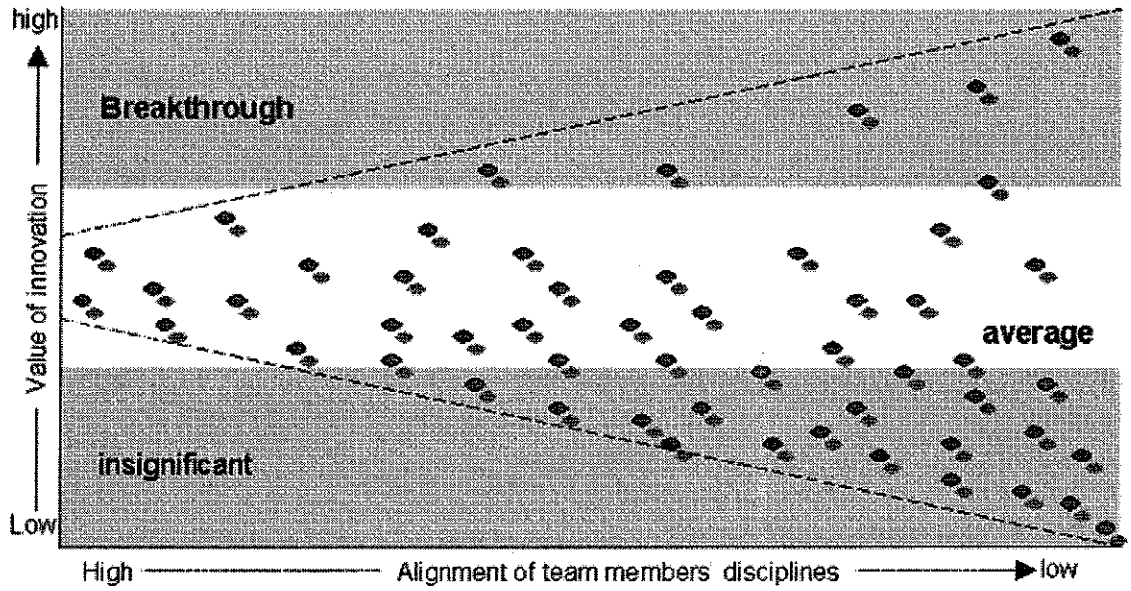

figure 1. Impact of team members' diverse disciplines on innovation (Source: Lee Fleming 2004)

Several of our previous European research projects suggest that one way to increase the chance of good innovation and to reduce the chance of failure is to bring together people with cultural diversity and deep knowledge in their respective discipline. A lowering on the diversity of disciplines and an increase on the diversity of cultural background might also increase the chance of high innovation and breakthroughs.

Other studies suggest[88] that because of diverse views from skill sets, age, gender, race and different ethnic groups, many more perspectives are brought into play, and those ideas that are brought forward affect other ideas, as well as ideas being more thoroughly examined. These concepts are applicable to European business through a group of people that are from diverse parts of Europe, and as long as those different behaviours and cultural views are understood by all, high-value innovation and group dynamics will help European companies succeed.

Yet, research is still required to define exactly the value of European diversity for achieving significant innovation. This research area will get funding from the first focal point of the SO "Collaborative working environments" to design and develop innovative concepts and methods for distributed collaboration at work.

5.3.2. RTD challenges and innovation

The achievement of the objectives of the Collaboration@Work initiative requires research activities to be carried out following a seamless system integration approach. Collaboration@Work applied research is positioned at the crossroads of the convergence between infrastructure and services, and terminal devices[89] (see figure below). This system approach is reflected in all our activities and it is the key for success in this multidisciplinary research domain. The outcome will

[88] Gardenswartz L. and Rowe A. "Managing Diversity: A Complete Desk Reference and Planning Guide". McGraw-Hill. 1998.

[89] Technology Roadmap on Software Intensive Systems. Eureka ITEA Cluster March 2001

be enabling technologies that will support e-activities, such as eBusiness, eCommerce, eManufacturing, eGovernment, eHealth and eLearning.

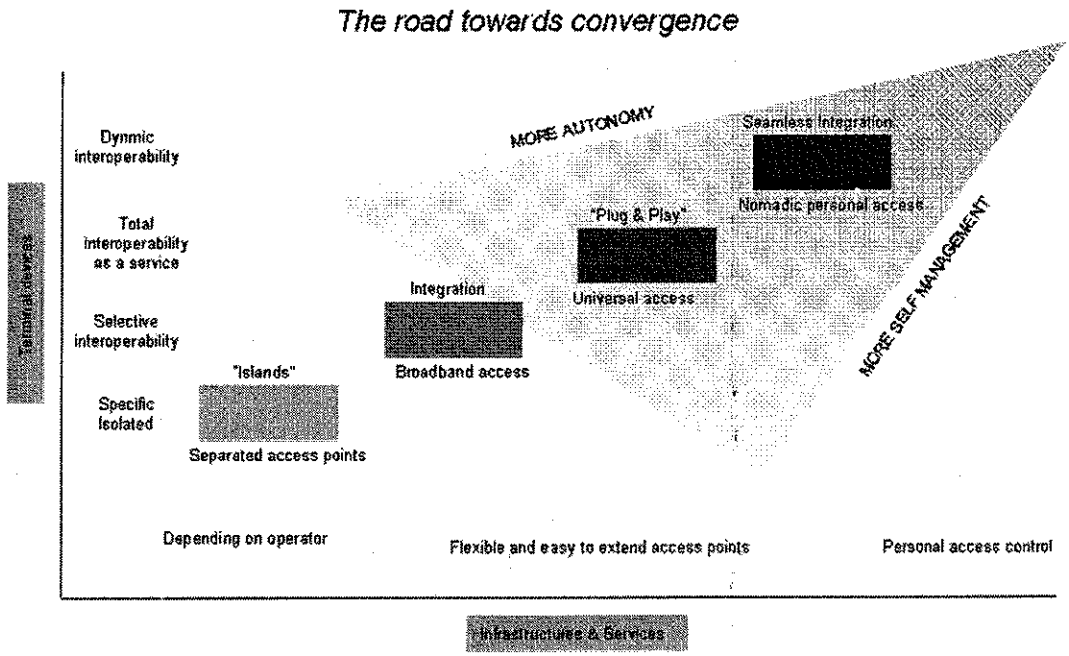

figure 2. Convergence of infrastructure and services with terminal devices. (Source: Technology Roadmap on Software Intensive Systems, Eureka ITEA Cluster, March 2001)

After several meetings, the Collaboration@Work Expert group (CWEG) drew up the 'Next Generation Collaborative Working Environments' report. It includes a list of the 9 issues that will have to be tackled in order to realize the vision of *'Next Generation Collaborative Working Environments (NGCWE) delivering quality of experience to co-workers, based on flexible services components and customized to different communities*[90]*'*. These 9 issues, as well as the specific related RTD challenges, are:

1. **Reference architecture for collaboration at work.** Potential internationally agreed open reference architecture, such as the reference architectures defined by consensus creation organisations like the Workflow Management Coalition, W3C, IETF, etc, which enables network specialists and software developers to create reusable and interoperable collaborative components, application and services.
   Challenge: to agree on common reference architecture which enables the development of reusable and interoperable service and application components for collaboration at work.

2. **Ontologies for collaboration at work.** Distributed collaborative working environments need a semantic description of the preferences of the users, the relevant computing components and the collaboration acts and processes. It will allow the matching amongst the required capabilities for a specific task and the available services. It will also identify the most adequate interaction given an actual context.
   Challenges: to improve modelling languages and models to consider the complexity of distributed groups of workers; the development of ontologies for semantic compatibility or for specific domains.

[90] Collaboration@Work Expert group Report on Next Generation Collaborative Working Environments. June 2004. To be found on: www amiatwork.com / publications

3. **Plug&Play interoperable service oriented architecture (SOA) for collaboration at work.** Web services and ontologies will enable interoperability among services that will, in turn, allow automatic composition of services which will be able to adapt to dynamically changing environments.
   Challenges: to improve current infrastructure for more ubiquitous, secure and reliable software based collaboration at work services; to create methods for communicating and describing collaboration service functionalities; to create new mechanisms and methods for collaboration at work service composition.

4. **Smooth "upper layer" middleware interaction with the underlying layers.** The enabling "upper layer" collaboration @ work middleware for distributed environments will incorporate the advanced network services offered by the communication layer combining different middleware, e.g. UPnP, Web services, etc. In particular, it will consider IPv6 to recover end-to-end communication providing access to the end user application, requested quality and services, signalling protocols and network services to allow applications to seek authorization and network status information, as well as other non IP networks, including sensor or mobile networks.
   Challenges: to investigate the usage of the end-to-end IPv6 model for provision of new collaboration at work services; to improve the way to get network information related to QoS, security, VPNs, multicast, and location for group of workers; to incorporate mediation algorithms to manage complexity and interworking with sensor or mobile networks of workers; to create overlay networks which integrate network services with content services in order to adapt the collaboration services to the available network capabilities and context of the co-worker.

5. **Interaction among peers (workers, systems, robots).** The "upper layer" collaboration @ work middleware for distributed environments will abstract the complexity of distributed working environments, solving problems such as: scalability, routing, replication, discovery of peers, resources and services, management of shared control and data among entities. Peer to peer systems allow distributed resources to perform distributed collaborative work tasks based on dynamic discovery of peers and may use software agents or 'overlay networks' which seem to be the most adequate solution for distributed environments.
   Challenges: an "upper layer" middleware for dynamic discovery of peers, resources and collaboration at work services; use of software agents, web services, etc, to implement P2P systems for collaboration at work with no central authority; and a new privacy and security paradigm within teams, related to P2P connectivity and IPv6 features.

6. **Utility-like computing capacity and connectivity.** Workers will need computing resources, as well as connectivity to carry out their tasks. These resources will be requested and delivered in real time with network-related features, for instance dependability, QoS, SLA (service level agreement), etc.
   Challenges: algorithms for on-demand allocation to co-workers of resources with requested QoS and security; integration of mobility and wireless sensor technologies with advanced network services, SOA (Service Oriented Architecture), grid technologies and data centres to provide 'always on' connection to co-workers.

7. **Contextualization and content.** As workers will face dynamic and frequently unpredicted environments, they will need systems to complement human ability to act on a context of incomplete information derived from ongoing tasks, processes, communication, co-operation,

etc. Application developers should be freed of writing code to react to each possible user circumstance in complex environments. Reasoning systems will analyze and extract conclusions from old tasks, content and data coming from sensors. Specific algorithms (the Naïve Bayes algorithm and other machine learning technologies) will infer meaning from unstructured content using statistical methods that derive patterns. Contextualized services and content should also consider end-user access devices and network-related constraints.
Challenges: to incorporate inferential capacities within the "upper layer" collaboration at work middleware; to deliver contextualized collaboration at work services and content; to balance inference with the provision of context information to co-workers.

8. **Group-level security, privacy and trust**. The convergence of work and private environments raise concerns on security and privacy issues. Enabling "upper layer" collaboration at work middleware will include means to secure business information while protecting private data and will support digital identity, peer authentication, integrity, non repudiation, encryption, etc.
Challenges: to include group authentication and authorization infrastructures within the "upper layer" middleware; new mechanisms for delegation and revocation within and among teams; to solve scalability and interoperability problems of PKI authentication systems within teams; to investigate and provide solutions for privacy issues related to network and software elements carrying private information of co-workers.

9. **Mobility at work**. The type of access device, the identity of the worker and the current location of the worker will have to be known in order to manage mobility. In addition, collaborative distributed environments add new challenges that next generation signalling protocols, such as SIP (Session Initiation Protocol), should consider in depth.
Challenges: to integrate signalling protocols and P2P within "upper layer" collaboration at work middleware; to generate agent-based ontologies for collaborative mobile working environments.

The innovation needed for the fully-fledged collaborative working environments requires the development of technologies and functionalities following the modern understanding of the innovation process, which is true especially in dynamic areas such as ICT. The innovation process is not seen as a linear, sequential process, one step following each other, but more as a strongly parallel and interdisciplinary process, where the crossroads of technologies and disciplines are the source of innovation.

Multidisciplinary basic research must interact with technology and applied research in environments where systemic innovation, i.e. behavioural and implementation innovation, can be fostered by real world verification environments and trials, with so called "living labs"[91].

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[91] Living Labs, concept developed at Massachusetts institute of technology (MIT) in the 90s.

5.4. CORPORATE SOCIAL RESPONSIBILITY@WORK

Corporate social responsibility and sustainable development in the emerging knowledge-based global Information Society

The European Union has to deliver the ambitious but achievable objectives set in 2000 by the Lisbon strategy to becoming the most competitive and dynamic knowledge-based economy in the world by 2010, capable of sustainable economic growth with more and better jobs and greater social cohesion. Europe has to raise its economic potential delivering at the same time more sustainable employment by significantly increasing investments in both private and public research spending. This has to contribute to and trigger higher productivity, leading to more people in work and working more productively.

To boost employment and productivity, Europe has to improve the adaptability of workers and at the same time attract more highly qualified people to the labour market, by investing more effectively in human capital.

However, the rapidly aging European population is putting more pressure on the need to improve productivity growth and the growth rates of the European economies are structurally lower than those of US, and improved competitiveness and employment can only be sustained in the long run if they are based on productivity growth and innovation.

All this has to happen in a sustainable way, in which sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development – the Brundtland Commission, 1987).

The Goteborg Summit in 2001 agreed on a strategy for sustainable development by placing environmental issues on an equal footing with economic and social matters, requiring all EU actions to be subjected to a sustainable impact assessment based on more sustainable production and consumption patterns involving new ways of working and innovation in technological development.

Sustained development is about achieving a competitive, socially just economy that delivers higher added value in all products and services, improved energy efficiency and a better "lifeWork-balance" with more eWork in local communities and better land-use planning.

Preserving social cohesion and increasing entrepreneurship and inclusion in work can be achieved by addressing the digital divide, increasing human capital and the quality of work. Breaking the link between economic growth and resource use and promoting frameworks for corporate social responsibility that integrates environmental and social considerations are other key contributors to achieving the Lisbon Strategy.

Business models, strategies and lifestyle aspirations must be changed by balanced integration of both social and environmental concerns leading to viable sustainable consumption and production patterns, and by linking technology development and business innovations with long term societal goals.

Information and communication technologies are crosscutting by nature with pervasive impacts and can make an important contribution to the realisation of the challenging Lisbon objectives.

However their contribution to sustainable development requires a paradigm shift in how we organise labour and our life style with more flexible approaches to mobility and the greater acceptance of new concepts such as lifelong learning. The effective use of new applications and tools also provides strong incentives for changes in citizens and companies behaviour towards more sustainable approaches.

The Global Reporting Initiative (GRI) established in 1997 by the UN Environment Program and the Coalition for Environmentally Responsible Economies was an important attempt to provide a set of globally applicable guidelines for reporting on social, environmental and economic performance.

The European Commission initiated a Green paper on Corporate and Social Responsibility and a communication in 2002 lead to the launch of a European Multi-Stakeholder Forum on Corporate Social Responsibility.

The GRI has received support from major companies not only in Europe but around the globe, and the Johannes World Summit on Sustainable Development in 2002 gave a further impetus with a concrete plan for implementation and a particular reference to the concept of Corporate Social Responsibility triggering more companies to make a contribution to sustainable development.

Leading businesses in Europe realise now that both the sustainable and societal impacts of their activities have to be integrated in a meaningful way with economic interest if they want to meet concerned consumers demands for products and services that can live up to the highest social and environmental standards.

The Information Society programme can and has already made important contributions in projects providing the right applications and tools for companies to respect these growing concerns. There is now for the first time a strong belief that among major companies in and outside Europe that non-financial performance of an enterprise can be objectively managed, measured and reported upon in a way which allows auditing and certification to take place while still respecting financial performance and also providing a non-financial performance rating. This thinking has influenced and lead to a widespread acceptance of the term "triple bottom line" which links financial, environmental and social performance of companies.

Corporate social responsibility integrates these complex and evolving activities into a single framework that supports business objectives and promotes dialogue with key stakeholders.

Europe has to continue to push for more wealth and prosperity by being able to take full advantage of technology developments in information and communication technologies, to be used for developing and delivering more products and services and at the same time ensuring the sustainability of its development.

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6. PROJECT REPORTS

6.1. B2B-METRICS

Measuring Forms, Content, Strategy and Impacts of B2B ECommerce

The rationale behind the launch of the current study was the development of a novel set of metrics for the processes and practices that fall within the scope of 'eBusiness'. Notwithstanding the illuminating insights provided by earlier efforts to engage with the dimensions and dynamics of electronic business-to-business (eB2B) trading and interchange, it has been evident for some time that this critically important phenomenon has been lacking (a) a tailored, finely-tuned and comprehensive set of metrics, and (b) an approach to measurement that deals adequately with its specificities.

6.1.1. Definition and scope

A lack of clarity with respect to definitions of eB2B, widely differing methods for data collection, an absence of comparability in questionnaires and samples, and marked inconsistencies in approaches to analysis are just some of the factors that have underlined the necessity for a new perspective. For B2B Metrics, such factors implied that the study should:

(a) start with the establishment of a precise definition in relation to eB2B:

EBusiness is the exchange of machine-readable and machine-processible information that is associated with business transactions or processes that take place both within and between the public and private sectors. Machine-readable information is that which contains both descriptive data and processible data – it also contains data relating to message contents and the steps that are necessary for the processing of such content (descriptive data typically includes information on products, suppliers/customers and transaction types, and instructions for further processing). Information of this form must be created and transmitted in a standardised format. eBusiness therefore involves the exchange of standardised information relating to business processes. Standardisation of data is required on several levels - product, supplier, customer, catalogue format, transmission and integration. The aim is not only the automation of processes, but the integration of information into all relevant process chains within the enterprise, and with all partners in the value chain, in order to increase transparency and throughput speed, and to save on transaction, capital and handling costs.

(b) set-out to fashion a new, coherent and consistent approach (albeit one that would be informed by previous efforts) to the measurement of the diffusion, deployment and implications of eBusiness. The approach to measurement in B2B Metrics constitutes an attempt to capture three aspects of development:

- The diffusion of B2B applications and the nature of impediments to acquisition and adoption - here the project aims to address issues such as 'development stages' in eBusiness, the emergence of new practices and market forms (e.g. the aggregation of demand, the evolution of portals and exchanges etc.), and the sources and forms of barriers to implementation
- The nature and evolution of complementary innovations, i.e. infrastructures, institutionalisation and controlling of B2B activities, training, standardisation protocols and process integration tools that support and facilitate the diffusion
- The impacts of eBusiness, for example, (a) increasing 'richness and reach' of information in B2B transactions, (b) transaction cost savings (through P-M and M-M transactions, process time reduction, and the use of new instruments), (c) collaboration effects (via combined stock and logistics management processes, enhanced delivery times, broader and more rapid availability of information, and improved knowledge management), (d) the effects of disintermediation and the entry of new intermediaries, and (e) human resource effects.

6.1.2. Research questions and selected results

6.1.2.1. Diffusion of B2B use

One of the underlying assumptions of eBusiness was that new forms of e-transactions would rapidly displace traditional forms by offering richer information with wider reach. Is this assumption valid for B2B? and if so, is it measurable? Our results indicate that the use of specific internet techniques like demand aggregation, marketplaces or auctions is still not widely spread. Diffusion in the B2B segment depends on standardisation. This also limits the richness of transmitted information and its reach.

6.1.2.2. Benchmarking development stages

What are the appropriate indicators for development phases? As a starting point for analysis we defined three development stages based on the use of applications: early, based on the use of "simple" stand alone transactions; enlarged, including first steps towards process automation; and advanced, comprising mainly collaborative networking use. This way we arrived at 72% of advanced users, 20% of enlarged and 7% of early use for the automotive value chain. On closer inspection of other indicators describing complementary innovation – e.g. standardisation, process integration and external data exchange – we split the advanced group further into three stages: intermediate with 47%, a more advanced group with around 15% of respondents, and a very advanced group around 10%.

Is there a "standard" developmental pathway or are there different ways and discernible strategies? Our results from interviews and the survey suggest that there is no "standard" pathway. The pathway may depend on framework conditions – e.g. the absence of enterprises with formative power in a value chain – or the importance of partner firms for the processes: in a fragmented

value chain development will tend to lag, small or less important partners will be – connected via portals.

Different strategies could also be identified: A clustering of the applications in business processes led to three discernible groups in automotive which could tentatively be described as: collaboration oriented, logistics and accounting oriented, and information collection oriented. The first cluster indicated a significant correlation with an existing eBusiness plan. A clustering of complementary innovation and impacts of B2B application showed what we might call two different approaches to adoption: an "organisation oriented" approach and an "IT integration" approach.

What are the barriers to a common B2B development? Apart from cost, the relatively low diffusion of standards, organisational institutionalisation and controlling, the integration of processes and a reluctance towards external data exchange are the main barriers. These barriers tend to be higher in fragmented value chains and to a lesser extent in co-operative networks and lower in hierarchically organised chains.

6.1.2.3. Impacts and enablers

What are the assumed impacts? Interview discussions of the questionnaire led us to distinguish between process related impacts and general impacts which could not be directly related to a process. The most frequent process related impacts measured so far could be observed in procurement where process time and procurement price reductions were mentioned most frequently. Process time reduction was the most important impact if response frequencies for all other business processes are included. Sales applications and CRM impacts seem quite low in consideration of the significant system investments in this area. Collaborative development may need further inputs in complementary innovation in order to arrive at broader impact. Among general impacts – which were separated into tangible and intangible – informational transparency is cited most frequently among intangibles. The most important tangible effects were savings from demand aggregation, standardisation and outline agreements. Disintermediation savings were rarely cited.

What might be indicators of successful B2B implementation? Are they related to IT "enablers" as several studies and the IT integration cluster might suggest? Or are factors of complementary innovation decisive as the Net Impact study and the organisation oriented cluster suggest? We used regression analysis to test these hypotheses. Our results indicate no significant correlation between successful implementation and broadband internet access or IT personnel, whereas standardisation, B2B personnel and controlling show clearly significant correlation. The results on controlling confirm the findings of the Net Impact study.

6.1.2.4. Applicability of our questionnaire

Is there a "one-size-fits-all" approach to B2B measurement? The survey has shown that this option does not exist: sectoral specificities may necessitate modified modules (e.g. in financial services or pharmaceutical development), if high response rates are the aim, the questionnaire has to be short, and different policy questions do require different approaches. We therefore proposed several tools.

6.1.3. Conclusions and recommendations

If complementary innovation is used as a criterion for differentiation, a great lag between small and large firms in B2B application is observable. Will this lag be closed within the next few years or is it more probable that different developmental pathways will show? The latter is suggested by the interviews we conducted. At least two discernible pathways were discussed:

- The *first* will be aimed at an overall process integration including all firms with process-critical knowledge.
- The *second* will loosely link smaller firms through portal solutions of larger, central firms of the value chain.

It is still unclear what will happen in value chains where no firms with formative power exist which could introduce standards and push for process integration. If and how self organisation of small firm networks might work could not be derived from our pilot study. The only result visible from a comparison between a more hierarchically organised network as in the automotive value chain and a more self-organising network as in co-operative distribution suggests clear developmental advantages for hierarchical solutions.

It is also unclear if collaborative exchanges or the use of net-services and application service providers could offer a cost-efficient solution for small business in the medium term. For the moment, such a solution is not visible. A "lean approach", too, so far was not sufficiently discussed. With a lean approach we refer to simpler B2B solutions, using lower band internet access (ISDN or DSL), simple and cheap standard software and the development of an easy to use XML standard which does not rely on IT specialists.

From the limited results of our pilot study combined with assumptions on non-respondents we might tentatively conclude that

- There may well exist a digital divide between small and larger firms regarding B2B application.
- This may lead to developmental disadvantages of small firms and structural change.
- If the share of "peripheral" firms not participating in B2B networks is high, this will probably lower the overall impact of B2B application (and the success of eEurope).

Given the initially made reservations regarding reliability and the limited scope of the pilot study we think that further and wider research is necessary to validate these findings.

Our study suggests that technological factors thought to be enablers: IT personnel, broadband deployment and B2B software technology do not play an important role in successful B2B implementation. Not technology – complementary innovation is decisive for the success of B2B.

The internal success factors for B2B implementation we found in statistical analysis were complementary innovations: the introduction and the extent of use of standards, the institutionalisation of B2B in the organisation and the use of controlling. External success factors were – in contradiction to a long time cherished assumption on the superiority of flat, self organising structures – hierarchically dominated chains. Impacts – in those cases where they could be quantitatively measured – quite often were estimated considerably lower than optimistic forecasts would have them.

We recommend no single toolkit approach for all situations but an approach adapted to the data situation and the political aims of data collection. They are categorised in five strategies.

In regard of the Lisbon objectives the integration of SMEs into B2B networks may be extremely important. We should therefore

- Study the situation of SMEs in different value chains in more detail.
- Find ways to overcome standardisation blockades in fragmented segments.
- Switch incentives to collaboration and organisation oriented approaches from a too strong technology orientation.
- Put more weight on lean approaches – other approaches may be self promoting.

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6.2. DIECOFIS

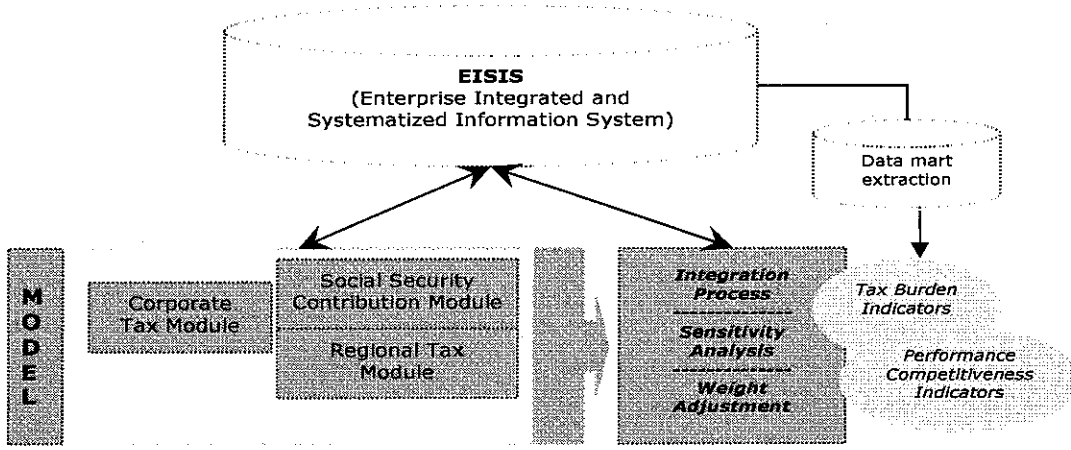
Development of a System of Indicators on Competitiveness and Fiscal Impact on Enterprises Performance

One important indication that has emerged from the debates on the policy initiatives deemed necessary to fulfil the Lisbon pronouncement, is the need to design "best policies" that can serve to effectively achieve the targets which it sets. In a nutshell, what it is all about is "better law-making", "better regulations" and ways and means to execute policies, in conditions of openness and transparency, which are broadly shared and sustained with proper analysis. Since policymakers can hardly distinguish between "best", "better" and "bad" policies without adequate analytical support, an investment in policy-Knowledge is needed. This will have to consist of independent and sound analysis of the expected impact of new policy initiatives. In view of the underdevelopment of policy impact analysis in Europe (with the notable exception of the United Kingdom and some of the Nordic countries), the development of tools, methods and statistical information systems that support evidence based policies is a challenge and a priority at the highest level.

Supporting policies with evidence is a data thirsty activity. To this effect, the advent of the Information Society and the spread of e-accessible databases in which billions of items of data are stored, potentially provide a mass of microdata which can be used to support microeconomic PIA. This goldmine of information remains mostly un-mined, since the potential of new technologies is not being used to store and access the microdata which are collected. As a result, collection and access remain supply driven, not demand pulled, with a tendency to "rehearse the past" (as witnessed by the limited information on the new economy and ICT related change). Besides, a variety of barriers hinder access (including barriers due to old fashioned storing methods), with consequent losses of potentially available information and high opportunity costs in terms of both quality and quantity of the information on hand to produce new knowledge.

Against this background, it has appeared important to gather research consensus through the DIECOFIS consortium, with a view to develop enterprise analytical tools, such as microsimulation models, microfounded and decomposable performance indicators and the parallel development of e-accessible information systems needed to support these activities, including integrated and systematized information systems on enterprises (EISIS). To this effect DIECOFIS has generated critical research mass to test and pilot problems and methods, develop prototypes and search for the best ways that can eventually lead to fill an increasing patent gap in policy impact analysis (PIA).

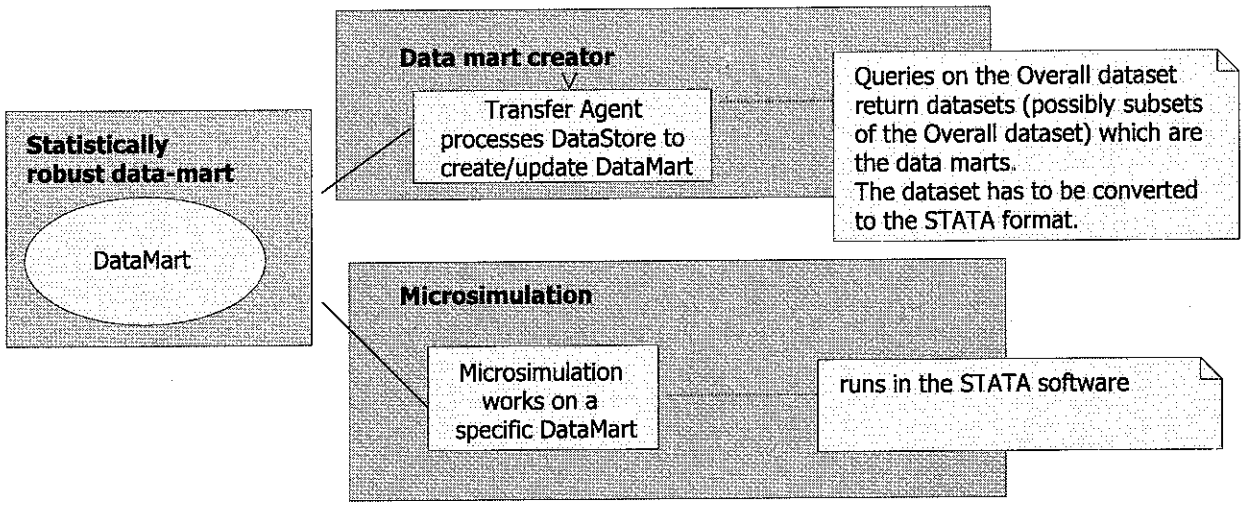
Conceptual Framework for Microsimulation Analysis and Modelling



The DIECOFIS project has offered an opportunity to develop an e-accessible statistical information systems of micro-data, including metadata, relational models, software and statistical methodologies to support PIA in various policy areas. Behind this work is an evolutionary vision which implies the transition from "hard-statistics and "hard-databases" to eStatistics, eDatabases and wide-ranging information systems obtained from the integration and systematization of data from administrative and statistical sources. The objective is to make them accessible to Government Agencies, the research community and stakeholders at large. This has required reconciling (data-linking) statistics from multiple sources, taking into account differences in definitions and adjusting for inconsistencies between sources (metadata matrix), as well as knowledge of the quality and reliability (statistical properties) of linked datasets.

The IT model behind EISIS provides a prototype of the software that may be applied for managing and accessing the data needed for microsimulation and, more generally, for policy impact analysis. The DIECOFIS system uses existing statistical software packages, which permit implementation of statistically robust procedures that can serve to fulfil the multi source data integration and micro simulation purposes envisaged under the project. The DIECOFIS User Interface for multi source data integration and data mart creation is realised in SAS Software. It allows the user to interact with SAS macros in a user-friendly and transparent way. The flexibility and expansion of the DIECOFIS system with regard to new source integration and new micro simulation extension is guaranteed through a dynamic application configuration.

Microsimulation System structure



DIECOFIS has permitted a group of government officials, statisticians, academics and researchers in five EU member countries, to join forces and work together in a trans-national, multi-disciplinary and networked research environment[92]. Using the EISIS framework, DIECOFIS has progressed and developed unique new knowledge and tools for the analysis of the impact of national tax policies on enterprises, and on their performance and competitiveness. It has made it possible to (i) map finely enterprises systemic structures and performance, by means of sets of elementary and multidimensional, composable and decomposable indicators, broken down by groups classified by size, region, sector, etc.; (ii) benchmark national tax legislations across member countries; and (iii) draw "parades" of enterprise performance; and (iv) study the "drivers" of performance and competitiveness with a high precision and detail, at a point in time, over time and longitudinally (i.e. for homogeneous groups of enterprises).

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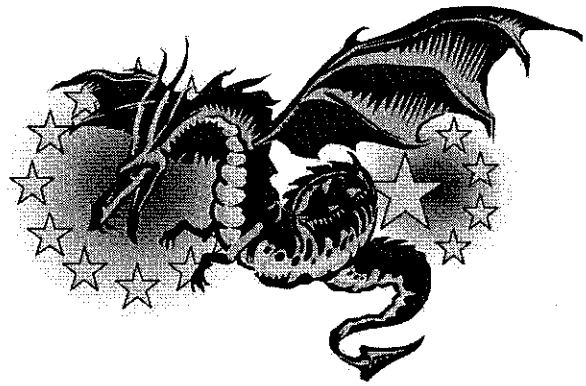
[92] Consortium members include: ISTAT (co-ordinator), Inland Revenue, Informer SA, European Commission Joint Research Centre, CERES Centre Economic and Social Research, University of Cambridge, London School of Economics, University of Florence, Wirtschaftsuniversitaet Wien, University of Tor Vergata

6.3. DRAGON



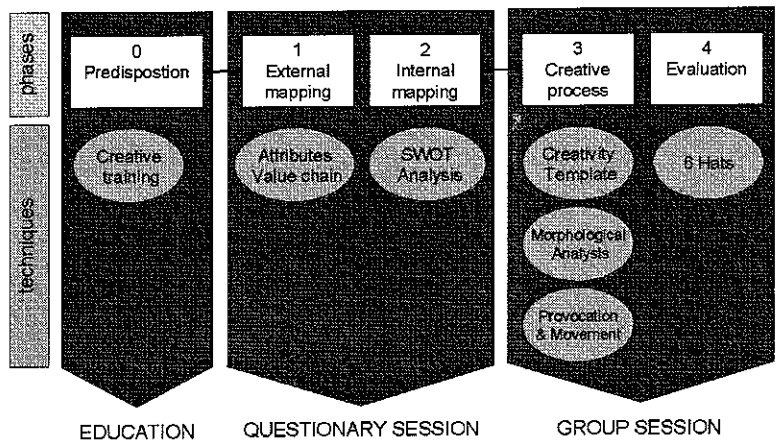
6.3.1. Introduction

The method of co-operation between different companies has become a strategic issue, especially with regard to enabling cooperation between enterprises situated in different locations and having a different cultural background (e.g. Chinese and European companies). Not only the purchase or the supply of a product, but particularly the ability to find a matching supplier and the integration into the development process of a manufacturer during the whole product development cycle plays a more and more important role.

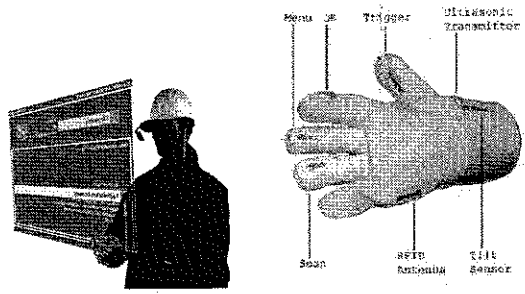
The overall goal of the DRAGON project (Development of an interactive engineering portal for Open Networks) was to realize a common virtual product development process between distant companies based on digital knowledge exchange and sharing processes without giving away vital know-how.

The result of the DRAGON project was an Engineering Portal representing a virtual, process- and data-oriented integration platform accessible to the involved companies within a heterogeneous IT-infrastructure. The Portal serves as an overall framework for the cooperation of business partners based on given IT-technologies and software tools as well as Internet technologies. In order to improve supply chain management, the Portal provides services covering all phases of the product development process, including contact initiation and collaboration establishment (*Request and Navigation component, Check of Collaboration Partners),* requirement specification and handling *(Specification Modeller),* common workflow definition *(Process Modeller),* components for the *Visualization and Validation of Engineering Data* as well as a *Cultural Repository* which deals with Cultural issues. These components use the DRAGON Information Broker (DIB), which provides web services for accessing the data that the components need. In this way the components don't have to know about where the data is located.

The CREATE[84] project is focused on the process of idea generation and creativity. It has built a library of some 80 creativity techniques, a subset of which it is testing through a series of workshops at a mid-sized white goods manufacturing and motorcycle manufacturer , both in Southern Europe. In addition, it is providing a number of creativity workshops to organisations throughout Europe, notably in Norway and Slovenia.



The WEARIT@Work[85] project is developing a European framework for wearable computing, which will provide a basis for the launch of numerous products and services as this technology matures and customer demand for wearable computing devices increases in coming years. From a knowledge and capabilities management perspective, it is noteworthy that the project is developing four use cases, two involving individual work settings, and two involving collaborative work settings, for which it will provide for extensive observation activities to try to develop a realistic impression of what happens in the workplace. The project will also support the idea of "expert looking over your shoulder", which will provide operators with the possibility to interact not only with information necessary for the task at hand, but equally to interact richly with recognised experts through which problems can be solved and issues tackled through dialogue. The project will also assess aspects of human vulnerability in the context of wearable computing, and address the issue of career development of operators of wearables, from a skills/capabilities development perspective.



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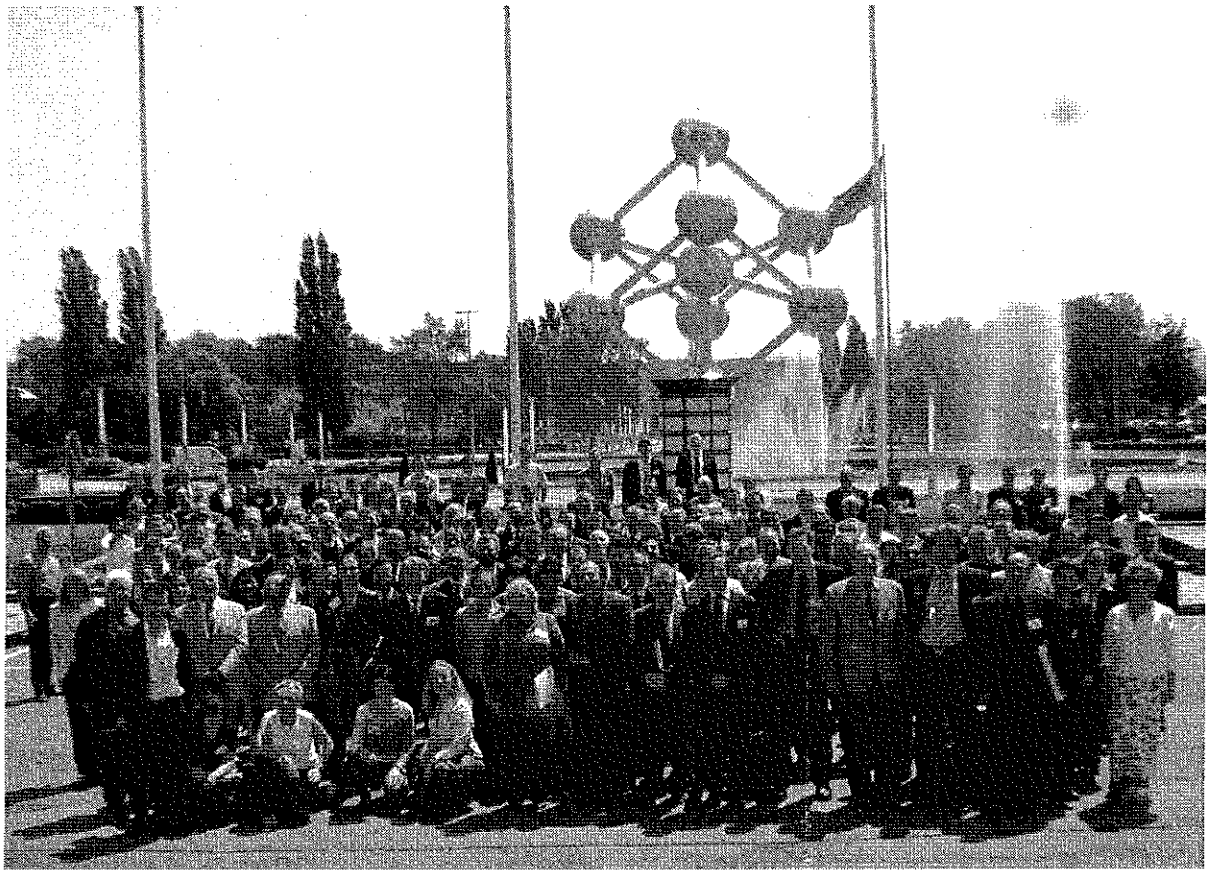
[84] CREATE project website : http://www.diegm.uniud.it/create

[85] WEARIT@Work project website : http://www.tzi.de/wearIT-at-work/

5.2. AMBIENT INTELLIGENCE@WORK

AmI@Work Family of ERA Communities - An Initiative for Systemic Innovation!



AMI@Work communities and Mobile Strategic Objective launch participants joined together for a family picture in front of the 'Atomium'. Overall more than 300 participants attended the 7-9 June 2004 launch event in Brussels

The New Working Environments unit of the European Commission's Information Society Directorate-General fosters Information Society Technologies (IST) research to bring about systemic innovation, in order to enable high-quality and productive person-centric and collaborative new working environments in Europe. To achieve this aim it is necessary to link European 'dream team' communities of research and deployment in a cross disciplinary manner.

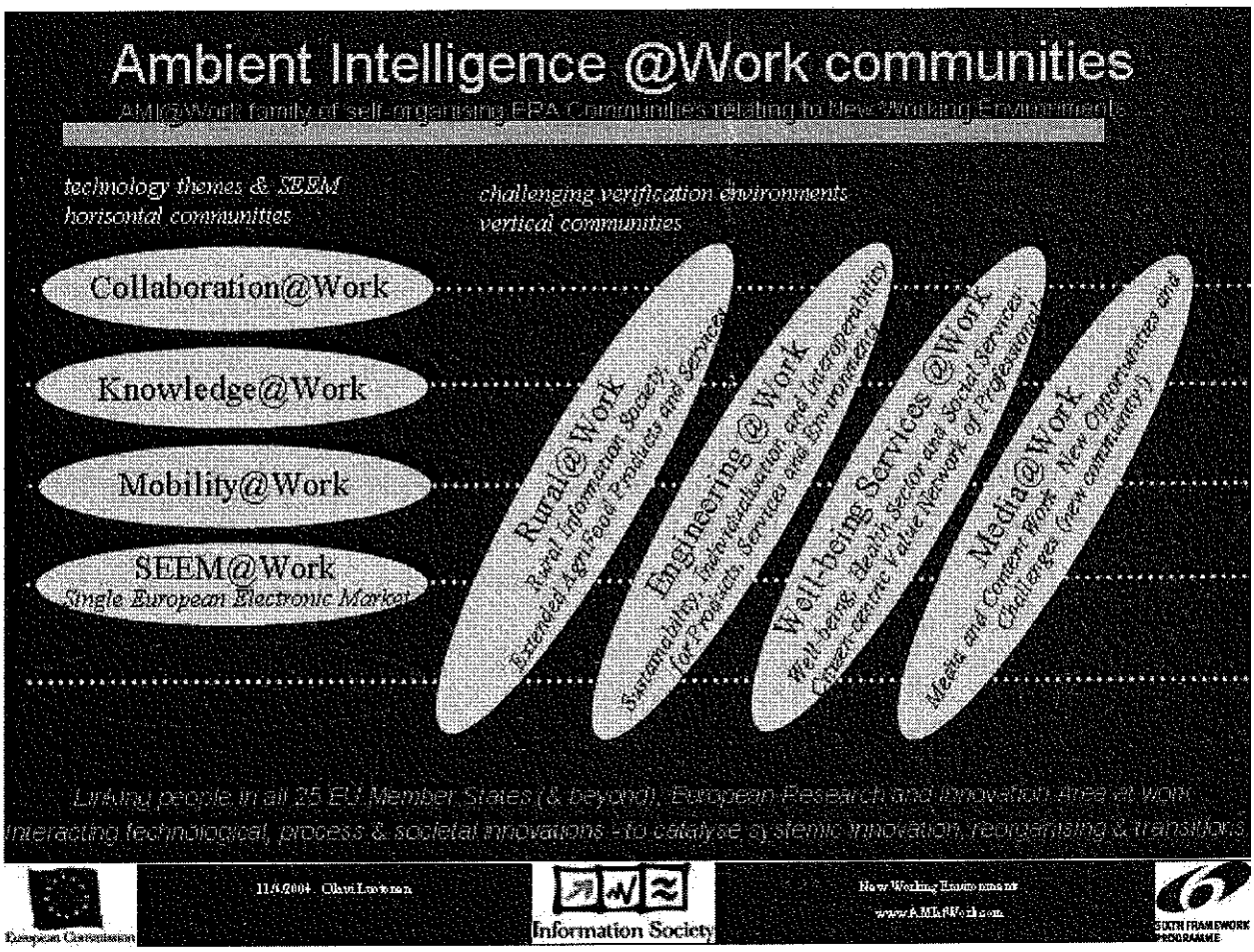
The AMI@Work family of self-organising ERA communities links people in all 25 EU Member States and beyond for a European Research and Innovation Area (ERA) at work. This family facilitates innovation in new working environments, ERA-wide and in EU 6th Framework Programme of research.

The family consists of self-organising communities, facilitated by elected leaders, in collaboration with EU projects MOSAIC and SEEMseed, and the New Working Environments unit of DG INFSO, together with related Commission services. These communities represent potential cross-fertilising technology themes and challenging validation environments with a significant technological, economic and societal impact. The *AMI@Work family of ERA communities* itself is

a real-life collaboration experiment. 'Practice what we preach'. These communities are based on web-based membership registration by *interested individuals*.

Following preparatory workshops in Brussels in March and in Budapest in May, the main launch event was held in Brussels from 7 to 9 June 2004. The first day was dedicated to AMI@Work communities, including leadership elections. On the second day, the plenary session launched the AMI@Work family of ERA communities, as well as EU IST projects related to the Strategic Objective 'Applications and Services for the Mobile User and Worker'. The third day focused on information, networking and partnering for the future EU IST Calls for Proposals as well as AMI@Work Special Interest Groups.

Erkki Liikanen, European Commissioner for Enterprise and the Information Society observed at the launch plenary that "Innovation is not just a matter of buying technology, it is about redesigning businesses processes and the way things are done. Mobile communications, particularly the next generation of mobile services which allow high speed access to the Internet, e-mail or databases while on the move, will deliver a major boost to productivity and help to strengthen our competitiveness. AMI@Work is a highly innovative way to look at how we can make work more interesting, creative and productive".



Many participants, from over 20 European countries, have already registered for this initiative. There are different motivations to join the AMI@Work family of self-organising communities:

- **Collaborate** with other new working environments users, experts and leaders, throughout Europe and beyond. Use synergies, not to 'reinvent the wheel'. Connect your current networks with complementary networks. Cross-fertilise development organisations or transition arenas to reach for crucial systemic changes collaboratively.
- **Co-create** a real working European Research and Innovation Area for users, experts and leaders of corporate, professional, local, regional, national, European or global projects or 'tribes' - where the whole is clearly greater than the sum of the parts, where cross disciplinary value creation thrives, where 'passionate pragmatists', visionary early adopters, create a path to the future, together with technological and societal innovators.
- **Find out** how far collaborative technologies can help us in enabling a Rural Information Society, well-being at work or giving doctors and nurses more support and time to care and cure. How can innovative mobile work environments combine productivity and quality of life? What technologies, processes and societal innovations will sustain global 24-hour collaboration across time zones for product design and service creation?
- **Identify** partners for collaborative European 'dream teams' with joint objectives and complementary competences for future Calls for Proposals of European IST research projects. You already live in an EU of 25 countries and want to link people, create ties and extend your networks to the new Member States. Contribute to the conception of the 7th Framework Programme.

Contact Points	
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5.3. COLLABORATION@WORK

Next Generation Collaborative Working Environments

Collaboration@Work is the name given by the European Commission New Working Environments Unit to next generation collaborative working environments, comprising innovative technical solutions as well as socioeconomic and policy-related aspects. Collaboration@Work aims at improving human abilities to work collaboratively, thereby increasing creativity which, in turn, will boost innovation and productivity as well as support new value creation forms. The enabling systems and platforms will provide advanced services to act as a catalyst to the development of worker-centric, flexible, scalable and adaptable tools and applications to boost seamless and natural collaboration amongst a diversity of agents (humans, machines, etc) within knowledge-rich virtualized environments and with any devices available anywhere anytime.

The work to be carried out in the framework of this initiative will receive funds from the Strategic Objective "Collaborative working environments" of the Sixth EU Framework Programme for Research and Technological Development (FP6) IST priority Work Programme 2005/2006. This Strategic Objective will develop next generation collaborative working environments, which will provide collaboration services to make possible the development of worker-centric, flexible, scalable and adaptable tools and applications. This S.O. will focus on three layered tasks following a systems approach. The first task will centre on the design and development of innovative concepts, methods and core services for distributed collaboration at work. The second task will support research on tools for collaborative work in rich virtualised environments, building on top of the core services developed in the lower layer. The upper focal point will develop innovative validating applications for collaborative work in content-rich, mobile and fixed collaborative environments, testing and integrating the core services and tools developed in the previous focal points.

5.3.1. European advantage for innovation: cultural diversity

The reason for launching the Collaboration@Work initiative is the need to turn European cultural diversity into a competitive advantage for European companies. This will help increase European competitiveness in the new era where collaboration and self-organising organisations[86] will play a key role in the global economy. There are several research studies suggesting that when a team is made up of a group of people from very diverse backgrounds it is more likely to achieve breakthroughs in innovation. Therefore teams made up of workers from every part of Europe will likely develop innovative products, thereby increasing European competitiveness by opening new markets and increasing productivity.

Lee Fleming's research[87] suggests that when a creative team is made up of people from very similar disciplines, the average value of its innovations will be high, but it will be unlikely to achieve a breakthrough. On the other hand, it suggests that a group of people from very diverse disciplines is more likely to achieve breakthroughs – but will also produce more low-value innovations, see picture below. However this study misses the cultural diversity as another way to enrich

[86] Ticoll, David. "Get self-organised". Harvard Business Review 82, no 9 (September 2004): 18-19

[87] Fleming, Lee. "Perfecting Cross-Pollination" Harvard Business Review 82, no 9 (September 2004): 22-24

background diversity of working teams, as it mainly considers diverse discipline as unique source of diversity.

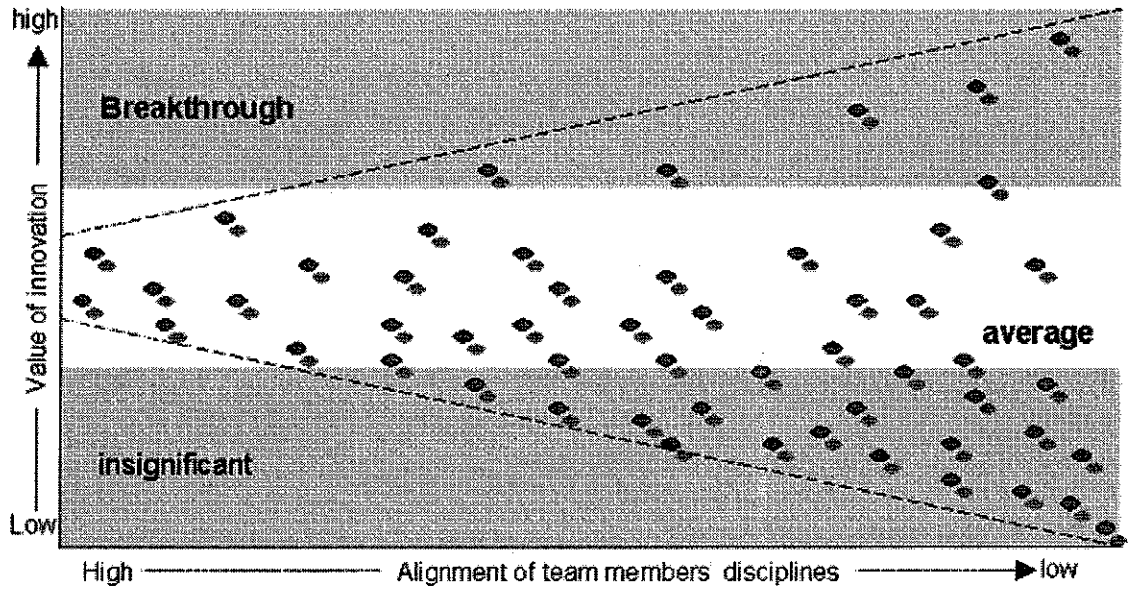

figure 1. Impact of team members' diverse disciplines on innovation (Source: Lee Fleming 2004)

Several of our previous European research projects suggest that one way to increase the chance of good innovation and to reduce the chance of failure is to bring together people with cultural diversity and deep knowledge in their respective discipline. A lowering on the diversity of disciplines and an increase on the diversity of cultural background might also increase the chance of high innovation and breakthroughs.

Other studies suggest[88] that because of diverse views from skill sets, age, gender, race and different ethnic groups, many more perspectives are brought into play, and those ideas that are brought forward affect other ideas, as well as ideas being more thoroughly examined. These concepts are applicable to European business through a group of people that are from diverse parts of Europe, and as long as those different behaviours and cultural views are understood by all, high-value innovation and group dynamics will help European companies succeed.

Yet, research is still required to define exactly the value of European diversity for achieving significant innovation. This research area will get funding from the first focal point of the SO "Collaborative working environments" to design and develop innovative concepts and methods for distributed collaboration at work.

5.3.2. RTD challenges and innovation

The achievement of the objectives of the Collaboration@Work initiative requires research activities to be carried out following a seamless system integration approach. Collaboration@Work applied research is positioned at the crossroads of the convergence between infrastructure and services, and terminal devices[89] (see figure below). This system approach is reflected in all our activities and it is the key for success in this multidisciplinary research domain. The outcome will

[88] Gardenswartz L. and Rowe A. "Managing Diversity: A Complete Desk Reference and Planning Guide". McGraw-Hill. 1998.

[89] Technology Roadmap on Software Intensive Systems. Eureka ITEA Cluster March 2001

be enabling technologies that will support e-activities, such as eBusiness, eCommerce, eManufacturing, eGovernment, eHealth and eLearning.

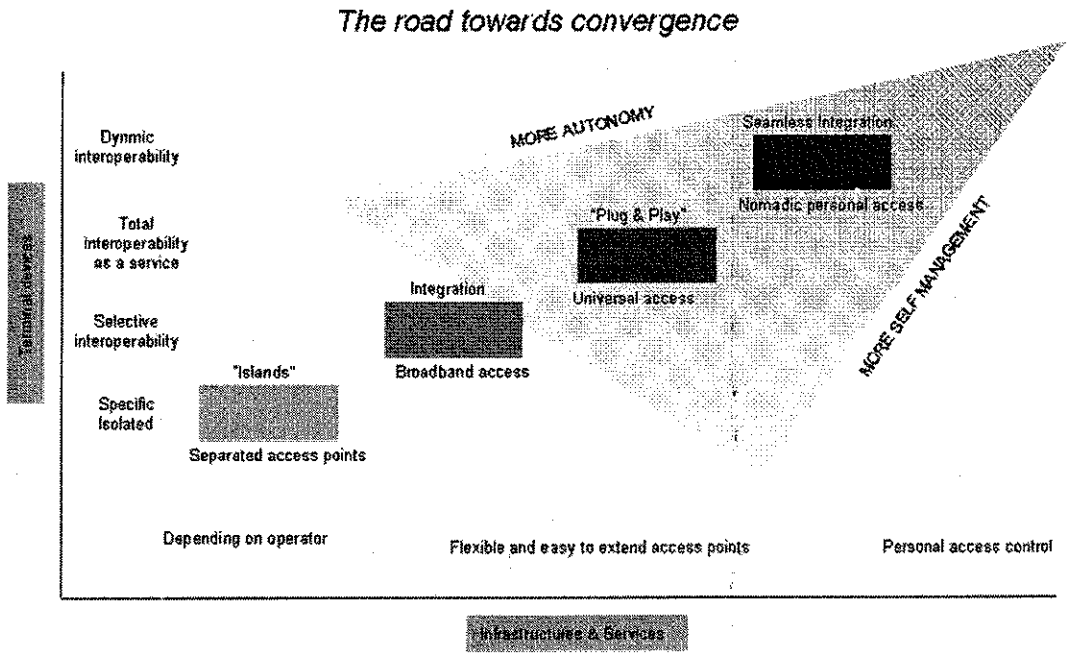

figure 2. Convergence of infrastructure and services with terminal devices. (Source: Technology Roadmap on Software Intensive Systems, Eureka ITEA Cluster, March 2001)

After several meetings, the Collaboration@Work Expert group (CWEG) drew up the 'Next Generation Collaborative Working Environments' report. It includes a list of the 9 issues that will have to be tackled in order to realize the vision of *'Next Generation Collaborative Working Environments (NGCWE) delivering quality of experience to co-workers, based on flexible services components and customized to different communities*[90]*'*. These 9 issues, as well as the specific related RTD challenges, are:

1. **Reference architecture for collaboration at work.** Potential internationally agreed open reference architecture, such as the reference architectures defined by consensus creation organisations like the Workflow Management Coalition, W3C, IETF, etc, which enables network specialists and software developers to create reusable and interoperable collaborative components, application and services.
   Challenge: to agree on common reference architecture which enables the development of reusable and interoperable service and application components for collaboration at work.

2. **Ontologies for collaboration at work.** Distributed collaborative working environments need a semantic description of the preferences of the users, the relevant computing components and the collaboration acts and processes. It will allow the matching amongst the required capabilities for a specific task and the available services. It will also identify the most adequate interaction given an actual context.
   Challenges: to improve modelling languages and models to consider the complexity of distributed groups of workers; the development of ontologies for semantic compatibility or for specific domains.

[90] Collaboration@Work Expert group Report on Next Generation Collaborative Working Environments. June 2004. To be found on: www amiatwork.com / publications

3. **Plug&Play interoperable service oriented architecture (SOA) for collaboration at work.** Web services and ontologies will enable interoperability among services that will, in turn, allow automatic composition of services which will be able to adapt to dynamically changing environments.
   Challenges: to improve current infrastructure for more ubiquitous, secure and reliable software based collaboration at work services; to create methods for communicating and describing collaboration service functionalities; to create new mechanisms and methods for collaboration at work service composition.

4. **Smooth "upper layer" middleware interaction with the underlying layers.** The enabling "upper layer" collaboration @ work middleware for distributed environments will incorporate the advanced network services offered by the communication layer combining different middleware, e.g. UPnP, Web services, etc. In particular, it will consider IPv6 to recover end-to-end communication providing access to the end user application, requested quality and services, signalling protocols and network services to allow applications to seek authorization and network status information, as well as other non IP networks, including sensor or mobile networks.
   Challenges: to investigate the usage of the end-to-end IPv6 model for provision of new collaboration at work services; to improve the way to get network information related to QoS, security, VPNs, multicast, and location for group of workers; to incorporate mediation algorithms to manage complexity and interworking with sensor or mobile networks of workers; to create overlay networks which integrate network services with content services in order to adapt the collaboration services to the available network capabilities and context of the co-worker.

5. **Interaction among peers (workers, systems, robots).** The "upper layer" collaboration @ work middleware for distributed environments will abstract the complexity of distributed working environments, solving problems such as: scalability, routing, replication, discovery of peers, resources and services, management of shared control and data among entities. Peer to peer systems allow distributed resources to perform distributed collaborative work tasks based on dynamic discovery of peers and may use software agents or 'overlay networks' which seem to be the most adequate solution for distributed environments.
   Challenges: an "upper layer" middleware for dynamic discovery of peers, resources and collaboration at work services; use of software agents, web services, etc, to implement P2P systems for collaboration at work with no central authority; and a new privacy and security paradigm within teams, related to P2P connectivity and IPv6 features.

6. **Utility-like computing capacity and connectivity.** Workers will need computing resources, as well as connectivity to carry out their tasks. These resources will be requested and delivered in real time with network-related features, for instance dependability, QoS, SLA (service level agreement), etc.
   Challenges: algorithms for on-demand allocation to co-workers of resources with requested QoS and security; integration of mobility and wireless sensor technologies with advanced network services, SOA (Service Oriented Architecture), grid technologies and data centres to provide 'always on' connection to co-workers.

7. **Contextualization and content.** As workers will face dynamic and frequently unpredicted environments, they will need systems to complement human ability to act on a context of incomplete information derived from ongoing tasks, processes, communication, co-operation,

etc. Application developers should be freed of writing code to react to each possible user circumstance in complex environments. Reasoning systems will analyze and extract conclusions from old tasks, content and data coming from sensors. Specific algorithms (the Naïve Bayes algorithm and other machine learning technologies) will infer meaning from unstructured content using statistical methods that derive patterns. Contextualized services and content should also consider end-user access devices and network-related constraints.
Challenges: to incorporate inferential capacities within the "upper layer" collaboration at work middleware; to deliver contextualized collaboration at work services and content; to balance inference with the provision of context information to co-workers.

8. **Group-level security, privacy and trust**. The convergence of work and private environments raise concerns on security and privacy issues. Enabling "upper layer" collaboration at work middleware will include means to secure business information while protecting private data and will support digital identity, peer authentication, integrity, non repudiation, encryption, etc.
Challenges: to include group authentication and authorization infrastructures within the "upper layer" middleware; new mechanisms for delegation and revocation within and among teams; to solve scalability and interoperability problems of PKI authentication systems within teams; to investigate and provide solutions for privacy issues related to network and software elements carrying private information of co-workers.

9. **Mobility at work**. The type of access device, the identity of the worker and the current location of the worker will have to be known in order to manage mobility. In addition, collaborative distributed environments add new challenges that next generation signalling protocols, such as SIP (Session Initiation Protocol), should consider in depth.
Challenges: to integrate signalling protocols and P2P within "upper layer" collaboration at work middleware; to generate agent-based ontologies for collaborative mobile working environments.

The innovation needed for the fully-fledged collaborative working environments requires the development of technologies and functionalities following the modern understanding of the innovation process, which is true especially in dynamic areas such as ICT. The innovation process is not seen as a linear, sequential process, one step following each other, but more as a strongly parallel and interdisciplinary process, where the crossroads of technologies and disciplines are the source of innovation.

Multidisciplinary basic research must interact with technology and applied research in environments where systemic innovation, i.e. behavioural and implementation innovation, can be fostered by real world verification environments and trials, with so called "living labs"[91].

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[91] Living Labs, concept developed at Massachusetts institute of technology (MIT) in the 90s.

5.4. CORPORATE SOCIAL RESPONSIBILITY@WORK

Corporate social responsibility and sustainable development in the emerging knowledge-based global Information Society

The European Union has to deliver the ambitious but achievable objectives set in 2000 by the Lisbon strategy to becoming the most competitive and dynamic knowledge-based economy in the world by 2010, capable of sustainable economic growth with more and better jobs and greater social cohesion. Europe has to raise its economic potential delivering at the same time more sustainable employment by significantly increasing investments in both private and public research spending. This has to contribute to and trigger higher productivity, leading to more people in work and working more productively.

To boost employment and productivity, Europe has to improve the adaptability of workers and at the same time attract more highly qualified people to the labour market, by investing more effectively in human capital.

However, the rapidly aging European population is putting more pressure on the need to improve productivity growth and the growth rates of the European economies are structurally lower than those of US, and improved competitiveness and employment can only be sustained in the long run if they are based on productivity growth and innovation.

All this has to happen in a sustainable way, in which sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development – the Brundtland Commission, 1987).

The Goteborg Summit in 2001 agreed on a strategy for sustainable development by placing environmental issues on an equal footing with economic and social matters, requiring all EU actions to be subjected to a sustainable impact assessment based on more sustainable production and consumption patterns involving new ways of working and innovation in technological development.

Sustained development is about achieving a competitive, socially just economy that delivers higher added value in all products and services, improved energy efficiency and a better "lifeWork-balance" with more eWork in local communities and better land-use planning.

Preserving social cohesion and increasing entrepreneurship and inclusion in work can be achieved by addressing the digital divide, increasing human capital and the quality of work. Breaking the link between economic growth and resource use and promoting frameworks for corporate social responsibility that integrates environmental and social considerations are other key contributors to achieving the Lisbon Strategy.

Business models, strategies and lifestyle aspirations must be changed by balanced integration of both social and environmental concerns leading to viable sustainable consumption and production patterns, and by linking technology development and business innovations with long term societal goals.

Information and communication technologies are crosscutting by nature with pervasive impacts and can make an important contribution to the realisation of the challenging Lisbon objectives.

However their contribution to sustainable development requires a paradigm shift in how we organise labour and our life style with more flexible approaches to mobility and the greater acceptance of new concepts such as lifelong learning. The effective use of new applications and tools also provides strong incentives for changes in citizens and companies behaviour towards more sustainable approaches.

The Global Reporting Initiative (GRI) established in 1997 by the UN Environment Program and the Coalition for Environmentally Responsible Economies was an important attempt to provide a set of globally applicable guidelines for reporting on social, environmental and economic performance.

The European Commission initiated a Green paper on Corporate and Social Responsibility and a communication in 2002 lead to the launch of a European Multi-Stakeholder Forum on Corporate Social Responsibility.

The GRI has received support from major companies not only in Europe but around the globe, and the Johannes World Summit on Sustainable Development in 2002 gave a further impetus with a concrete plan for implementation and a particular reference to the concept of Corporate Social Responsibility triggering more companies to make a contribution to sustainable development.

Leading businesses in Europe realise now that both the sustainable and societal impacts of their activities have to be integrated in a meaningful way with economic interest if they want to meet concerned consumers demands for products and services that can live up to the highest social and environmental standards.

The Information Society programme can and has already made important contributions in projects providing the right applications and tools for companies to respect these growing concerns. There is now for the first time a strong belief that among major companies in and outside Europe that non-financial performance of an enterprise can be objectively managed, measured and reported upon in a way which allows auditing and certification to take place while still respecting financial performance and also providing a non-financial performance rating. This thinking has influenced and lead to a widespread acceptance of the term "triple bottom line" which links financial, environmental and social performance of companies.

Corporate social responsibility integrates these complex and evolving activities into a single framework that supports business objectives and promotes dialogue with key stakeholders.

Europe has to continue to push for more wealth and prosperity by being able to take full advantage of technology developments in information and communication technologies, to be used for developing and delivering more products and services and at the same time ensuring the sustainability of its development.

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6. PROJECT REPORTS

6.1. B2B-METRICS

Measuring Forms, Content, Strategy and Impacts of B2B ECommerce

The rationale behind the launch of the current study was the development of a novel set of metrics for the processes and practices that fall within the scope of 'eBusiness'. Notwithstanding the illuminating insights provided by earlier efforts to engage with the dimensions and dynamics of electronic business-to-business (eB2B) trading and interchange, it has been evident for some time that this critically important phenomenon has been lacking (a) a tailored, finely-tuned and comprehensive set of metrics, and (b) an approach to measurement that deals adequately with its specificities.

6.1.1. Definition and scope

A lack of clarity with respect to definitions of eB2B, widely differing methods for data collection, an absence of comparability in questionnaires and samples, and marked inconsistencies in approaches to analysis are just some of the factors that have underlined the necessity for a new perspective. For B2B Metrics, such factors implied that the study should:

(a) start with the establishment of a precise definition in relation to eB2B:

EBusiness is the exchange of machine-readable and machine-processible information that is associated with business transactions or processes that take place both within and between the public and private sectors. Machine-readable information is that which contains both descriptive data and processible data – it also contains data relating to message contents and the steps that are necessary for the processing of such content (descriptive data typically includes information on products, suppliers/customers and transaction types, and instructions for further processing). Information of this form must be created and transmitted in a standardised format. eBusiness therefore involves the exchange of standardised information relating to business processes. Standardisation of data is required on several levels - product, supplier, customer, catalogue format, transmission and integration. The aim is not only the automation of processes, but the integration of information into all relevant process chains within the enterprise, and with all partners in the value chain, in order to increase transparency and throughput speed, and to save on transaction, capital and handling costs.

(b) set-out to fashion a new, coherent and consistent approach (albeit one that would be informed by previous efforts) to the measurement of the diffusion, deployment and implications of eBusiness. The approach to measurement in B2B Metrics constitutes an attempt to capture three aspects of development:

- The diffusion of B2B applications and the nature of impediments to acquisition and adoption - here the project aims to address issues such as 'development stages' in eBusiness, the emergence of new practices and market forms (e.g. the aggregation of demand, the evolution of portals and exchanges etc.), and the sources and forms of barriers to implementation
- The nature and evolution of complementary innovations, i.e. infrastructures, institutionalisation and controlling of B2B activities, training, standardisation protocols and process integration tools that support and facilitate the diffusion
- The impacts of eBusiness, for example, (a) increasing 'richness and reach' of information in B2B transactions, (b) transaction cost savings (through P-M and M-M transactions, process time reduction, and the use of new instruments), (c) collaboration effects (via combined stock and logistics management processes, enhanced delivery times, broader and more rapid availability of information, and improved knowledge management), (d) the effects of disintermediation and the entry of new intermediaries, and (e) human resource effects.

6.1.2. Research questions and selected results

6.1.2.1. Diffusion of B2B use

One of the underlying assumptions of eBusiness was that new forms of e-transactions would rapidly displace traditional forms by offering richer information with wider reach. Is this assumption valid for B2B? and if so, is it measurable? Our results indicate that the use of specific internet techniques like demand aggregation, marketplaces or auctions is still not widely spread. Diffusion in the B2B segment depends on standardisation. This also limits the richness of transmitted information and its reach.

6.1.2.2. Benchmarking development stages

What are the appropriate indicators for development phases? As a starting point for analysis we defined three development stages based on the use of applications: early, based on the use of "simple" stand alone transactions; enlarged, including first steps towards process automation; and advanced, comprising mainly collaborative networking use. This way we arrived at 72% of advanced users, 20% of enlarged and 7% of early use for the automotive value chain. On closer inspection of other indicators describing complementary innovation – e.g. standardisation, process integration and external data exchange – we split the advanced group further into three stages: intermediate with 47%, a more advanced group with around 15% of respondents, and a very advanced group around 10%.

Is there a "standard" developmental pathway or are there different ways and discernible strategies? Our results from interviews and the survey suggest that there is no "standard" pathway. The pathway may depend on framework conditions – e.g. the absence of enterprises with formative power in a value chain – or the importance of partner firms for the processes: in a fragmented

value chain development will tend to lag, small or less important partners will be – connected via portals.

Different strategies could also be identified: A clustering of the applications in business processes led to three discernible groups in automotive which could tentatively be described as: collaboration oriented, logistics and accounting oriented, and information collection oriented. The first cluster indicated a significant correlation with an existing eBusiness plan. A clustering of complementary innovation and impacts of B2B application showed what we might call two different approaches to adoption: an "organisation oriented" approach and an "IT integration" approach.

What are the barriers to a common B2B development? Apart from cost, the relatively low diffusion of standards, organisational institutionalisation and controlling, the integration of processes and a reluctance towards external data exchange are the main barriers. These barriers tend to be higher in fragmented value chains and to a lesser extent in co-operative networks and lower in hierarchically organised chains.

6.1.2.3. Impacts and enablers

What are the assumed impacts? Interview discussions of the questionnaire led us to distinguish between process related impacts and general impacts which could not be directly related to a process. The most frequent process related impacts measured so far could be observed in procurement where process time and procurement price reductions were mentioned most frequently. Process time reduction was the most important impact if response frequencies for all other business processes are included. Sales applications and CRM impacts seem quite low in consideration of the significant system investments in this area. Collaborative development may need further inputs in complementary innovation in order to arrive at broader impact. Among general impacts – which were separated into tangible and intangible – informational transparency is cited most frequently among intangibles. The most important tangible effects were savings from demand aggregation, standardisation and outline agreements. Disintermediation savings were rarely cited.

What might be indicators of successful B2B implementation? Are they related to IT "enablers" as several studies and the IT integration cluster might suggest? Or are factors of complementary innovation decisive as the Net Impact study and the organisation oriented cluster suggest? We used regression analysis to test these hypotheses. Our results indicate no significant correlation between successful implementation and broadband internet access or IT personnel, whereas standardisation, B2B personnel and controlling show clearly significant correlation. The results on controlling confirm the findings of the Net Impact study.

6.1.2.4. Applicability of our questionnaire

Is there a "one-size-fits-all" approach to B2B measurement? The survey has shown that this option does not exist: sectoral specificities may necessitate modified modules (e.g. in financial services or pharmaceutical development), if high response rates are the aim, the questionnaire has to be short, and different policy questions do require different approaches. We therefore proposed several tools.

6.1.3. Conclusions and recommendations

If complementary innovation is used as a criterion for differentiation, a great lag between small and large firms in B2B application is observable. Will this lag be closed within the next few years or is it more probable that different developmental pathways will show? The latter is suggested by the interviews we conducted. At least two discernible pathways were discussed:

- The *first* will be aimed at an overall process integration including all firms with process-critical knowledge.
- The *second* will loosely link smaller firms through portal solutions of larger, central firms of the value chain.

It is still unclear what will happen in value chains where no firms with formative power exist which could introduce standards and push for process integration. If and how self organisation of small firm networks might work could not be derived from our pilot study. The only result visible from a comparison between a more hierarchically organised network as in the automotive value chain and a more self-organising network as in co-operative distribution suggests clear developmental advantages for hierarchical solutions.

It is also unclear if collaborative exchanges or the use of net-services and application service providers could offer a cost-efficient solution for small business in the medium term. For the moment, such a solution is not visible. A "lean approach", too, so far was not sufficiently discussed. With a lean approach we refer to simpler B2B solutions, using lower band internet access (ISDN or DSL), simple and cheap standard software and the development of an easy to use XML standard which does not rely on IT specialists.

From the limited results of our pilot study combined with assumptions on non-respondents we might tentatively conclude that

- There may well exist a digital divide between small and larger firms regarding B2B application.
- This may lead to developmental disadvantages of small firms and structural change.
- If the share of "peripheral" firms not participating in B2B networks is high, this will probably lower the overall impact of B2B application (and the success of eEurope).

Given the initially made reservations regarding reliability and the limited scope of the pilot study we think that further and wider research is necessary to validate these findings.

Our study suggests that technological factors thought to be enablers: IT personnel, broadband deployment and B2B software technology do not play an important role in successful B2B implementation. Not technology – complementary innovation is decisive for the success of B2B.

The internal success factors for B2B implementation we found in statistical analysis were complementary innovations: the introduction and the extent of use of standards, the institutionalisation of B2B in the organisation and the use of controlling. External success factors were – in contradiction to a long time cherished assumption on the superiority of flat, self organising structures – hierarchically dominated chains. Impacts – in those cases where they could be quantitatively measured – quite often were estimated considerably lower than optimistic forecasts would have them.

We recommend no single toolkit approach for all situations but an approach adapted to the data situation and the political aims of data collection. They are categorised in five strategies.

In regard of the Lisbon objectives the integration of SMEs into B2B networks may be extremely important. We should therefore

- Study the situation of SMEs in different value chains in more detail.
- Find ways to overcome standardisation blockades in fragmented segments.
- Switch incentives to collaboration and organisation oriented approaches from a too strong technology orientation.
- Put more weight on lean approaches – other approaches may be self promoting.

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6.2. DIECOFIS

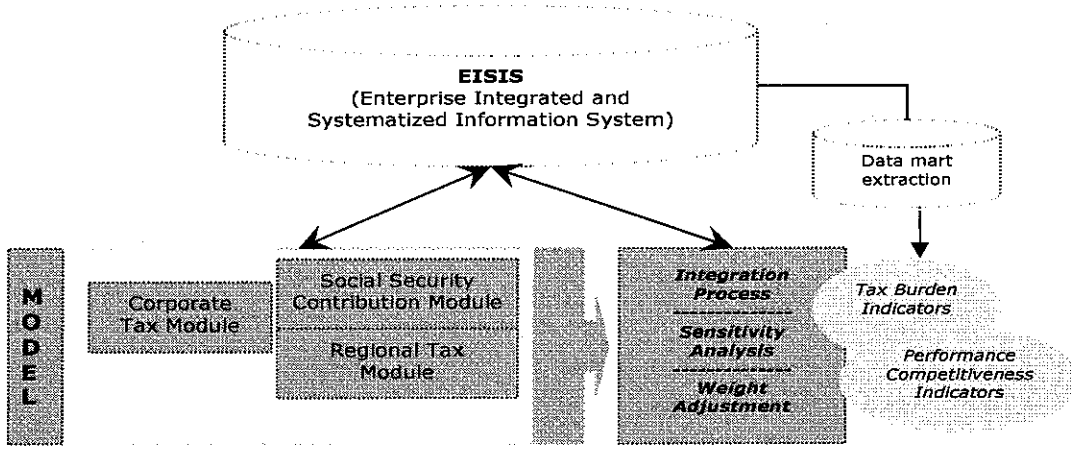
Development of a System of Indicators on Competitiveness and Fiscal Impact on Enterprises Performance

One important indication that has emerged from the debates on the policy initiatives deemed necessary to fulfil the Lisbon pronouncement, is the need to design "best policies" that can serve to effectively achieve the targets which it sets. In a nutshell, what it is all about is "better law-making", "better regulations" and ways and means to execute policies, in conditions of openness and transparency, which are broadly shared and sustained with proper analysis. Since policymakers can hardly distinguish between "best", "better" and "bad" policies without adequate analytical support, an investment in policy-Knowledge is needed. This will have to consist of independent and sound analysis of the expected impact of new policy initiatives. In view of the underdevelopment of policy impact analysis in Europe (with the notable exception of the United Kingdom and some of the Nordic countries), the development of tools, methods and statistical information systems that support evidence based policies is a challenge and a priority at the highest level.

Supporting policies with evidence is a data thirsty activity. To this effect, the advent of the Information Society and the spread of e-accessible databases in which billions of items of data are stored, potentially provide a mass of microdata which can be used to support microeconomic PIA. This goldmine of information remains mostly un-mined, since the potential of new technologies is not being used to store and access the microdata which are collected. As a result, collection and access remain supply driven, not demand pulled, with a tendency to "rehearse the past" (as witnessed by the limited information on the new economy and ICT related change). Besides, a variety of barriers hinder access (including barriers due to old fashioned storing methods), with consequent losses of potentially available information and high opportunity costs in terms of both quality and quantity of the information on hand to produce new knowledge.

Against this background, it has appeared important to gather research consensus through the DIECOFIS consortium, with a view to develop enterprise analytical tools, such as microsimulation models, microfounded and decomposable performance indicators and the parallel development of e-accessible information systems needed to support these activities, including integrated and systematized information systems on enterprises (EISIS). To this effect DIECOFIS has generated critical research mass to test and pilot problems and methods, develop prototypes and search for the best ways that can eventually lead to fill an increasing patent gap in policy impact analysis (PIA).

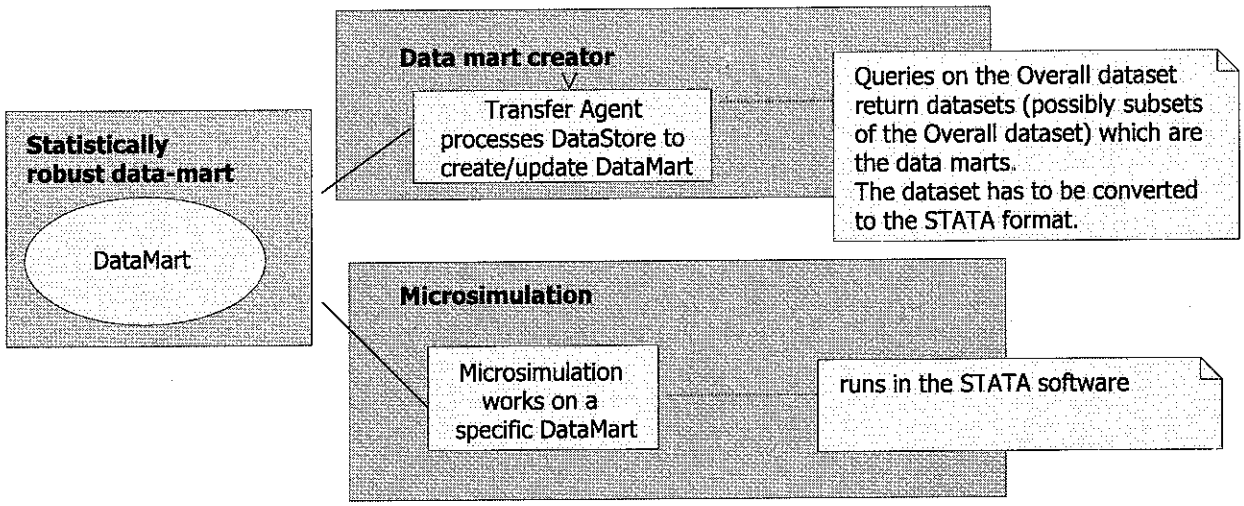
Conceptual Framework for Microsimulation Analysis and Modelling



The DIECOFIS project has offered an opportunity to develop an e-accessible statistical information systems of micro-data, including metadata, relational models, software and statistical methodologies to support PIA in various policy areas. Behind this work is an evolutionary vision which implies the transition from "hard-statistics and "hard-databases" to eStatistics, eDatabases and wide-ranging information systems obtained from the integration and systematization of data from administrative and statistical sources. The objective is to make them accessible to Government Agencies, the research community and stakeholders at large. This has required reconciling (data-linking) statistics from multiple sources, taking into account differences in definitions and adjusting for inconsistencies between sources (metadata matrix), as well as knowledge of the quality and reliability (statistical properties) of linked datasets.

The IT model behind EISIS provides a prototype of the software that may be applied for managing and accessing the data needed for microsimulation and, more generally, for policy impact analysis. The DIECOFIS system uses existing statistical software packages, which permit implementation of statistically robust procedures that can serve to fulfil the multi source data integration and micro simulation purposes envisaged under the project. The DIECOFIS User Interface for multi source data integration and data mart creation is realised in SAS Software. It allows the user to interact with SAS macros in a user-friendly and transparent way. The flexibility and expansion of the DIECOFIS system with regard to new source integration and new micro simulation extension is guaranteed through a dynamic application configuration.

Microsimulation System structure



DIECOFIS has permitted a group of government officials, statisticians, academics and researchers in five EU member countries, to join forces and work together in a trans-national, multi-disciplinary and networked research environment[92]. Using the EISIS framework, DIECOFIS has progressed and developed unique new knowledge and tools for the analysis of the impact of national tax policies on enterprises, and on their performance and competitiveness. It has made it possible to (i) map finely enterprises systemic structures and performance, by means of sets of elementary and multidimensional, composable and decomposable indicators, broken down by groups classified by size, region, sector, etc.; (ii) benchmark national tax legislations across member countries; and (iii) draw "parades" of enterprise performance; and (iv) study the "drivers" of performance and competitiveness with a high precision and detail, at a point in time, over time and longitudinally (i.e. for homogeneous groups of enterprises).

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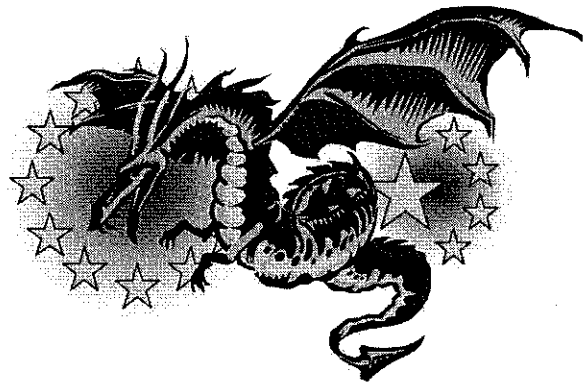
[92] Consortium members include: ISTAT (co-ordinator), Inland Revenue, Informer SA, European Commission Joint Research Centre, CERES Centre Economic and Social Research, University of Cambridge, London School of Economics, University of Florence, Wirtschaftsuniversitaet Wien, University of Tor Vergata

6.3. DRAGON



6.3.1. Introduction

The method of co-operation between different companies has become a strategic issue, especially with regard to enabling cooperation between enterprises situated in different locations and having a different cultural background (e.g. Chinese and European companies). Not only the purchase or the supply of a product, but particularly the ability to find a matching supplier and the integration into the development process of a manufacturer during the whole product development cycle plays a more and more important role.

The overall goal of the DRAGON project (Development of an interactive engineering portal for Open Networks) was to realize a common virtual product development process between distant companies based on digital knowledge exchange and sharing processes without giving away vital know-how.

The result of the DRAGON project was an Engineering Portal representing a virtual, process- and data-oriented integration platform accessible to the involved companies within a heterogeneous IT-infrastructure. The Portal serves as an overall framework for the cooperation of business partners based on given IT-technologies and software tools as well as Internet technologies. In order to improve supply chain management, the Portal provides services covering all phases of the product development process, including contact initiation and collaboration establishment (*Request and Navigation component, Check of Collaboration Partners),* requirement specification and handling *(Specification Modeller),* common workflow definition *(Process Modeller),* components for the *Visualization and Validation of Engineering Data* as well as a *Cultural Repository* which deals with Cultural issues. These components use the DRAGON Information Broker (DIB), which provides web services for accessing the data that the components need. In this way the components don't have to know about where the data is located.

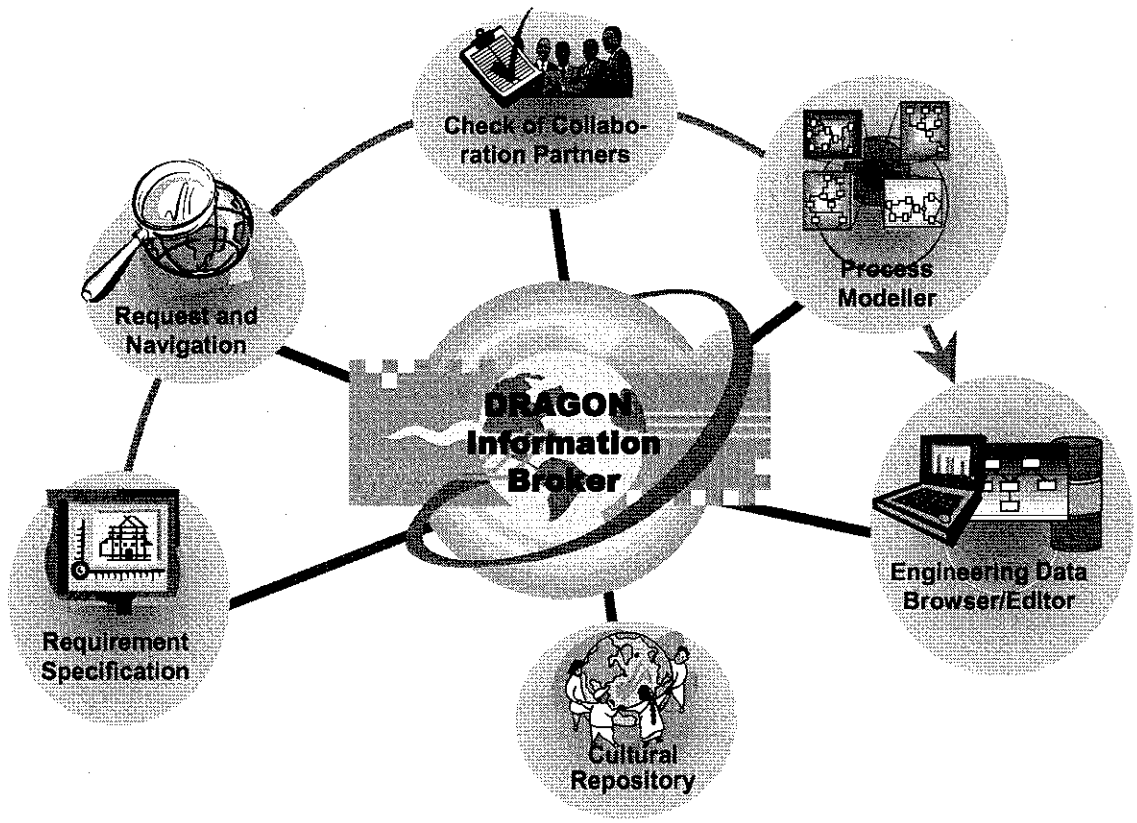


fig 1: DRAGON components

6.3.2. Dragon Information Broker

DRAGON deals with so called reference data models which could be seen as "Lego stones", which could be assembled for the needs of each collaboration. It is also possible to extend the data models by adding new object types, attributes or relationships (at runtime). This approach of a generic data model allows the fast set up of a collaboration without implementing huge integrative data models (like STEP), where only a small part will be used within the collaboration. This saves time and costs for each collaboration partner.

6.3.3. Cultural Repository

One of the inevitable consequences of global engineering processes is the intercultural composition of project teams. Different cultural backgrounds – and therefore different values, norms, behaviours etc - make communication and co-operation between the participants difficult and hamper the project success. In order to support intercultural project teams throughout their joint work, the Cultural Repository Component will be established as part of the DRAGON portal.

6.3.4. Requirement Specification

The requirement specification component provides a formal description of business objects such as products and services but also requests/inquiries and expertise profiles (offers) and subsequently on the establishment of a basis for a requirement driven product development process.

6.3.5. Request and Navigation & Check of Collaboration Partners

The request and navigation and the check of collaboration partners component provides support during contact initiation and collaboration establishment.

6.3.6. Process Modelling

The process modelling component provides the process definitions for the integration of the local engineering processes of collaboration partners and serves as the basis for the execution of engineering processes by the workflow engine.

6.3.7. Engineering Data Browser/Editor

The engineering Data Browser/Editor visualize product information across system, model boundaries and ensure consistency of product information.

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6.4. E3 WORK

The lessons of five Eastern European eWork pilot projects may soon encourage employees and organisations throughout this part of the world to join the 20 million European Union citizens that already eWorked in 2002. Between October 2001 and November 2003, the IST project e3Work guided all five of the pilot initiatives. "Our project evolved out of the desire to transfer the eWork concept to Eastern European national organisations, both private and public," says e3Work coordinator Nicole Turbé-Suetens, from Distance Expert in France.

"We proved it is feasible to make international transfers like this," she adds, referring to the seven partners in the project consortium. While acknowledging that modern technologies - personal computers and broadband telecommunications - played a vital role, she underlines that it was the people involved who were most important. Anyone wishing to be an eWorker needs a positive attitude, she says, especially in countries less familiar with new ways of organising work.

6.4.1. The pilots

Hungary's largest telecom service provider, Hungatel, permitted nine employees to test eWork for two periods of three months (a period also stipulated in the four other pilot projects), applying the implementation methodology developed by Distance Expert. After assessing the trials, Hungary's St. Stephen University's Institute of Management Education concluded that eWork requires modern technology, a willingness among employees to become eWorkers, and a positive attitude from employers and management.

The Latvian pilot, involving the souvenir design, advertising and selling host company Baltijas Suveniri Ltd, concluded that eWork is ideal for enterprises offering similar services, as well as programming and Web design companies. Employees who took part liked, for example, the time they saved by not commuting, and the better communication and coordination with their colleagues. But they agreed that eWork needs organisational changes and strong network security.

In Lithuania, business consultancy Advera and the Lithuanian Women's Society tested mobile and home-based eWorking. It was found, for instance, that 20 sales-people could work from just 12 workstations, saving on office space and computer costs. This was a real breakthrough, according to Turbé-Suetens: "Lithuania was the first country of the ten new EU members to implement 'shared offices'. Our project there became a model for other sales-forces - all of which are now nomadic and share offices."

Polish translation company GET iT, one of the largest in the country, concluded from its pilot that eWork is perfect for service enterprises such as itself. Translators can cooperate with ease, while

increasing their productivity and the quality of their work. EWorking also allows employees to work at home, if they wish, at their own rhythm.

The fifth pilot, in Romania, involving the project partner Western IQ, was hosted by the National Communications Research Institute. In 2002, only one in 200 of the population were eWorkers, nine times lower than in developed European countries. The project noted that this situation would only change if law-makers accepted work at home as a new type of work organisation. This happened in 2003, with the launch of a new Romanian labour code.

The e3Work project was widely influential. "In Romania, as well as Hungary, people involved in their respective projects consulted with their unions and lobbied their governments to change social and employment legislation that had previously ignored eWork," says Turbé-Suetens. "In 2002, Lithuanian participants met with their national parliament's representatives to persuade them to introduce specific eWork legislation."

Certain challenges cropped up in all the projects. Many participants, for example, found it initially difficult to access their company's main computer from their remote PCs. Adds the coordinator: "There were infrastructure and security barriers to eWork. But solving these issues also taught participants a great deal about network security."

6.4.2. Virtual community

One of e3Work's major innovations was to organise and manage the whole project as a virtual community, embracing all six countries. The community has both public and private sections on the e3Work website.

The public section disseminates the results and experience acquired in e3Work. Supported permanently by a staff of two - from the partners Distance Expert and Mayetic - the private section focuses on management of the community, collaborative work, training and internal tools. Lessons learned during the project are also stored here, for the benefit of all the community.

"The virtual community was very instructive," says Turbé-Suetens. She cites how it underlined the need for additional training, reviews of the project architecture and same-day reactions to queries from partners. Quick reactivity is even considered "key to the project's success".

It was also shown that an eWorker can become a 'knowledge producer', adding value to the virtual community. "If a community like this is well managed, it can become a real repository for knowledge management in a team," adds the coordinator. Did she see anything that could have been improved? "I think we would have benefited from using the workflow feature of the mayeticVillage platform," she says, referring to the virtual community.

National character must be taken into consideration in projects like this, it emerged. Participants from the five countries often responded very differently to similar eWorking challenges. While these responses depended to some extent on the local penetration levels of the Internet, computers and networks, they were also determined by working traditions, culture and employment legislation.

Yet in all cases, the project demonstrated how eWorkers and their organisers must be adaptable and flexible. For many European countries, that will require a cultural shift in management methods and practices - based more on achieving results than time spent at work. Several of the French, Polish and Romanian partners are already planning to use the e3Work virtual community in new environments.

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6.5. EGAP

'Best Practice' for eWork in SMEs

The brief of the 'eGap' project was to evaluate reasons for the 'Gap' in time between technological innovation and social innovation, with an eWork focus. Teams from five European regions took part, and after running studies in their own regions, were able to pool data for comparative analysis. As opposed to much eWork research, eGap restricted its scope to small firms, or more precisely, SMEs (Small and Medium-sized Enterprises, i.e. firms with fewer than 250 employees). The majority were selected among SMEs already connected to the Internet.

The Five Regions of the eGap Project	
Finland	Tampere region
France	Rhône-Alpes region
Hungary	Central Transdanubia
Italy	Emilia Romagna
United Kingdom	'Greater West London Wedge'

After consideration of the impact of political, legal, social and cultural factors that applied in each region, one of the main aims was to identify major inhibitors to eWork implementation as well as 'best practice' for eWork in the meaning of successful practice according to the context. To identify 'best practice' the results of 300 in-depth face-to-face interviews – with managers, eWorkers and other stakeholders (such as local authorities, trade unions and technology providers) – were analysed through a grid made up of 12 criteria. These were distributed among four dimensions and took a sustainable development perspective. The types of dimension were: economic, social, technological and environmental.

The findings show that a large range of successful practices are in place across the five regions, but they remain scarce, scattered, often implicit and/or introduced by 'stealth'. Taking into account the apparent 'limits' to current eWork practice, it seems clear they are mostly of an 'implicit' nature. There is a lack of agreement in some regions between social partners and trade unions, and on the place of highly skilled workers. Mostly however any lack of agreement appears to be much more local in thrust – between managers and their workers. The fact that most eWork agreements appear to be handled in an informal manner contributes in part to an apparent under-reporting of eWork. eGap findings show that while there may be consensus on ten points (mainly in the economic and technological dimensions), there are important cultural differences as shown by data from the social dimension. So, for example, in some partner countries, successful eWork adoption requires more exposition of the benefits and risks felt by employers and trade unions in order that some agreement might be brought in its train. But no matter the criterion and any attributes described by the five partners, the promotion of eWork amongst SMEs across Europe will require successful practice to be shaped by local and cultural contexts.

Strong Consensus between the Five Regions
Economic Dimension
EWork can bring added value and can have a positive impact on the productivity and efficiency of company operations.
Internal communication and communication practices are important factors that should receive close attention.
EWorkers' ability to work autonomously is critical.
Measurement by output in a framework of management by objectives is required.
Recruitment policies are significant in the whole eWorking process to ensure that individuals with the necessary aptitude are hired.
Mutual agreement between manager and eWorker is necessary.
Specific training courses for eWork are required.
Social Dimension
Mutual trust between a firm and its eWorkers is necessary.
Technology Dimension
High-quality and user-friendly technology is required.
Some level of technological autonomy is necessary, and adequate training for this must be provided.

Consensus between Four Regions		
Rhône-Alpes region	Tampere region 'Greater West London Wedge' Central Transdanubia	Emilia Romagna
Implicit or implied	EWork must be implemented in a part-time manner in order to avoid social isolation	
Security problems need critical attention		Not mentioned

Social Dimension *Issues Pointed out in all Regions, with Cultural Differences in the Solutions Presented*	
PERCEPTION OF TIME	
Tampere region	To be flexible and an ability to work under pressure are necessary
Rhône-Alpes region	The ability to organise one's time and work is important
Central Transdanubia	Good working relations with colleagues can be maintained with the rational use of time
Emilia Romagna	The ability to meet deadlines, and to plan one's activity is important
'Greater West London Wedge'	Individuals that can be trusted and that have a strong sense of professionalism are required for eWork
'UNSUITABLE TASKS FOR TELEWORK'	
Tampere region	EWork is not suitable for every task. For example, activities that are closely tied to a certain time and place, or where satisfaction gained from work is mostly based on face-to-face feedback, or where special instruments are necessary that would be difficult to move away from the office, are all unsuited to eWorking

Rhône-Alpes region	Tasks which require physical manipulation of things, or which need face-to-face contacts are unsuited to eWorking
Central Transdanubia	Participation in project work of a creative nature that requires frequent personal consultation is unlikely to be compatible with eWork
Emilia Romagna	Some tasks are unsuitable for eWork, but no precisions are given by the Italian partner
'Greater West London Wedge'	Tasks requiring the rapid turnaround of paper documents appear unsuited to eWorking
HOME IS CONSIDERED TO BE A BETTER WORK ENVIRONMENT *Home is generally considered to be a better working environment than the office in all regional reports. There are various reasons.*	
Tampere region	EWorkers enjoy working at home when required. They can dress as they please, drink their coffee or skip it regardless of any official coffee breaks
Rhône-Alpes region	Home is a better working environment because eWorkers can be near their families, provided some help is given if there are pre-school-age children
Central Transdanubia	The home environment – because of the lack of disturbances (e.g. superfluous but obligatory chats with colleagues) – is more suitable for work requiring prolonged concentration
Emilia Romagna	EWorkers are much happier when they can work in calm and with greater concentration at their homes
'Greater West London Wedge'	At home eWorkers can find the necessary peace and quiet they need for difficult tasks such as report writing that may be best undertaken in isolation
WORKING HOURS AND 'FLEXIBILITY OF TIME' *The opportunity to organise one's working time, i.e. 'flexibility of time' is mentioned by every regional report, but each partner emphasizes a particular aspect of this issue.*	
Tampere region	'Flexible eWork' is a sort of part-time eWork that prevents workaholism by those that find it difficult to detach themselves from work
Rhône-Alpes region	Measuring work time on a weekly or yearly basis facilitates eWork
Central Transdanubia	Flexible work schedules are another advantage of working at home
Emilia Romagna	Planning of working hours allows employees to organise their own working time; agreements that set fixed weekly timetables need to be validated by eWorkers' managers
'Greater West London Wedge'	'Core hours' and regular schedules may be required to ensure eWorkers are easily available for consultation by colleagues; workaholism is a danger for work-life balance.

Economic Dimension *Some Consensus amongst the Regions*	
Each region has its own specific way to describe positive feedback, but very few SMEs are able to be precise on this. *In each region different solutions for MBO (Management By Objectives) are proposed.*	
Tampere region	Ability and performance can only be shown by the amount and the quality of work done
Rhône-Alpes region	Setting clear objectives, targets and timescales, and checking completed tasks and their timeliness in addition to an appraisal of costs and sales benefits are all required.
Central Transdanubia	EWorkers participating in the pilot group felt that they could perform their tasks more effectively in this new work form than in the traditional way in the office. Also emphasized was that through eWork, tasks would accumulate less, decreasing work related stress. Finally, this new form of work leads to better performance both quantitatively and qualitatively.
Emilia Romagna	A specific system by which work is evaluated annually along with an evaluation of the professional growth of the employee and her/his future potential is required in addition to procedures for automatically evaluating delivery times and quality of work carried out.
'Greater West London Wedge'	EWork requires the measurement of output rather than input.

N.B.: Contrary to other eGap findings, Hungarian data on 'best practice' are based on the experience of a large firm rather than SMEs because eWork is a very recent practice there.

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6.6. E-MMEDIATE

Improving Virtual Enterprises Practices in SMEs Context

6.6.1. Introduction

The dynamism of the market and the fast changes in customer requirements make it strategic for SMEs to be more and more flexible, acquiring a high capability of partnership creation and management. Many ICT infrastructures exist already on the market for collaborative environments but even the most advanced tools sometimes require complex configuration and customization processes hardly manageable by SMEs. Most of the time new technologies require considerable effort to implement and configure Virtual Enterprise infrastructure.

6.6.2. Approach

The e-MMEDIATE project sets out to support the implementation of eWorking solutions in collaborative SME environments. The project was a take-up action funded under the IST Programme with project partners from Austria, Germany, Spain and Italy. The project redesigned existing business structures and procedures towards the "smart organisation" supporting engineering activities and manufacturing processes through network tracking of specified orders in the virtual enterprise (VE), management of product specifications in the development process as well as the exchange of relevant knowledge, experiences, and product and project data. Some multi-cultural Best Practice cases included multiple management aspects as well as the usability of ICT tools available in the market.

The e-MMEDIATE solution itself comprises three components – methodology, technology and organisational dimension which form the roadmap of the project. Companies in each cluster analysed a number of relevant eWorking solutions (from Project Management to product management to web services) yielding a set of roles, responsibilities, workflows, document flows and document templates for each scenario which in turn were used to define the tailored ICT solutions. The results of the project had direct and practical impact on project partners and the roadmap was proposed to provide a toolset for also supporting other European SMEs.

The roadmap can be used as a reference architecture reflecting the required steps for establishing and improving co-operation within a VE. The backbone of the roadmap can be summarized as follows:

Step 1 : Trust building among the companies supported with a brainstorming session where a checklist helps to define the degree of virtuality of the networking structure according to the actors involved, temporiness and legal form of relationships, value added by each partner.
Step 2 : Current state analysis and industrial requirements which is carried on with questionnaires and graphical representations of the processes based on Business Process Analysis methodologies

Step 3 : Product development scenario with methodology for designing the processes under improvement (both AS-IS and TO-BE scenario). According to the requirements collected, the ICT-selection is based on a common list of criteria used by the partners. Moreover the implementation and training plan is agreed among software providers and companies
Step 4 : Implementation of the ICT application and of the new working methods for the VE is done with the support of the service provider and catalyst of the project.
Step 5 : Evaluation of the improvements achieved within the VE, to monitor how the co-operation process changed thanks to the implemented ICT-Tool and if the expectations are reached.

Each cluster was supported by an external catalyst (either consultant or research institute) in order to guide traditional SMEs through the right path towards the right implementation. SMEs can have some disadvantages in approaching new technologies due to difficulties in deciding how to move in the market and in accepting changes that can occur as a consequence of processing and managing products and services. Implementation of tools in a VE context can be more complex than in single enterprise environment due to the need to synchronize tasks and efforts. SMEs do not want to implement tools that are too complex, rather they prefer user friendly and low cost solutions.

The main requirements collected from the industrial partners are characterized by the following features:

- Lack of clearly defined project process commonly shared among the partners
- Processes and procedures too often based on individual company regulations and procedures
- Weak monitoring and visibility at cluster level: importance of order tracking and workflow management frequently underestimated
- Co-ordination mode restricted to "person to person relationships"
- Absence of common project services and shared working spaces
- Lack of version control of documents shared among the participants to the cluster.

6.6.3. Results

From the requirements of each of the clusters it turned out that it was not convenient to work on a common platform applicable to all the four VEs but it was better to focus on a specific configuration for each context. For this reason the four clusters worked on improving particular performance typical of their collaboration structure. The Italian cluster, with partners of the shoe sector, implemented a web service for managing stock sales at the end of the season via internet to increase the number of contacts with potential buyers. Another web service was implemented in this sector to support a shoe producer in managing production planning with subcontractors. In this way the service providers can act as business integrators for the shoe sector facilitating the contacts and managing services which are otherwise too expensive for a single shoe producer. The Spanish cluster implemented a project management tool to manage specific relationships between a supplier providing innovative design services and outsourcers, to exchange in a formalized way data and drawings. The German cluster is composed of four companies working in an horizontal partnership to answer to common customers. They also implemented a project management tool for co-ordinating activities and sharing drawings and documents but they preferred to use an open source tool to have the possibility to easily involve new customers or new partners in the use of

the tool with no need to re-configure their internal infrastructures. Finally in the Austrian cluster, where a medium size manufacturing company interfaces with two of its suppliers producing moulds, they decided to implement both a PDM system and a project management tool to exchange and work together on complex drawings of the product. The roadmap and these 4 case studies showed how improvements can be easily applied to any SME's collaborative context when it is methodologically supported and the software implementation is balanced with organisational changes management to meet new working methods.

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6.7. IST4BALT

The project "Information Society Promotion in Baltic States (IST4Balt)" is a Co-ordination Action for the FP6 Programme, and IST4Balt is a follow-up of the FP5 IST project "Teleworking as a Tool for Information Society Technologies Programme Promotion to Baltic States (TELEBALT)", which was successfully completed in October 2003.

IST4Balt will be implemented by the coordinator – "Earth Data Network for Education and Scientific Exchange (EDNES)", Strasbourg, France, and its partners:

- United Nations Industrial Development Organization (UNIDO), Austria
- Riga Technical University (RTU), Latvia
- Latvian Information Technology and Telecommunications Association (LITTA), Riga, Latvia
- Association of the Information Technology, Telecommunications and Office Equipment Companies of Lithuania (INFOBALT), Vilnius, Lithuania
- Visoriai Information Technology Park (VITP), Vilnius, Lithuania
- Inforing AS, Kohtla-Jarve, Estonia
- Bi-Info AS Information and Consulting Company, Tallinn, Estonia

In IST4Balt each of the Baltic countries is represented by two partners, and national co-ordinating mechanism will be established in them to co-ordinate the project.

The main goal of the project is to promote the FP6 IST Priority to Latvia, Lithuania and Estonia by implementing fast dissemination and awareness actions targeted on these new EU member states. IST4Balt will perform technology studies and market reviews of the present situation with IST in the three Baltic countries. Based on the results of these studies, it will provide (through IST4Balt Web-sites, News Journal, workshops, conferences and training course) relevant information and formulate appropriate recommendations to EU research and marketing telematics communities.

Based on the applicability of the services and tools in the Baltic countries to launch new educational, research, environmental, telemedicine and/or business project proposals to IST and other relevant EU programs with participation of EU members and Baltic States, the project will select and demonstrate in the Baltic countries up to eight IST developed services and tools following IST Strategic Objectives :

2.3.2.6 Applications and services for the mobile user and worker
2.3.2.10 eInclusion
2.3.2.9 Improving Risk management
2.3.2.7 Cross-media content for leisure and entertainment
2.3.2.3 Open development platforms for software and services

In the framework of IST4Balt a system of three goal oriented Information Dissemination Centers (IDCs) will be developed in the Baltic countries (one IDC in each participating country). The basis of this IDC system was launched under "Open Latvia", Latvia, INFOBALT, Lithuania, and Inforing AS, Estonia, by TELEBALT. Lithuanian IDC at INFOBALT will focus on business applications included in the Strategic Objective *2.3.2.6 Applications and services for the mobile user and*

worker. Latvian IDC at RTU will concentrate on the Strategic Objective *2.3.2.3 Open development platforms for software and services* and will also deal with telematic for tourism included in the Strategic Objective *2.3.2.7 Cross-media content for leisure and entertainment*. The Estonian partner Bi-Info will orient its IDC towards the Strategic Objective *2.3.2.9 Improving Risk management*, as far as economic and financial risk are concerned, and new employment opportunities following the Strategic Objective *2.3.2.10 eInclusion*.

A comprehensive system of IST4Balt interactive and interconnected latest generation Web-sites will be developed by each of the three IDCs along with IST4Balt Web-site in EDNES. The Web-sites in Baltic countries will be focused on particular application areas: open development platforms for software and services at Riga Technical University (RTU), tourism at subcontractor of RTU – "Open Latvia", business applications at INFOBALT and VITP, Lithuania, risk management at Bi-Info, and new employment opportunities at Inforing, Estonia. To these Web-resources UNIDO will include an eWorking system of eCertificates for building the trust and online collaboration in the framework of FP6. The IST4Balt Web system will be designed in the English, Latvian, Lithuanian and Estonian languages. Russian, still being a language of international communication in the Baltic States, will be used to back up necessary parts of the system.

Three issues of IST4Balt News Journal will be published electronically and in hard copies on a yearly basis. It will be devoted to IST events and tools relevant to Information Society activities in Baltic States. The journal will be widely distributed among IST and other relevant EU projects and organizations in the Baltic States as well as posted at IST4Balt Web-sites.

The project will provide co-ordination and support and co-organize major internationally recognized Baltic ICT events - three INFOBALT-IST4Balt conferences in Vilnius in October 2004, 2005, 2006, three Baltic IT&T-IST4Balt conferences in Riga in April 2005, 2006, 2007, and organize a special IST training day inside the conference "Logistics and information technologies in international trade" in Tallinn in December 2005. In total the conferences expect up to 6000 IST participants from Baltic States with wide participation of potential EU team work partners. Based on the IDC system, seven IST4Balt technical/training workshops will be organized (six goal oriented IST4Balt technical workshops at the time of the conferences in Tallinn, Vilnius and Riga, and IST4Balt training workshop in Kohtla-Jarve, Estonia). The workshops will be devoted to FP6 and IST Priority promotion and technical matters of eWorking in business, research, education and environmental protection. The events will clearly show new FP6 opportunities for the Baltic countries and will contribute to launching IST project proposals, as well as proposals to other relevant EU programs.

IST4Balt will provide training measures (distant through IST4Balt Web-sites, and face-to-face at the project workshops) to promote IST FP6 in general to the users in the Baltic countries. The goal of the training will be to show new intellectual, technical, educational and business opportunities that IST opens up to Baltic States as new EU member states.

Finally, the project will initiate the creation of Trans-Baltic Information Society Technologies Association (Trans-Balt IST Association) that will unite the IST4Balt participants along with other leading computer networking, telematic, ePublishing, eEducation and eBusiness organizations in Latvia, Lithuania and Estonia. The association should lead and co-ordinate joint efforts of the three Baltic States in Information Society development focusing on integration of these countries

in the European Union. The Trans-Balt IST Association will ensure a smooth transition of IST4Balt to its follow-up activities at the end of the project.

IST4Balt starts in September 2004 an will have a duration of 36 months.

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6.8. MOBILIFE

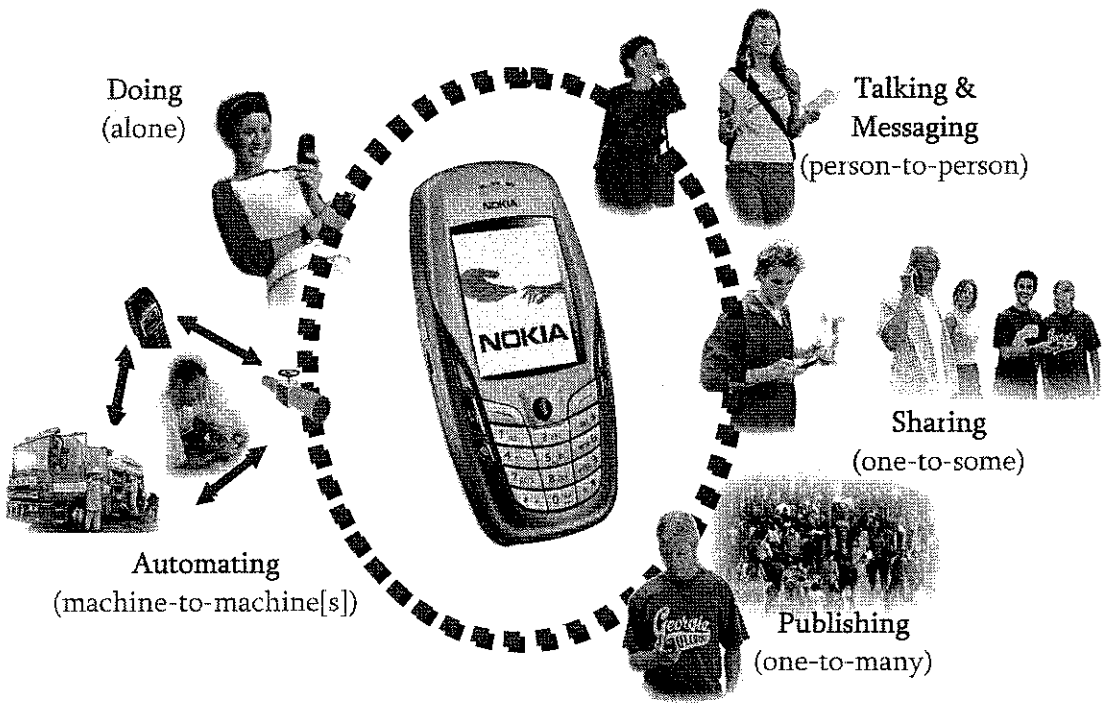
Applications and Services for the Mobile World

6.8.1. Introduction

People are used to being able to contact anyone, anywhere, at anytime. However, the challenge of enabling mass-market-scale ubiquitous services and applications remains. MobiLife Integrated Project in IST-FP6 is to bring advances in mobile applications and services within the reach of users in their everyday life by deploying new innovative applications and services based on the evolving capabilities of the systems and beyond. The project addresses with a strong user-centric view, problems related to different end-user devices, available communication networks, interaction modes, applications and services. The MobiLife consortium consists of application owners (mostly SMEs), manufacturers, operators, solution providers and academia. MobiLife is part of the Wireless World Initiative (WWI), which comprises several projects for IST.

6.8.2. Overview of MobiLife

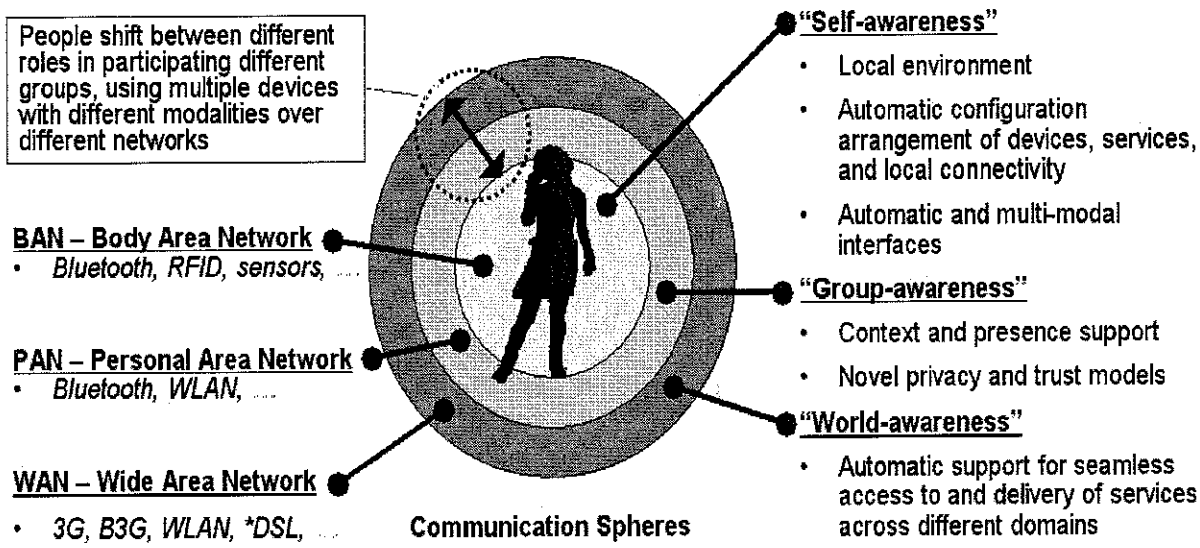
During the past decade, personal communication and online services, based on the widespread adoption of wireless and Internet technology, have been major driving forces behind the growth of the European economy and the improved quality of living. Now the industry is in a major transformation where telecommunications, information technology, consumer electronics, and media industries are converging. This is taking us to the new Mobile World, where a major share of personal and business communication and online services – be it voice, data, images, or multimedia – will be wireless.



As users are participating in varying social contexts in everyday life, we need a facility to maintain such relationships: to communicate, to share items and time, and to manage today's complex lifestyles. This mandates the development of group awareness support which enables the

automatic and meaningful (self) organisation of communication means, the view and use of shared items, adapted to the relevant context. Equally important, this requires new privacy and trust models, so that such solutions can gain user acceptance. These models must also be understandable to the users.

Methodologically, the MobiLife project will follow an interactive approach that acknowledges that the user requirements must be learned partially from experiments with novel service and application prototypes illustrating the end-user value and possibilities of new enabling technologies. To implement this, the project assumes a user-centric stance, focusing on the viewpoint of an individual user and her everyday life defined by the complex web of relationships and interactions with other people and groups. The objective is to recognize and realise novel services and applications that address the true user needs emerging from this complex picture and provide sustained added value and positive experiences to the end-user.



To make these services and applications real, the project will likewise investigate key application enablers and technologies deemed crucial for their implementation, keeping in mind the qualitative constraints such as the very large number of end-users and their diversity. Technologies for maintaining a "shared cognition" amongst groups of users, such as modelling and reasoning for contextual awareness, technologies for facilitating and maintaining privacy and trust, and technologies for creating and sharing various kinds of content and media related to everyday life belong to key areas covered in the project. The enablers and technologies will be embodied in application experience prototypes, thus providing the project further opportunities to learn interactively how they can facilitate providing sustained added value to the end-users.

None of the services and applications developed in the project will ever reach the end-users, if they cannot in practice be created and provided by some value network consisting of network operators, service operators, content providers, integrators, and others as may be needed. Therefore, the full lifecycle of service creation, packaging, configuration, provision, and support is also addressed by the project, thus complementing the user-centric view with the equally decisive value network view. In the context of marketplace dynamics, the project will also study the

relevant business model and societal issues, in particular potential legal problems and their solutions.

In the larger context of the Wireless World Initiative (WWI), MobiLife co-operates with the majority of world-leading operators, suppliers, research organisations, and other industries with the aim to develop an integrated approach and to reach global consensus on a new, robust, and technology independent future communications systems environment.

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6.9. MOSAIC

Mobile Worker Support Environments and AMI@Work Communities

6.9.1. Introduction

The key objective of the MOSAIC project which is undertaken in the Strategic Objective 'Applications and Services for the Mobile user and Worker' of the IST FP6 programme, is to accelerate innovation in mobile workplaces. MOSAIC is accomplishing this by providing a breeding ground for future research and innovation activities in Europe. We explore business and societal innovation and our aim is to prepare Europe for deploying innovative mobile technology in a range of application domains, to support mobile workers who are part of networked organisations in their day-to-day work environments in distributed and location-sensitive settings. The project focuses on mobile working innovation in three key domains: Healthcare and Wellbeing, Engineering sectors (Building and Construction, Manufacturing) and Rural and Regional Work Environments. In addition to the established players, MOSAIC encourages participation of small and medium size enterprises and small research teams across Europe including New Member State countries. We are working closely with the New Working Environment Unit within the European Commission to establish innovation communities in the area of Ambient Intelligence@Work. Since March 2004 we have launched the communities Health and Wellbeing@Work, Engineering@Work, and Rural and Regional@Work, and additionally the 'horizontal' communities Collaboration@Work, Mobility@Work and Knowledge@Work and recently a new community Media@Work has been initiated.

6.9.2. Building a Breeding Ground for Workplace Innovation

In order to achieve our aim and objectives, MOSAIC is carrying out a series of parallel activities such as expert network building, identification of mobile work good practices and critical success factors in current mobile work pilots and national programmes, identification of future R&D and development of domain-specific roadmaps to support the successful deployment of mobile working within the chosen three application sectors, development of a generic roadmap and research agenda for mobile working, promotion of European-wide collaboration for deploying mobile work environments, running of working groups and dissemination activities, promotion of take-up activities etc. Through these multi-disciplinary work activities, MOSAIC aims to build partnerships among stakeholders and to influence EU policies and strategies for RTD and innovation in the area of the mobile worker and mobile work environments. For this purpose MOSAIC has brought together a core team of partners with a strong track record in community building, mobile working RTD and co-ordination of roadmap projects and network activities under FP5 (such as COCONET, Future Workspaces, INTELCITIES, NESKEY, ROADCON, CE-NET and others).

6.9.3. Workplaces for People

The driving force for MOSAIC is the challenge to support efficient, intuitive, user-oriented and 'human-centric' work environments where technology is aligned to organisations and human behaviour, enabling people to work together irrespective of constraints in location and time. Undoubtedly, ICTs supporting mobility, context and location-awareness, networking and ambient interfaces will play an important role in implementing this challenge. However, ICT impacts on

the worker environment are not well understood, hindering innovation. Therefore technical, organisational and geographical aspects of workplace innovation, and coping with social issues in mobility, sustainability and quality of work should go hand in hand with ICT innovation. MOSAIC therefore pursues a holistic and multidisciplinary view on innovation, bringing together different disciplines and communities, in particular those in the areas of mobile and wireless technologies and applications, workplace innovation, and spatial infrastructures for living and working. We believe that in order to exploit the potential of the area and set out a realistic research and innovation strategy and create an industry support base, boundaries between traditional disciplines and communities should be overcome. MOSAIC aims to create a "breeding ground" for such multi-disciplinary collaboration and innovation in the area of mobile work environments.

6.9.4. Results of MOSAIC so far

Up to now, MOSAIC has achieved several key results. One is the preparation and successful launch of AMI@Work communities being the breeding grounds for mobile workplace innovation with now over 600 registered members covering over 20 European countries. The Communities have been launched officially at the Brussels Launch event 7-8 June 2004, where former EU Commissioner Erkki Liikanen has termed them 'Living Laboratories' involving all the research and innovation players needed. Several preparatory AMI Community workshops have been organised jointly with the New Work Environments unit, such as the AMI preparatory meetings in Brussels in March and Budapest in May. MOSAIC has designed and implemented the webspace environments for all AMI@Work communities. Besides, MOSAIC has organised specific workshops dealing with mobile workplace scenarios and workplace innovation roadmap, and dealing with societal aspects of mobile workplace innovation. A number of working papers have been produced dealing with good practices, industry domain developments in mobile work, scenarios and roadmap, and societal aspects of mobile workplace innovation. Additionally, MOSAIC and AMI@ Work communities increasingly share their resources for common activities like workshops and development of working papers. This work is going to be continued until May 2005 and our website will make available all results.

6.9.5. MOSAIC Network and AMI@ Work Communities

MOSAIC offers membership to individuals and organisations either users, researchers, providers, consultants, policy makers or decision makers interested in contributing to shape the vision of the future mobile workplace, and to commonly develop scenarios and roadmaps for application domains in mobile working. MOSAIC workshops are organised jointly with the Ambient Intelligence@Work family of communities' events as organised by the New Working Environments unit of the European Commission. Besides MOSAIC Network membership we facilitate membership of the different AMI@Work Communities.

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MOSAIC project website : http://mosaic-network.org/ AMI@Work Communities Registration : http://www.mosaic-network.org/registerAMI/index.html	

6.10. STILE

Growth and labour market mobility in the ICT sector in Europe

Measuring labour market mobility in the ICT sector, a forthcoming paper resulting from the STILE (Statistics and Indicators on the Labour Market in the eEconomy) project, aims to see to what extent the inflows and outflows of ICT workers as well as their destination sectors can be detailed using information from the EU LFS and the Belgian Datawarehouse[93]. The objective is a better understanding of the knowledge flows in and around the ICT sector as well as of the composition of the ICT sector itself. Extracts of this paper are presented below.

table 1 : ICT employment by gender and age, European Countries 2002

	Men				Women					Total	
	25-64	25-34	35-44	45-64	25-64	25-34	35-44	45-64	Among total ICT employed aged 25-64	ICT employment as a% of total employment	Annual average growth rate (1998-2002)
	1000s	%	%	%	1000s	%	%	%	%	%	%
EU-25	4 775	36	34	30	2 320	36	34	29	33	4.5	2.7
EU-15	4 518	35	34	30	2 074	37	35	29	31	4.6	2.6
BE	135	37	33	30	47	40	35	25	26	5.0	3.9
CZ	85	47	23	30	86	28	30	42	50	4.0	2.2
DK	87	29	31	40	44	34	44	22	33	5.6	3.3
DE	1 054	32	38	30	524	32	37	31	33	4.9	5.2
EE	:u	:u	:u	:u	12	:u	:u	47u	:u	3.1	6.1
EL	55	35	29	35	18	39	34	27	24	2.1	5.8
ES	271	46	30	24	131	54	29	16	33	2.8	3.4
FR	657	36	32	32	398	33	34	33	38	4.9	1.8
IE	70	48	32	21	37	59	26	15	35	7.6	1.9
IT	530	36	33	31	248	40	35	25	32	3.9	3.4
CY	3	51	28u	21u	1u	46u	50u	:u	26	1.7	1.4
LV	10	:u	:u	:u	8	:u	:u	60u	45	2.0	5.8
LT	12	:u	46	:u	12	42	:u	:u	49	1.9	-7.9
LU	4	43	29u	28u	1u	:u	40u	:u	28	3.0	5.3
HU	94	46	26	28	82	39	24	38	46	5.1	7.0
NL	240	36	33	31	75	34	41	25	24	4.7	1.4
AT	117	38	35	27	49	38	36	26	30	5.1	4.4
PL	:	:	:	:	:	:	:	:	:	:	:
PT	43	45	25u	30u	28	58	:u	:u	40	1.7	-0.7
SI	15	44	25u	32u	9u	51u	36u	13u	36	3.0	2.5
SK	34	37	30	33	36	36	36	28	52	3.8	3.7
FI	80	42	29	28	45	38	30	32	36	5.9	0.2
SE	148	35	29	36	75	32	34	34	34	5.9	1.5
UK	1 027	34	36	31	356	35	35	30	26	5.8	2.1
IS	3	39	32	:u	2	:u	:u	:u	33	3.9	1.1
NO	58	40	33	27	27	33	30	37	32	4.3	3.3
CH	132	34	33	33	66	31	38	31	33	6.0	1.3
BG	35	36	24u	41	37	21u	29	50	52	2.8	3.5
RO	79	52	22	26	61	37	36	27	44	1.8	-2.0

EU-25 and EU-15 are estimated. Exceptions to the reference year 2002: DE, LU = 2001; exceptions to the reference period 1998-2002: DE, LU = 1998-2001; EU-25, CY = 1999-2002; BG = 2000-2002. :u = data unreliable; u = data should be treated with caution. Source: EU LFS, spring data (Processing Camire S.L.)

[93] *Measuring labour market mobility in the ICT sector* (Stimpson and Tielens, 2004) was written as part of the STILE project and funded by the European Commission's Information Society Technologies (IST) programme. It will be presented at the final STILE conference, Measuring the Information Society, on 30 September – 1 October 2004 in Brussels, and published in a forthcoming book bearing the same title.

Employment in the ICT Sector in Europe

Table 1 shows the degree of ICT employment-intensity (the proportion of total jobs in the ICT sector) in each European country in 2002. Ireland has by far the highest proportion at 7.6%. Other leading countries are Switzerland, Finland, Sweden, the UK and Denmark, all with over 5.5% of total employment in the ICT sector. In 2002, Portugal and Cyprus had the lowest level of ICT employment-intensity at 1.7% each, just over a third of the average for the EU-25.

Country differences notwithstanding, the ICT sector in Europe can also be characterised by its male dominated nature. On average, only one in three ICT jobs is held by a woman. The most extreme cases of gender inequality can be found in the Netherlands and Greece, where less than one quarter of all people working in the ICT sector are women, although the United Kingdom, Belgium and Cyprus are not far off this low. At the other end of the scale, the economies that have the most gender equality in their ICT employment structures are the new Member States.

But if there are strong country differences between the proportions of men and women working in ICT, there are on average similarities in the distribution of these workers among age cohorts. Although it is unsurprising that ICT workers generally fall into the younger cohorts, in the EU-25, more than one in every three jobs in the ICT sector is carried out by someone in the 25-34 year old age bracket and 70% of all ICT jobs are held by people aged between 25 and 44.

In terms of an ageing ICT workforce, Bulgaria and Denmark have the highest proportions of male ICT workers in the 45-64 year old age bracket (41% and 40% respectively), while for women, Latvia and Bulgaria have the highest proportions of 45-64 year old female ICT workers (60% and 50% respectively).

In addition to age and gender playing strong roles in the composition of the ICT sector workforce, a frequently suggested phenomenon linked to the growth of an industry focused on information and communication technologies is the breakdown in traditional working conditions. Table 2 shows that, far from being a sector that is characterised by job insecurity, the proportion of employees on a temporary contract in the ICT sector in Europe is below the level of the overall economy. Furthermore, over time, the gap has been increasing: the proportion of all employees with temporary contracts was 8.5% in 1998, growing to 9.4% in 2002. To a certain extent, this rise is explained by the high increase in temporary contracts in Poland, which has paralleled an increasing joblessness (not in Table). Over the same period, the proportion of employees on a temporary contract in the ICT sector has fallen from 5.6% to 5.3%.

If workers in the ICT sector have a greater amount of job security than is the average, so too are they more likely to be employed on a full-time basis. At the aggregate level, whilst the proportion of people working part-time has generally increased in Europe between 1998 and 2002, in the ICT sector it has fallen. Though this provides no indication of when the hours are worked (i.e. late, night, weekends), it does at least suggest that the ICT sector is more demanding in terms of the number of hours it requires from its workers.

Another pertinent indicator concerns the proportion of people that are self-employed in the ICT sector, how this is changing over time and how it compares with the economy as whole. Change in the proportion of people that are self-employed is an indicator of the degree to which there are increasing or decreasing levels of entrepreneurship. It is a little surprising that the differences

between levels of entrepreneurship for the economy overall and for the ICT sector are as prevalent as they appear to be. At the European level, even though entrepreneurship has increased marginally in the ICT sector between 1998 and 2002 (from 6.8% to 7.2%) it still remains at less than half of the level evident for the overall economy, which itself has fallen over the same time period to 15.3% in 2002.

table 2 : Number of employed and % of which are working part-time in the ICT sector and overall EU-25, 1998 and 2002

	1998				2002			
	Total		ICT sector		Total		ICT sector	
	1000s	%	1000s	%	1000s	%	1000s	%
Temporary contracts (employees only)	131 339	8.5	5 568	5.6	139 679	9.4	6 569	5.3
Part-time work (all employed)	159 969	14.8	5 989	9.9	168 243	15.3	7 095	9.4
Self-employment (all employed)	159 969	16.1	5 989	6.8	168 243	15.3	7 095	7.2

EU-25 is estimated. Source: EU LFS, spring data (Processing Camire S.L.)

ICT job mobility in Belgium

The job-to-job mobility rate reflects the proportion of employees who are working for a different employer (enterprise level) one year later. Globally speaking, 7.2% of all employees in Belgium moved jobs between 1999 and 2000.

table 3 : Job-to-job mobility rate of employees (15-64 years old) according to sector of activity Belgium, 2nd quarter 1999-2000

NACE / Sector	Description	Total number of employees (n)	Job mobility rate (%)
NACE 30.0	Manufacture of office machinery and computers	432	5.1
NACE 32.1	Manufacture of electronic valves and tubes and other electronic components	7 194	3.7
NACE 32.2	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	8 767	4.6
NACE 32.3	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods	3 131	5.9
NACE 33.2	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	1 207	4.9
NACE 33.3	Manufacture of industrial process control equipment	2 047	8.5
NACE 64.2	Telecommunications	26 429	5.7
NACE 72.1	Hardware consultancy	11 008	17.0
NACE 72.2	Software consultancy and supply	12 600	15.0
NACE 72.3	Data processing	1 815	10.6
NACE 72.4	Data base activities	818	12.7
NACE 72.5	Maintenance and repair of office, accounting and computing machinery	1 432	12.6
NACE 72.6	Other computer related activities	81	29.6
ICT 3 digits	NACE 30, 32, 33.2, 33.3, 64.2 and 72	76 961	8.9
Total Economy		2 778 338	7.2

Source: KSZ-DWH Labour Market – administrative data (Processing Steunpunt WAV)

In general, employees in the commercial service sectors (for example hotels and restaurants, wholesale and retail) experience greater job-to-job mobility and those in industry (for example metals or wood industry) and in the non-profit making sectors (for example post or health activities) are less mobile. Focusing on the ICT sectors notable differences come to the fore. The commercial provision of services (especially Consultancy, NACE 72.1 and 72.2), is much more mobile than, for example, the industrial branch of ICT (Office accounting and computing machinery) and Telecommunications. Within the Hardware and Software consultancy, respectively 17% and 15% of employees are job-to-job mobile, which makes consultants one of the most job mobile employees. But other employees within NACE sector 72 also have a higher than average job-to-job mobility.

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6.11. TEAMWORK

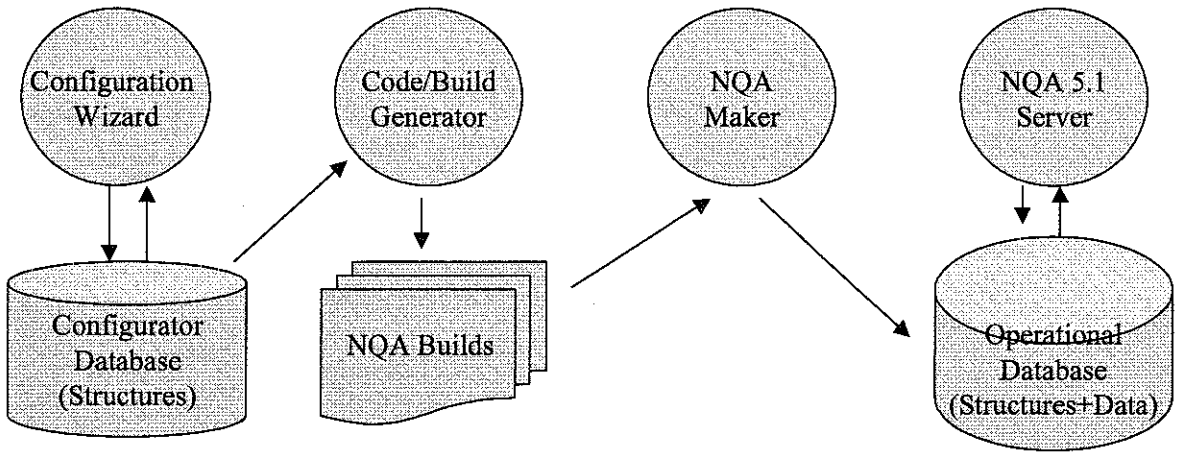
The TEAMwork project set out to trial an innovative eWorking solution for use in a distributed, multi-cultural environment. The project, an eighteen month take-up action was funded under the IST FP5 Programme with project partners drawn from seven EU and Accession States. The project trialed the solution in a diverse range of distributed working environments in three user domains:- public service organisations, research networks and software engineering companies.

The TEAMwork solution itself comprises three integrated components – methodology, technology and social dimension. The starting point in the project was to apply the methodology and technology in the user group. Users in each domain analysed a number of relevant eWorking scenarios using the Bestregit teamworking methodology. This analysis yielded a set of roles, responsibilities, work flows, document flows and document templates for each scenario which in turn were used to configure the NQA 'virtual office' technology with a series of tailored bespoke eWorking solutions. The methodology was regarded as a valuable tool by users in explicitly defining activity flows, roles and responsibilities and facilitated teams to think in a structured and logical way about a work process

The technology component NQA (Network based Quality Assurance) is a virtual office with strong document management capabilities. Users found the ability to work on documents in a shared environment critical to the perceived usefulness of the system with strong security and integrity features addressing users sensitivities about sharing information in a virtual environment. The configured technology was tested in each user domain through a series of trials conducted over a four-month period involving users in Ireland, UK, Spain, Austria and Slovenia. Feedback from users was captured using questionnaire (HTML form), interview and open feedback. Feedback focused on evaluation of the technology, methodology together with a set of questions designed to assess the social and cultural dimension of working in a distributed virtual environment. User feedback confirmed that the TEAMwork solution could effectively support collaboration in a diverse range of eWorking scenarios.

While user feedback to the NQA was positive, a number of improvements and refinements were made to the system in response to specific user feedback. The principal refinement was the addition of an eWorking application wizard to enable non-technical users to generate their own eWorking environments. The wizard includes
A Configurator, an interface developed with PHP, SQL database and Apache server which supports the creation of project types, eWorking spaces and document flows.
A Generator – a tool which builds NQA containing all regenerated user interface templates and scripts so that NQA can be tailored automatically.

A new Graphical User Interface was also added to improve the user-friendliness of the interface. This included a number of simplifications, the addition of a discussion forum and a menu style format. These improvements in the user interface and system functionality significantly improve the usability of the system and position the TEAMwork solution as an advanced state-of-the-art solution.



The New Tool Chain

The social dimension of the project was an acknowledgement that the development of more innovative eWorking solutions is also leading to the design of new social spaces. These require sophisticated communication and inter-personal skills to ensure that the technologically-mediated spaces are socially functional and organisationally effective. The social impact of these systems is high because they are changing the working reality for many people in a dramatic way. The challenge in TEAMwork was to bring to light issues associated with working in these kinds of spaces, and to understand both the role and the limitations of the technologies and methodologies associated with these spaces.

It was interesting that all users were found to have had a positive experience of using the system which was somewhat surprising as it had been assumed that the document centric approach of TEAMwork and the formalised definition of roles and methods of communication would have rebutted at least some of the participants. National and cultural differences were also found to be only of minor importance in users interaction with the system. The participants used the technology in a very similar manner and described their experiences with the same words and concepts. Given the extent to which the literature highlights the importance of cultural factors in this kind of system these findings are important. Further research is needed to understand the extent to which cultural homogeneity is emerging within the EU as a result of, or in parallel with, technology development.

Systems and technology must not overly-formalise human behaviour – forcing humans to act as appendages to the technology. Technology, as demonstrated in the project, is at its most effective when people are encouraged to engage with each other, rather than with the technology per se. This perhaps explains some of the difficulties reportedly associated with many advanced supply-chain integration systems which adopt a very formal model of organisational behaviour and then force people to work according to that model.

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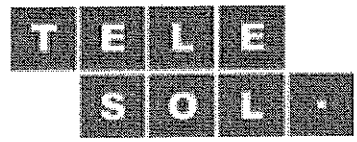
6.12. TELESOL

Telework solutions for promotion of EU cooperation in business and research with the Commonwealth of Independent States



6.12.1. Introduction

Concepts of eCollaboration, distributed office, televillage, telemedicine, are the facts of everyday business life in the EU. The businesses and organizations in these countries have a vast experience in telematic methods of work; they identified and concentrated on the best solutions and best practices in that area. The process of gaining the expertise in the telematic methods of work is taking place in the CIS countries. At the same time, these countries often lack the systematic knowledge to be gained from the experience of others. So the emerging everyday problems are not properly addressed, and the results of telematic work are far from optimal.

The traditional argument in favor of telework is the difference in wages level between regions, which makes telework economically interesting. But eCollaboration, including telework within one location or organization, can have other advantages as well. eCollaboration helps better combine work responsibilities and family issues, involves disabled in work processes and improves work conditions for all, diminishing commuting time. eCollaboration assists regional development by inviting qualified personnel to remotely situated organizations; use of telework helps to overcome such calamity issues as epidemics.

6.12.2. Goals and Objectives

TELESOL is in the IST program of the European Commission. The coordinators of the project are UNIDO – United Nations Industrial Development Organization, and association EDNES (Earth Data Network for Science and Educational Exchange), France. EDNES has good experience in carrying out the joint EU-CIS research projects.

The main objectives of the project are:

- create telework awareness in the local business and research communities;
- make use of experience and best practices of other IST projects and EU companies to address telework issues in CIS countries;
- collect the information in the participating CIS countries, concerning their technological and other readiness for the telematic methods of work;
- identify local telework problems;
- widely disseminate the relevant information by project events, publications and through Internet;
- develop interactive training materials on the telematic methods of work.

The goals and objectives of the project defined a choice of the participants. The IST projects and EU companies and organizations were chosen for having the knowledge and the experience in the telematic methods of work, including cross-border eCollaboration. At this moment organizations, which were active in the project activities so far, represent Austria, Germany, France, Denmark, the Netherlands, Ireland, Switzerland, Poland, and the list is open.

We were able to identify in the participating CIS countries the business and research organizations, involved and/or experienced in the telematic methods of work, thus contributing to the project. These organizations are considered to be the focal points of the project in each of the participating CIS countries. The participants of the project represent the following countries of CIS: Central Asian (Kazakhstan, Kyrghyzstan, Uzbekistan), Caucasian (Armenia, Azerbaijan, Georgia), Slavic (Russia, Ukraine).

6.12.3. Events and Materials in 2002-2004

Project TELESOL is achieving its goals and objectives by the following means:

- The fruitful working meetings of the representatives of IST projects, eWork experts from EU, other project participants and of the telematic community in the participating CIS countries. Up to this moment, the following events were conducted:
    - Kick-off workshop in the Bishkek (Kyrghyzstan), 8-9 June 2002;
    - Regional workshop "Technical aspects of the telework" in Yerevan (Armenia), 19-20 November 2002;
    - Regional workshop "Telework in research, medicine and business" in Kiev (Ukraine), 24-25 April 2003;
    - Regional workshop "Telework in education and training" in Baku (Azerbaijan), 6-8 February 2004;
- The following events are planned for remaining period:
    - Central Asian telework conference in Almaty (Kazakhstan), October 14-15, 2004;
- The creation of the Telework Competence Centers in the participating CIS countries. In each country, TCCs will be the focal point of the knowledge, experience and best practices of the telematic methods of work;
- In 2002-2003, the interactive web-based training materials on telework for russian-speaking audience were developed. The expert persons and organizations from France, Germany, Ireland, Poland, Russia took part in this activity. The pilot use of these materials was made on Kiev, Yerevan and Baku workshops. Part of the work was realized as an eWorking project between Ireland (project FLEXWORK), Russia and Armenia;
- The wide dissemination of the relevant information, including yearly issue of the project newsletter and the creation of project web-site.

6.12.4. Publications and web-sites

In 2002 and 2003, the first and second volumes of the TELESOL newsletter were published in 1000 copies in English and Russian. The newsletter was widely disseminated by direct mailing to eWork experts and at TELESOL events. The third volume of the TELESOL newsletter is in print and will be available in autumn 2004. The TELESOL team considers Internet as the most important tool for dissemination of eWork methodology and experience information. For this purpose, the TELESOL main web-site was developed, which contains all information about the project and a lot of useful eWork information and resources. TELESOL web-sites were also developed in all participating CIS countries; these sites contain country-specific eWork information. The address of the main site is: http://www.ednes.org/telesol; one can find there the links to the local web-sites.

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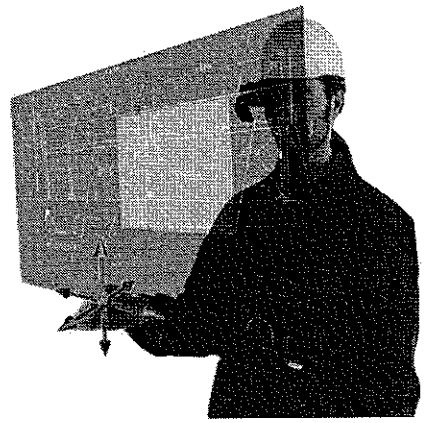
6.13. WEARIT@WORK

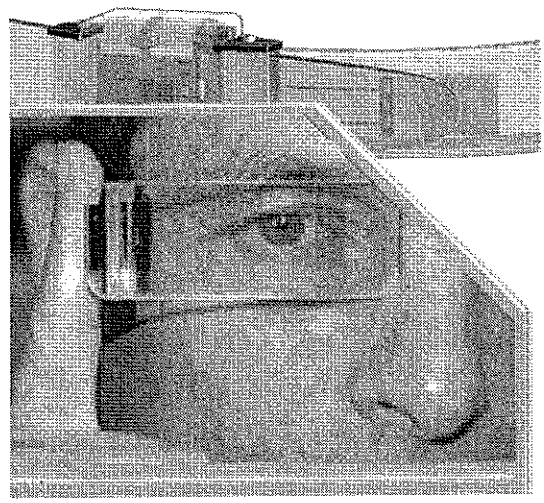
Empowering the mobile worker by wearable computing

6.13.1. Background



wearIT@work is funded the European Commission as an IST FP5 Integrated Project to investigate "Wearable Computing" as a technology dealing with computer systems integrated in clothing. The project has 36 partners, among them EADS, HP, Microsoft, SAP, Sony, Siemens, and Zeiss. With a project cost of about 23.7 million € and a funding of about 14.6 million €, wearIT@work is the largest project world-wide in wearable computing. The TZI is one of the University of Bremen research centres and co-ordinates this key project of the "Bremen Mobile Research Centre". - wearIT@work contributes to the shaping of today's most challenging computer applications.

6.13.2. Project Description



wearIT@work will prove the applicability of computer systems integrated to clothes, the so-called wearables, in various industrial environments. These novel computer systems will support their users or groups of users in an unobtrusive way, wearing them as a computer-belt. This will allow them to perform their primary task without distracting their attention thus enabling computer applications in novel fields.

Interaction with wearables by the user must be minimal to realize optimal system behaviour. For this reason a wearable computer recognizes by integrated sensors the current work progress of a user. Based on the work context detected, the system pushes useful information to its user, e.g. how to proceed with the work. Apart from speech output, media could be optical systems presenting the information, e.g. via semi-transparent glasses within the workers visual field. Output devices for tactile feedback will be applicable too.

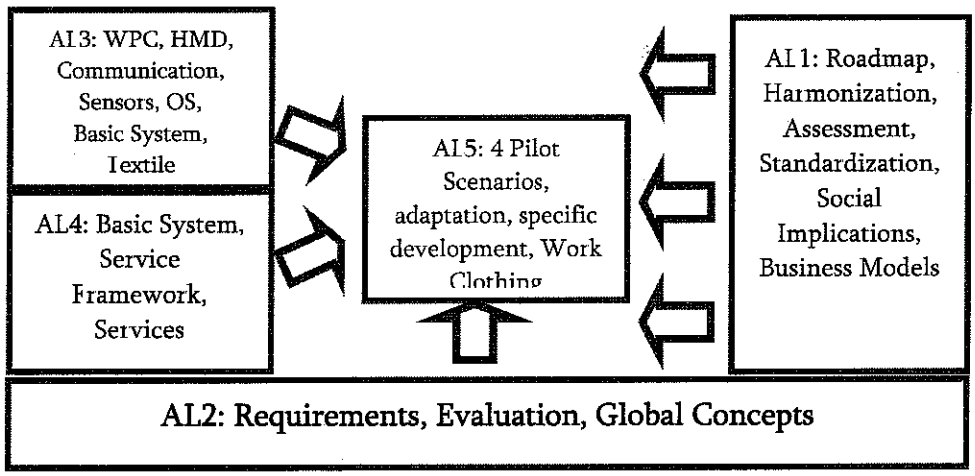
6.13.3. Project Goals

One of the major goals is to investigate the user acceptance of wearables. Furthermore methods for user interaction and processes suited to wearables in industry will be identified. It seems to be essential to have methods to detect the work context and have a general architecture of wearables as well as a hardware and software platform for the implementation of wearables. This will be the basis for the four industrial pilot applications, variant production, the clinical pathway, maintenance and emergency.

In variant production the challenge will be information integration and intelligent information presentation. For the clinical pathway the focus will be on intelligent information logistics and context aware collaboration. The maintenance scenario will have its focal point on context detection and intelligent manuals. The focus of the emergency activity field will be collaborative planning and interaction using wearable devices.

6.13.4. Project Aspects and Organisation

This Integrated Project is organised in activity lines (AL) and activity fields (AF) to manage its complex structure and follows a human centred approach. The pilot applications will be developed in a 1 ½ year's cyclic manner based on the following project structure.



6.13.5. Advantages

The following advantages are expected: First of all an improved productivity and flexibility of workers will be achieved. Second, increased safety at work and decreased pressure towards automation is the aim. All this will allow simplified access to enterprise information and lead to faster group decisions. Furthermore new information technology products will be introduced into the market based on the pilot applications developed within wearIT@work. The worldwide market for wearable computers generated over $70 million in supplier revenues in 2001. The market will increase at a compound annual growth rate (CAGR) of over 51% through 2006, and grow to over $563 million. Despite its massive growth, the market for wearables is still a niche market compared to the industrial use of desktop computers. Drivers of a stronger growth will be more standardised hardware and software platforms enabling the new work paradigms. wearIT@work intends to be with its partners a key driver for this market.

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ANNEX 1 : EUROPEAN PROJECTS (IN ALPHABETICAL ORDER)

AFORO	AGRI-FOOD ROADMAP. A vision and workplan to implement future RTD trends fro the transformation of agri-food industries into digital companies.	IST-2001-37258

The objective of AFORO is twofold. It is first oriented to integrate, refine and validate partners' knowledge to identify key research demands for the next five to ten years, and their feasibility with regard to the development and implementation of novel eCommerce, eBusiness and eWork technologies, concepts and models, into companies belonging to the agro-food industry and services. This first objective is achieved by reinforcing and building consensus among a group of experiences actors in the RTD domain for Agro-Food applications. Secondly AFORO produces a sensitive course of action to implement such RTD activities within the next five years taking into consideration the potential EC competitive position, identifying all relevant actors and generating implementation models.

Project period : June 2002 – June 2003 (12 months) www.aforo.net/

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AMIRA	Advanced Multi-modal Intelligence for Remote Assistance	FP6-511740

The business goal of AMIRA is to significantly improve the accessibility and resources available to support urgent and critical diagnostics and decisions that must be taken by mobile workers, operating individually or in multi-discipline collaborations, at their point of intervention in an event. The technical goal is to develop a set of reusable components using search, reasoning, speech dialogue technology and collaborative working techniques that can be used to create a variety of applications for use by mobile workers operating in safety or business critical situations in the field. The prototype application developed in AMIRA will be a wireless, easy to use, intelligent, real-time diagnostic and decision support system for mobile workers using multi-modal devices such as wireless earphone/microphone, PDA or UMTS 'phone. The focus of the work will be on proving the application in providing multi-modal assistance at the point of intervention in time-critical, safety/business critical incidents. AMIRA will widen the applicability of advanced search and reasoning technologies to make it possible to access these through a speech dialogue interface. Structural case based reasoning (CBR) will drive the intelligence behind the dialogue, generating the questions to be automatically answered (in the same way as Web self service does today but targeting speech self service). AMIRA will provide semantically based and context aware systems that can acquire, organise, share and reuse knowledge in structured ways.
(Subject to contract)

Project period : July 2004 – July 2006 (24 months) www.amira.no

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AUDIOTAIN	Empowering audio content providers through ework and interactivity management to exploit audio knowledge bases in the market for interactive audio entertainment	IST-2000-29302

AUDIOTAIN enables audio content providers to exploit audio knowledge bases in order to effectively create interactive audio entertainment services for distribution across all digital media platforms. This led to new intra- and inter-organizational processes and, in particular, to new methods and models of ework and eCommerce in the respective organizations employing the Audiotain technology and beyond. The technology development resulted in an end-to-end knowledge management solution consisting of: an Audio Interactivity System, an Audio Back-end Integration Tool, and new interaction models. This end-to-end-knowledge management solution was validated and demonstrated in three different next generation interactive audio applications in: interactive news and current affairs infotainment, interactive music entertainment, and interactive culture edutainment.

Project period : September 2001 – August 2003 (24 months) www.audiotain.com

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A/VPACK	Adoption and Enhancement of open frameworks for converged Audio/Video/TV provision for the home user	IST-2001-34447

A/VPack Trial project aims at the adoption and acquisition of technology and expertise in open standards and frameworks for delivery and management of voice and video based services to the end-user. The project first adopts and enhances an emerging Video delivery architecture and content handling framework proposed by the DVB forum (MHP) and combines it with the emerging TASTE framework for time-shifted TV and second, the prevailing Packet Voice protocol (H.323 Voice over IP and Call Handler). The developments are integrated in an existing system (based on Linux) and evaluated in a rich testbed. The target is to formulate a fully converged Audio/Video delivery platform for residential entertainment. The main proposed business sector is the offering of multifunctional gateway systems.

Project period : September 2002 – April 2004 (20 months) www.avpack.org

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B2B METRICS	Statistical Indicators for the Information Society-Measuring Forms, Content, Strategy and Impacts of B2B ECommerce	IST-2001-32193

The project will allow for a better understanding of the B2B eCommerce development via the use of innovative frameworks and indicators. It will help to estimate forms, content, strategies and impacts of B2B eCommerce use on competitiveness employment and potential barriers to development. It will contribute to the development of toolkits for knowledge economy measurement in a co-operative way with all stakeholders. The indicators will be designed to cover the subject in a systematic and exhaustive way through the identified domains and types of indicators. Statistical problems of the indicators and data collection techniques will be discussed. An advisory committee and contacts to the relevant institutions will give support to the important dissemination aspect of the project. The project will in various ways contribute to the programmes and key actions of the FP.

Project period : Jan. 2002 – June 2004 (30 months) www.ifo.de/B2B

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BALTPORTS - IT	Simulation and IT-Solutions : Applications in the Baltic Ports' Areas of the Newly Associated States	IST-2001-33030

The first steps are directed to establish the necessary organizational infrastructure, for enabling the successful knowledge transfer to the Partners of the Baltic Sea Sub-Region: development of business models of maritime companies, establishing of a "competence centre" for joint collaboration of companies, institutes, public and industrial organizations and researchers.
The overall methodology used to achieve the objectives consists of:
- Simulation methodology for modelling of port logistics processes;
- Web-based and HLA-based technologies for studying harbour processes and combining different simulation and information systems located in different port areas of the Baltic Sea;
- LIS Technology and Formal Methods for Maritime Information Systems Design;
- Non-monetary Evaluation Methodology for Ports.

Project period : August 2001 - October 2003 (27 months) www.baltports-it.be

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BEATRICE-SME	Best Entreprise practice using Advanced Technologies in Recycling Industries for eCommerce and EBusiness in Small and Medium-sized Entreprises	IST-2001-35054

The overall objective of BEATRICE-SME is to explore and introduce new forms of smart organization of work of SMEs in the recycling domain and identify and implement appropriate advanced IST solutions to support such new forms of organizations, aiming at optimal achievement for both economic and ecological goals of the recycling chains. The application of the common methodology enables both users and catalysts to exchange experience on the best for new forms of collaboration. The methodology will also enable SMEs to increase their capability to initiate and realise innovative, smart forms of co-operation with other partners in the long-term. Five different business cases address 5 different forms of collaboration among the SMEs in recycling area. The solutions identified for these business cases are likely to be highly replicable primarily within the recycling sector, but also within a numerous SMEs in other sectors.

Project period : April 2002 - November 2003 (20 months)

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BEEP	Best eEurope Practices	IST-2000-26224

The BEEP project is concerned with analysing and exploiting socio-economic best practice in four main domains of the eEurope initiative: employment and skills, digital SME, social inclusion and regional cohesion, and in the important cross themes between them. Extant data sources from both Commission-supported and other high quality initiatives are used, most of which were not widely used and few are interlinked, though there is a great need for understanding and exploiting available knowledge at a European level. BEEP also updates this best practice knowledge in line with on-going developments, especially by closely supporting RTD projects and taking up their results. Data is analysed qualitatively and quantitatively to draw out socio-economic best practice and provide benchmarking standards. Results are widely disseminated in the programme and produce three fully developed services: socio-economic best practice, benchmarking, and linked knowledge databases. These services comprise a comprehensive set of tools available interactively on a user-friendly web-site which organizations and individuals will be able to easily exploit.
In July 2002, nine additional partners from NAS countries joined the project. The new NAS partners have enriched the knowledge base with additional cases across the four domains and have organized various dissemination events.

Project period : January 2001 - July 2003 (31 months) www.beep-eu.org

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CASCOM	Context-Aware business Application Service Co-ordination in Mobile Computing Environments	FP6-511632

CASCOM will research, implement, validate, and trial value-added support for business services for mobile workers and users across mobile and fixed networks. The vision of the CASCOM approach is that ubiquitous application services are flexibly co-ordinated and pervasively provided to mobile users by intelligent agents in dynamically changing contexts of open, large-scale, pervasive environments. For end users, the system provides easy and seamless access to semantic Web services anytime, anywhere, and using any device. For network operators, CASCOM aims for seamless service delivery providing better customer satisfaction. For service providers CASCOM provides an innovative platform for various mobile business application services. The essential approach is the innovative combination of intelligent agent technology, semantic Web services, peer-to-peer, and mobile computing for intelligent peer-to-peer mobile service environments. The intelligent peer-to-peer infrastructure includes efficient communication, support for context-aware adaptation techniques, as well as dynamic and secure service discovery and composition planning. The project will deliver a full proof-of-concept implementation of the generic support infrastructure and a trailed demonstrator for selected pervasive health care application services.

Project period : Sept 2004 – Sept 2007 (36 months) www.ist-cascom.org

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COCONET	Context Aware Collaborative Environments for Next Generation Business Networks	IST-2001-37460

The COCONET project deals with the long-term context of human work and collaboration in ambient intelligent environments. In particular it focuses on exploring a new type of collaboration environment that is person-centred through the use of context-awareness, knowledge support, and personalisation services, yet at the same time being seamlessly embedded in business processes of networked enterprises. The context under consideration includes multiple dimensions such as: languages, locations, time scales, cultural backgrounds, personal domains, tasks and administrative work procedures.

COCONET is preparing a strategy and roadmap for RTD of high industrial impact in the domain of context aware collaborative environments for next generation business networks ; and a research agenda for 5-10 years, including the organizational, user and policy environment. Possible innovative applications and business implementation paths with potential industrial stakeholders.

The key players in business and research, bring together their experience and expertise, in developing the research agenda and building the constituency.

Project period: July 2002 to June 2003 (12 months)
http://www.telin.nl/projecthome.cfm?id=104&language=en

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COMIC	Conversational Multimodal Interaction with Computers	IST-2001-32311

COMIC combines research in software and systems engineering, with human-human and human-computer interaction, cognitive psychology, and Human Factors to enable novel 3G mobile eCommerce and eWork services, in which computers, accessed from small portable terminals, act as a partner in collaborative problem solving.COMIC's R&D will contribute to safer and healthier working environments, strengthen Europe?s leading position in mobile telecom services and thereby enlarge employment.To realise the long-term vision of an ambient intelligence landscape in which artificial agents are able to understand emerging intentions in mixed-initiative natural language conversations with a customer, COMIC will build subsequently more capable demonstrator systems, which are then used for Human Factors studies.

Project period : March 2002 – Feb 2005 (36 months) www.hcrc.ed.ac.uk/comic/

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CREATE	Creative Processes for Enterprises Innovation	FP6-507947

The project will deal with the capacity of enterprises to be creative. Successful organisations create competitive advantage through innovation and creativity, which is the first step of the innovation process. Such companies must effectively manage the innovation process.

Thus, the general project goal is to increase the awareness and the capacity of European enterprises about methodologies and techniques that may promote the creative climate inside the enterprise and, thus, innovation both through the generation of new ideas and even the optimal utilisation of "resident" know-how and technology that often are unexploited or not properly valued. About 16 methodologies and 80 techniques developed both by scholars and consultants at international level have been studied and benchmarked, and the "best of breed" in terms of methodologies and techniques have been identified and defined.

Two industrial groups (home appliances and motorcycles) will be the field tests for the selected approach.

Some more theoretical sessions will take place with two other industrial users, to spread the concepts about creativity and to improve knowledge about the creative process. Moreover, the project aims to spread the main concepts towards other industrial fields. There are plans to deliver, in particular, 7 seminars: 3 in Italy, 2 in Norway and 2 in Slovenia, to present the project contents and outcomes.

Project period : Jan 2004 – Arpil 2005 (15 months)

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DEESD	Digital Europe : eBusiness and sustainable development	IST-2000-28606

DEESD aims to identify the crucial role that eCommerce and ework can play in creating an information society that is more user-friendly, socially inclusive and environmentally sustainable. The project builds a convincing "business case" for the contribution that can be made by eCommerce and ework to sustainable development, including a policy framework for "sustainable electronic markets" and makes further recommendations to the EC, EU member states, local authorities, businesses and NGOs. The specific objectives of the project are: to quantify the potential contribution of eBusiness to dematerialization, resource productivity and transport efficiency, to investigate the relationship between eBusiness and corporate social responsibility, to assess the impact of eBusiness on sustainable regional development.

The consortium provides an overview of the latest thinking and research about eBusiness and sustainable development from around the world. The primary research phase of the project includes in-depth interviews with senior managers in companies, desk-based research and policy analysis, and an in-depth survey of corporate attitudes, results and policies relating to eBusiness and sustainable development. Case studies are a central component of the research.

Project period : July 2001 - July 2003 (25 months) www.digital-eu.org

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DIECOFIS	Development Of A System Of Indicators On Competitiveness And Fiscal Impact On Enterprises Performance	IST-2000-31125

The project covers key and long debated EU issues on indicators, competitiveness and the impact of public policy. Within this broader topic it deals with issues of how public policy for enterprises and economic activity (notably tax and support policies) can be chartered and benchmarked by means of a system of ad hoc indicators derived from (a) a multi source, integrated data base of cross-section and longitudinal microdata from enterprise administrative registers and surveys and (b) microsimulation models that can serve to simulate and monitor how policy affects the competitive process and, by so doing, foster or hinder living standards, opportunities, the growth of knowledge and innovation, and the process of development and renewal of e- and non e-activities. The analysis has a national and, a no longer avoidable but still under researched EU perspective. The latter is a key features that is highly innovative and of utmost value for Community policy.

Project period : Dec. 2001 – Feb. 2004 (27 months) www.istat.it/diecofis

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DRAGON	Development of an interactive engineering portal for open networks	IST-2000-29366

The DRAGON project aims at the development of an Engineering Portal in order to innovatively support collaboration between dislocated business partners who have a common engineering task. Collaborations in this sense span from short term, project oriented co-operations to long term co-operations, such as joint ventures. The first hurdle to take is to find adequate collaboration partners which meet the established requirements. Then a collaboration has to be agreed upon. After that, so-called virtual teams are typically established across the companies' borders who do the engineering and administrative tasks. This scenario is particularly relevant to European companies as the globalisation of producer and consumer markets is rapidly advancing

Project period : August 2001 - October 2004 (39 months) www.dragon.uni-karlsruhe.de

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DUNES	Dialogic and argumentative negotiation educational software	IST-2001-34153

In tomorrow's learning and working environments, people will be increasingly involved in tasks within multidisciplinary, multicultural and physically distributed teams. The participation to such tasks puts heavy demands on the individual for which he/she is not usually prepared. Informal reasoning (cognitive) skills and social skills of collaboration are not duly exploited, as practices, from school to university, very poorly address their acquisition. The DUNES project will result in a methodology and software tools to enable collaborative learning and the acquisition of "soft skills" through Internet-mediated discussion, argumentation and social interaction. The project will involve broad implementation, testing and validation in a "large-scale experiment" to be carried out by many players in formal and informal learning environments and in workplaces throughout Europe.

Project period : March 2002 - August 2004 (30 months) www.dunes.gr

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e3 Work	eWork in Eastern Europe	IST-2001-33536

The E3WORK project aims to promote the use of ework and best practices of ework in five New Associated States: Hungary, Latvia, Lithuania, Poland and Romania helping them to fill the gap in this area of the Information Society.

The project will creates and develops local competences to further implement new methods of work in those countries. Local ework projects were launched in each country, training of trainers organized, and pilot teams of eworkers hosted by industry, set up and monitored to formalise specific rules and overcome local obstacles, in relation to industry, law, local authorities and unions.

The project's virtual community on the web is for the 5 countries members of the consortium a reference depository for the dissemination of information on ework related topics, for complementary training by eLearning, and for awareness of the EU RTD Programmes. In each of the five countries, E3WORK organizes training and dissemination events, local surveys, and identifies the specific issues to be reviewed.

Project period : October 2001 - September 2003 (24 months) www.mayeticvillage.com/e3work

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EC-BRIDGE	EC-Bridge: EU-Chinese forum on eWork, eLogistics, Research networks and Broadband solutions for mobile user and worker	FP6-511270

EC-Bridge aims at the mobilisation of various actors and stimulating high-level debates and co-operation on eWork, and eLogistics, Research Networks and Broadband solutions in the context of Mobile Worker and User applications between Europe and China. This will be achieved through the organisation of international conferences in Beijing and Shanghai dedicated to these issues. The presentations will include descriptions of the novel European and Chinese products & solutions, as well as successful EU-funded projects in the area of eWork & eLogistics, Research Networks and Broadband solutions for mobile user. Workshops and seminars will stimulate debates and pave the way to partnerships establishment between the European and Chinese actors. Exhibitions will be organised to demonstrate eWork best practices and technology achievements of European and Chinese industries. The consortium will also develop trend-mapping studies to define the current status of eWork & eLogistics, Research Networks and Broadband solutions for the mobile user in China 2004. Two Centres of Excellence dedicated to the EC-Bridge project issues will be deployed in Beijing and Shanghai in order to facilitate events organisation, and then promote solutions for the mobile user and worker on a self-sustainable basis in China. The project activities will target major industry actors, politicians at regional as well as national levels, key decision makers, and international actors developing, using and promoting new methods of work in their respective countries

Project period : June 2004 – June 2005 (12 months) www.ec-bridge.com

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E-COGNOS	Methodology, tools and architectures for electronic consistent knowledge management across projects and between enterprises in the construction domain.	IST-2000-28671

The e-COGNOS project aims at specifying and developing an open model-based infrastructure and a set of tools that promote consistent knowledge management within collaborative construction environments. The work relies on a deep understanding of knowledge management activities of European construction companies. The analysis of the semantics within and across documents led to the development of ontologies and adaptive mechanisms that can organize documents according to their contents and interdependencies. The web-based infrastructure includes services allowing to create, capture, index, retrieve and disseminate knowledge. It also favours the integration of proprietary tools. The e-COGNOS approach was tested and evaluated through a series of field trials. This was followed by the delivery of business recommendations regarding the deployment of e-COGNOS in the construction sector.

Project period : July 2001 – September 2003 (27 months) www e-cognos.org

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E-FACTORS	E-Factors: A Thematic Network in EBusiness Models	IST-2001-34868

The E-factors project aims to set up a thematic network dedicated to bringing together universities, research centers and practitioners with a common objective:To determine factors of broad and sustainable adoption of new business models based on eBusiness practices and research expertise across Europe.The E-Factors network will actively seek to transfer skills and experiences with a view to generating strategic implications in the implementation of eBusiness models and disseminating this knowledge across Europe.

Project period : March 2002 – Sept 2003 (19 months) http://e-factors.net/

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E-GAP	e-Society Gap Assessment Project	IST-2001-35179

Surveys confirm that ework is taking place on a significant scale in Europe, starting to induce a direct impact on employment practices and an indirect effect on the economy in a number of regions. Meanwhile, people observe discrepancies about the penetration of ework between companies according to their size. The results are significantly lower among SMEs. Another criterion is the political support in the country. With a strong will to contribute to a better use of ework at the levels of work people and policies framers, the E-GAP Project wants to identify, understand and highlight the hidden inhibitors to ework, and give arguments and tools to bring flexibility into Community legislation taking into account regional contexts.

Project period : June 2002 – June 2004 (24 months) www.egap-eu.com

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E-LIVING	Life in a Digital Europe	IST-2000-25409

Through the use of a coordinated set of pan-European longitudinal household panel surveys this project describes, explains, models and forecasts the changing patterns of uptake and usage of Information Society Technologies (ISTs) across Europe. By collecting at least 2 waves of data on the everyday time-use, social and economic capital, quality of life and IST usage behaviour of the same individuals over time the project examines the causal relationships between changes in IST usage and any subsequent changes in individual's life-styles and life experiences. The knowledge thus generated is of significant interest to policy and strategic decision makers in both the public and commercial sectors and is widely disseminated to encourage exploitation by placing its analytic reports and integrated data sets into the public domain as a resource for current and future RTD projects.

Project period : January 2001 - December 2003 (36 months) www.eurescom.de/e-living

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E-LOCUS	e-Locus: For a Larger Integration of the Individual at Workplace	IST-2001-38790

E-locus synergy clusters IST projects working in the area of workspace design, respecting the objectives of each specific type of project and action line and facilitating synergy between them. From a larger integration of the individual point of view, it interchanges information and forges links between R&D teams working already in the workspace design field all around Europe. Taking the person as a whole, the person integrated at workplace and how to improve that integration incorporating innovative technologies to the process as the start point, research areas such as workplace design, organisational internal communication, organisational knowledge management, emotional intelligence and team work management are explored, thus creating a holistic view of the integration of the person at the workplace.

Project period : Sept. 2002 – Dec. 2003 (13 months)

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eLOGMAR-M	Web-based and Mobile Solutions for Collaborative Work Environment with Logistics and Maritime Applications	FP6-511285

The major aim is to gather and co-ordinate activities in the field of IT- and Communication solutions (Web-services, GPRS and WAP/WML mobile services, simulation, technologies for information systems design, virtual reality) with maritime and logistics applications. The maritime freight route "Baltic Sea feeder ports - Western Europe hub ports (Hamburg) - Mediterranean ports - Chinese ports" is selected as the subject of investigation and demonstration. One of the main objectives is devoted to the problems of setting up a collaborative partner pool, which unites organisations from different countries (Germany, U.K., Finland, Greece, Poland, Lithuania, Latvia, Estonia and China) operating within the selected transport route by means of integrating their electronic information resources (databases, information systems, Web-sites and portals) in a collaborative work environment. Another important objective is focused on new work methods for mobile actors in logistics and maritime areas (traders, resellers, railway carriers, shippers, consignees, insurers, agents, forwarders etc.) providing them with advanced mobile services, such as WAP over GPRS, PC-connected Web surfing and mobile e-mail and chatting. The network of branch offices of the Baltic Regional Competence Centre in the field of advanced ITC solutions and transport logistics will be established, covering Estonia, Latvia and Lithuania.

Project period : Sept 2004 – Sept 2006 (24 months)

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ENGAGE	Engineering Emotional Design	FP6-510998

It is the ambition of this co-ordination action to promote the use of Affective Engineering for industry and open EU industry towards a knowledge based economy in the area of satisfying people's subjective and emotional lifestyle needs.

These are three main objectives: creating a new knowledge community; achieving best use of current knowledge through a broader awareness and confidence within industry of methodologies, novel tools and work environments that facilitate collaboration and creativity through holistic approaches to products and services; identifying needs and coordinate future research.

(Subject to contract)

Project period : Sept 2004 – March 2007 (30 months)

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eu-DOMAIN	enabling users for - DistanceWorking & Organizational Mobility using Ambient Intelligence service Networks	FP6-004420

eu-DOMAIN will develop a new, innovative European ambient intelligence service platform for automatic, context sensitive offering and contracting of mobile web services across heterogeneous networks. The eu-DOMAIN service platform will interconnect people, devices, buildings and content in an interoperable network, and can be deployed in a broad range of industrial, government, healthcare and other citizen applications. The platform will be validated in two sectors: building facility management and e-Health services. eu-DOMAIN supports mobility among users and workers by integrating them with seamlessly accessible ubiquitous intelligent surroundings that support self-configuring devices using semantic agents and tools for ambient awareness and decision support. It supports working-out-of-workspace by providing seamless delivery-on-demand of content and establishes multimodal exchange of knowledge amongst people, machines and devices. Intelligent user interfaces are based on context-sensitivity and automatic user profiling, tailored to the need of the mobile user. Business models will be developed based on the concept of value-nets and emphasis will be made on identifying value creation and new business opportunities for SME's. The main technological innovation lies in the 3-tier intelligence pools based on a hierarchal client/server structure. Network, application and location intelligence is guiding interaction between service providers, fixed and mobile locations and devices.

Project period : June 2004 – June 2007 (36 months) www.eu-domain.eu.com

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FAIRSNET	FairsNet - On-line Solutions for Trade Fairs	IST-2001-34290

FairsNet is a trial conceived with the overall objective to customise and validate a Web based integrated information technology application solution to support trade fair organisers to manage their entire business cycle of planning, organising and running exhibitions ("real fairs" in the physical exhibition environment as well as Web based "virtual fairs") and related on-line events. Furthermore, such an IT application solution is intended to enable and facilitate the seamless participation of European SMEs in modern fairs, as a commercial promotion tool. It is therefore enabling them to easily and cost-effectively access and exploit a wider spectrum of commercial opportunities.

Project period : August 2002 – June 2004 (23 months) http://www.fairsnet.net

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Future Workspaces	A Strategic Roadmap for Defining Distributed Engineering Workspaces of the Future	IST-2001-38346

FutureWorkspaces brings key European researchers and industrialists together to define the 2010 Vision of Collaborative Engineering Workspaces of the Future. Through consultation with expert and series of workshops, it reaches consensus regarding business demands, human factors issues and technological challenges involved in implementing the vision. The resulting roadmap for future development defines (a) where we want to go (vision of the workspaces of the future) and (b) how we want to get there (prioritised key challenges over 2 year, 5 year and 10 year period). The focus for the roadmap is the aerospace, automotive and construction industries and FutureWorkSpaces defines an indicative list of research projects required to satisfy the needs of these sectors.

Project period : July 2002 - July 2003 (12 months) www.avprc.ac.uk/fws

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GEM-EUROPE	Global Education in Manufacturing – Europe	IST-2001-32059

The GEM-EUROPE project aims at defining and understanding the needs of the manufacturing industry for training and education in manufacturing strategy on a global basis to comply with the concept of digital business and extended products.
Specifications for a curriculum in manufacturing strategy at Masters level will be developed. GEM-EUROPE will cover digital business along the supply chain, development of extended products and end of life planning and operation. It will have a modular structure allowing both training courses in industry and a full Master degree from a university.
The curriculum will be designed to comply with industry's needs. To obtain this, surveys will be conducted in selected industries and best practices will be studied. This activity is carried out in parallel in different GEM projects in several IMS regions (eg. Europe, USA, Japan, Canada and Australia). Training and education will have to be delivered in a way compatible with peoples work situation, i.e. it will have to be off-campus rather than on-campus based. This calls for new pedagogic approaches and new ways of delivery of training and education. The delivery will use ICT tools over the internet. The training will be based on application of multimedia. A demonstration to validate the pedagogic approach will be run with a course in project planning. The curriculum will be validated by a demonstrator and at workshops with industrial participation. It will be published on web and documented in a booklet.

Project period : Feb 2002 - Oct 2004 (33 months) www.sintef.no/gem

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ICCI	Innovation co-ordination, transfer and deployment through networked co-operation in the Construction industry	IST-2001-33022

The overall aim of ICCI is to enhance the co-ordination of research and developments in IST projects targeting the Construction sector, the promotion of the selected projects results, and a concerted support for the future implementation and deployment of new technologies in the building and construction industrial context. The objectives are to: synthesise industrial requirements, to publish ICT state-of-the-art in the fields of technical advances and commercial offerings, to synthesise information for the integration of human, organizational and technical elements, and to provide best practice guides, to assess the latest developments in the area of legal and contractual support for the use of ICT in construction, to deliver effective dissemination channels, and to provide guidance on future requirements, strategy and implementation plans for IT in Construction.

Project period : September 2001 – February 2004 (30 months) http://cic.vtt.fi/projects/icci

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IDIA	Inclusive Design and Intelligente Technology for Accessible Workplace	IST-2001-33205

In the knowledge-based economy the workplace is anywhere: regardless of the individual location where intellectual work is underway. By including ICT on the premises one can describe the workplace as an 'intelligent' workplace. The IDIA Network aims at integrating the potential of the intelligent workplace with the principle of Design for All, and thus develop a new concept for workplace design - moving the current mindset away from the 'individual' thinking, that tends to alter basic designs, towards including from the outset the maximum number of naturally diverse human beings in the design and planning process.

The IDIA Network establishes a multidisciplinary project team, coordinated by the IDIA Scientific Committee that carries out interdisciplinary analysis and studies for identifying user needs for the design of an accessible workplace, assessment of current and future technologies, and derive a collection of reference scenarios The IDIA Network produces a number of exploitable results: guidelines and prospective scenarios related to the uptake of a Europewide market for the production of new design components for accessible workplaces; s community of actors supporting IDIA-compliant design concepts, that will continue to contribute ideas and results after the project end.

Project period : Feb 2002 - Nov 2003 (21 months) www.idia2002.com

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IMAGE	Intelligent Mobility Agent for Complex Geographic Environments	IST-2000-30047

IMAGE aims to provide the users with mobile, personalised location based information on services, how to reach them and how to pay for them with mobile flexible means.
It will introduce an holistic approach to end user's personalised electronic access to useful services for everyday life needs (where travel is a core element). The main objectives of the project are to:
- design and develop an open & modular service platform, which co-ordinates both end user request data and service provider response data
- develop advanced key services, such as navigation, localisation & ecommerce services, and facilitate easy integration between them
- re-organize business models and relationships by introducing a new business role, the mobility agent, that intermediates between the actors involved in service delivery
- verify the integrated platform and inter-operation between agents of different test-beds
- prove the feasibility of the platform through financial and marketing analysis.

Project period: November 2001 – October 2003 (24 months) www.image-project.com/

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IMAP	An innovative Interactive Mobile Advertising Platform	IST-2001-33357

The IMAP project boosts the creation of next generation user-centred, cost-effective and interoperable, mobile (3G) interactive advertising tools in order to properly address the emerging large market of mobile advertising, set to have a $16 billion value world-wide in 2005 and being the number one mobile commerce application in Europe in 2003. IMAP, through the combination of UMTS 3G wireless technology, positioning and geographic systems, and by coupling IST adaptive delivery mechanisms with privacy tools, provides European mobile network operators, wireless portals and online advertisement agencies with easy-to-use, multimedia-rich and space-aware Advertising Campaign Management and Delivery tools along with the most effective business/revenue models to take advantage of this large upcoming market.

Project period : April 2002 - April 2004 (24 months) www.imapproject.org/imapproject/hmain.jsp

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INDIA	Intelligent networking of Dynamically Interrelated Actors	IST-2000-28413

India will develop and test a methodology and an Internet based service, to transform the structure of a traditional company (Constellation Driver) value chain, from a sequence of activities involving a limited number of partners to a dynamic organisation with constellation of enterprises. India will support the CD to move from bilateral to flexible relations to take fully advantage from increased competition between the participants. India will create a network of actors that will dynamically and seamlessly react to the CD actions. India platform will be based on Artificial Intelligence(AI), Natural Languages Processing (NLP) and Information Retrieval (IR) technologies. India will include e: analysis of the requirements, design, development and testing of the software platform and identification of the India methodology. The methodology and the platform will be validated by a company working on the EU market and its supply chain.

Project period : Sept 2001 – Jan. 2004 (29 months) www.indiaproject.net/

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INDIC@TOR	A Cross Cultural Study on the Measurement and Enhancement of Employability in Small and Medium Sized ICT Companies	IST-2000-31070

In an ever changing, global, technologically demanding business environment, sourcing and retaining talent becomes the competitive battleground. One way to adapt the activities of firms to the exigencies of the fast changing demands in their environment, is to increase the employability of personnel. This involves (both at the level of the individual as well as the organization) the enhancement of job-related expertise and professional growth.

In this project, seven European countries provide psychometrally sound survey and interview data on software engineers working in SMEs in the ICT sector. Recommendations and a selection of the practical results to enhance employability will be communicated to SMEs, IST projects, policy makers and other related stakeholders. Moreover, best employability practices will be identified and disseminated widely across Europe.

Project period : September 2001 - September 2004 (36 months)
www.alba.edu.gr/r&d/european/index.asp?proid=105

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INTELCITY	Towards Intelligent Sustainable Cities	IST-2001-37373

The thematic network seeks to explore the possibilities of novel and emerging ICTs in seeking better understanding of the future research options & priorities in the application area of sustinable urban development, beyond FP6. It brings together a wide range of European stakeholder interests & experience of planning, property development & management, utilities, urban transport, organizational knowledge management, eBusiness, eGovernance urban modelling and scenario building in a consultative process. The network explores user needs and expectations of ICTs in terms of new ways of working in urban planning (application pull) as well as the research challenges for new developments in ICTs (technology push) for use in urban re/development in all regions of Europe.

Project period : July 2002 - July 2003 (12 months) www.scri.salford.ac.uk/icpart

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INTUITION	Network of Excellence on VIrtual Reality aNd VirTUal Environments AppIIcaTIONs for Future Workspaces	FP6-507248

Virtual Reality (VR) technology is a rapidly evolving and diversifying field and has reached a stage which makes pan-European structuring and integration an absolute necessity. In addition, VR technology has started to be used in industrial applications. Thus, a critical milestone is to facilitate the adoption of VES in industrial processes and assess the impact of its penetration into the workplace and everyday life in terms of cost-effectiveness, health hazards and side-effects on the users and its impact on the actual working environment, on an individual and at organisational level. INTUITION's major objective is to bring together leading experts and key actors across all major areas of VE understanding, development, testing and application in Europe, including industrial representatives, SMEs and key research institutes, universities and major international organisations in order to overcome fragmentation and promote VE establishment within product and process design. Its major objectives include the integration of resources and VR equipment all around EUROPE, the structuring of a European Research Area in VR and the promotion of Europe as a leading force in this field world wide. Activities will include integration of human and infrastructure resources, research structuring, spreading of excellence and dissemination tasks. Strong links with relevant National Networks, current National and EU-funded projects and clustering activities with new initiatives will assist in structuring the VR European Research Area.
(Subject to contract)
Project period : Sept 2004 – Sept 2008 (48 months)
www.ctit.utwente.nl/research/projects/international/noe/intuition.doc/

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IST4BALT	Information Society Technologies Promotion in Baltic States	FP6-511331

IST4Balt is a multi-partner action that intends to promote and coordinate IST innovation activities in EU Baltic States. This coordination action promotes IST in Latvia, Lithuania and Estonia by fast dissemination-awareness actions, including IST strategic priorities, focused conferences and workshops, technology studies, virtual and face-to-face demonstrations, training, market recommendations to relevant EU communities. IST4Balt will develop two IST Information Dissemination Centres in each Baltic country. The project will organize six all-Baltic major conferences and nine technical/training workshops on FP6 opportunities for EU new member states. Via its IDCs it will disseminate comprehensive information on IST.

The project will provide distant and face-to-face training to promote IST, FP6, other EU and UNIDO programs relevant for eWorking in EU-Baltic States.

The courses will be available in interactive form at IST4Balt Web-system. Non-commercial IST tools for practical team work between EU member Baltic States will be carefully selected and proposed for implementation. The project will result in creation of a Trans-Baltic IST Association. It will unite IST4Balt participants and other leading Baltic telematic organizations and co-ordinate efforts of Baltic States in European Information Society development during and after the end of IST4Balt.

Project period : Sept 2004 – Sept 2007 (36 months)

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JANUS	Joint Analytical Network for Using Socio-economic research	IST-2001-33300

The prime objective of JANUS is to function as a clearing house for knowledge developed in a wide range of IST projects by bringing together the results from these projects, and jointly reach out with unified messages. For this purpose JANUS has two overall goals:

To establish an open mechanism to bring together, compare, coordinate and consolidate significant results of current socio-economic research within the IST Programme,related to the development of the information society and eEconmy, with particular focus on jobs. This will ensure that disparate efforts are effectively brought together to create a new synthesis, and will improve the work of individual projects and the IST Programme as a whole.

The establishment of an open platform to communicate synthesised but also sharply focused results in concise and professionally designed formats to targets outside the Programme in wider European society which has a need to know, in a timely and accessible manner, the current overall status, results and directions of such research. Thus JANUS will provide a single consolidated voice representing main trends and conclusions of socio-economic research output of the programme as a whole.

Project period : March 2002 – September 2004 (30 months) www.janus-eu.org

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KM FORUM	European Knowledge Management Forum	IST-2000-26393

The European KM Forum aims to build a pan-European KM Community, and to identify and promote the principles of KM. This is primarily done by providing infrastructure for networking and pushing KM information to a broad KM community of experts and laymen as well as pulling information and feedback from them. This infrastructure supports face-to-face communication as well as virtual meetings over the Internet. Besides this, the project has also contributed to the ongoing debate about standardising KM application and implementation approaches and to create wide acceptance for these approaches by the community.

The projects online community platform, at www.knowledgeboard.com, has attracted 5,500 members from 104 countries, and has won a number of external awards and accolades including "Best of the Web" from Harvard Business School in October 2002.

Project period: Jan. 2001 to Dec. 2003 (36 months) www.knowledgeboard.com

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KNOWCOAT	Neural knowledge management solutions for the coating market value chain	IST-2001-33262

The objective is an operational knowledge development, management and distribution platform for the coating industry. Transparent information within the coating industry will result in more correct and timely information at decision level. This results in higher quality products and processes reducing economical and environmental waste. Current waste is estimated at 400 MEuro per annum in Europe only. Social objectives include increase in work efficiency and improvement of health and working conditions. Resulting innovations are coating expert knowledge to transform unstructured information into accessible knowledge, and integration of state of the art information management tools. Project results dissemination and exploitation is actively pursued through the industry reference group. The EC is leading in coating technology. The project connects partners from 10 countries that because of expertise, would not be able to reach the objective independently.

Project Period : January 2002 – September 2004 (33 months) www.knowcoat.net

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LAW	Labour market changes and welfare perspectives in Europe	IST-2001-33356

Labour market trends and welfare systems are currently among the most important issues debated in the European Union, due to the deep social and economic changes that are taking place. So far, these subjects have been analysed separately, generally neglecting the mutual connections. This project aims at filling in this gap, scrutinising the effects of the emerging atypical working profiles (self-employment, temporary work, ework) on the welfare systems in several EU countries. The data, gathered from heterogeneous sources and structured by means of standardised indicators, will be collected in a central database, for a comparative prospect of the current situation and a projection of the expected trends. The final results will be presented at an International Conference to be organized for this purpose. The project outcome will be addressed to the institutions involved in the preparation and actuation of policies supporting employment and social protection, both at national and European level.

Project period : March 2002 – Nov 2005 (45 months) www.inps.it

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LIAISON	LocatIon bAsed servIceS for the enhancement of wOrking enviroNment	FP6- 511766

The project will turn emergent technologies, applications and services into actual business cases in order to allow key European actors to fulfil in a competitive manner the needs of workers in their daily life, for seamless and personalised location services across heterogeneous network. This Integrated Project unites expertise and activities from major European actors committed to provision of end-to-end Location Based Services, applications and solutions. LIAISON will integrate numerous existing standards and techniques, bring a set of emerging underlying technologies to the required maturity for professional usage, enhance the system capabilities through innovations resulting from the EGNOS and Galileo signals. End user communities, including institutional bodies and industrial actors seeking currently unavailable reliable LBS solutions, are in the consortium. LIAISON will consolidate the objectives for "LBS in working environments" and the commercial requirements; define the architecture of an end-to-end LBS solution for mobile workers in ubiquitous manner; validate the solution, its performance, and working environment impacts through tests cases; advance R&D activities in LBS to enhance the performance of future solutions and enable new functionality; carry out standardisation and regulatory activities for effective consolidation of the LIAISON solution. Expected impacts include: improvement of working conditions, security and safety of the mobile worker; promotion of European solution based on EGNOS and ultimately Galileo; reinforcement of European leadership in cellular technologies like GSM/GPRS; preparation of the European market for LBS before the operational launch of GALILEO services.

Project period : Sept 2004 – Mars 2008 (42 months)

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MANATEE	Maritime Advanced Network for Anticipating Information Technology Needs for eWork Environment in Satety at Sea	IST-2001-38091

MANATEE delivers a consistent EU visionary RTD results of an eWork platform for safe and efficient operation of maritime transport systems through the innovative development of a common safety IT language, derived from XML: the Maritime Safety Markup Language (MSML). MANATEE main aims will be to facilitate maritime eWork necessary for the future ""European Maritime Safety Agency"" eWork platform. MANAIEE focuses on the needed improvements / modifications / developments needed in current maritime II technologies in order to fully integrate MSML in the maritime business. The problems MANAIEE now faces and the solutions emerging by developing it can become the guidelines for use across Europe and through large-scale implementation projects. MANAIEE involves 10 RTD partners from 7 different European countries. The technical providers include Maritime engineering organisation, Research institution and organisations on Information Technology and Intelligent Transport Systems, as well as ship management. MANAIEE also involves 24 end-users and stakeholders representing 10 different European countries, they include Ministers of Transport, Maritime Administration, Ports, Shipowners, Classification Societies, Ship Management, education and training as well as expertise in maritime telecom and fisheries.

Project period : Dec 2002 – Nov 2004 (24 months)

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MBNET	A Network of Excellence in m-Business Applications and Services	IST-2001-39164

MB-NET investigates the future of mBusiness by identifying research challenges, formulating policy recommendations, and providing strategic roadmaps on a 5-year horizon, through a robust methodological approach pursued by an independent discursive forum consisting of industry and research leaders that collectively represent excellence in mBusiness across Europe MB-NEI focused on identifying the right questions to be addressed for future focused RTD in this field.

The main requirement behind MB-NEI is the identification and pursuit of a rigorous and comprehensive methodological approach. To this end four methodological requirements have been set: (a) robustness, satisfied through the execution of a survey on technological trends in the area of next-generation networks and services and intensive national workshops; (b) condensed time frame, strengthened by a sustainability plan to prepare the future of the network after the project end; (c) effective project management, ensured through two-levels of network membership (partners and members); (d) awareness focus, through presentation of MB-NEI results in key IST events (Prague, Copenhagen).The workplan includes roadmaps for next generation networks and services and roadmaps for mBusiness applications and services.

Project period: July 2002 to June 2003 (12 months) www.mbnet-forum.org

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MILK	Multimedia Interaction for Learning and Knowing	IST 2001-33165

MILK creates a solution as supporting knowledge and working processes in knowledge intensive organizations. The goals of MILK are:

- to define an integrated and comprehensive knowledge management solution which supports working in the best possible way – whether users are located in different places within or outside the company building, travellings; working at home alone or with others in open spaces, on coffee breaks or in other informal meetings
- to develop emerging approaches and methodologies in knowledge management and to implement them within organizations to measure their value on business processes and the organization as a whole
- to build and maintain a knowledge management "best in class" network of European academic institutions and public and private companies to share tools and practices.

Project period: February 2002 to July 2004 (30 months) www.milkforum.com

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MIRROR	Mirror World Communities of Practice for Learning and Innovation in Natural Science	IST-2001-32504

The objective of the project is to establish a Europe-wide community of practice for learning and innovation in the area of natural science In order to meet this objective, novel knowledge management techniques in combination with social theories of learning and scientific discourse are coupled with state-of-the-art information technologies including Internet acceleration and 3-Dimensional multi-user environment. In this framework, MIRROR innovation lies equally in both social and technological components of the project. A partnership of research organizations (academia and museums) and companies (IT and consulting experts) with complementary expertise will produce the innovative MIRROR methodology in knowledge management and a suite of software components to support the MIRROR approach.

Project period : Feb 2002 - March 2004 (26 months) www.syntax.gr

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MobileIN	Harmonised Services over Heterogeneous Mobile, IN and WLAN Infrastructures	FP6-004498

The main objective of the MobileIN project is to define and develop a novel set of advanced, future-proof, dynamic and configurable harmonised services for the mobile user and worker by taking full advantage of heterogeneous service infrastructures (Intelligent Network Services, Mobile Network Services, VoIP Services). The project builds on operator's needs to preserve and enhance existing services infrastructures (IN, CAMEL, LBS), integrated with new, emerging ones (IP, VoIP, SIP etc) that will provide operators and 3rd party application developers with access to as yet unrealised revenue streams. The project will specify and develop a state-of-the-art open framework for service creation and execution in multi-domain environments that with open, scalable service access points will demonstrate sophisticated applications in a composite IP-PSTN-PLMN-WLAN environment. The envisaged services will exploit the full potential of dispersed location information, subscriber data, and application logic, that cannot be effectively combined by currently deployed schemes

Project period : July 2004 – July 2006 (24 months)

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MobiLife	Mobilife-Mobile Life	FP6- 511607

People are used to being able to contact anyone, anywhere, at anytime. However, the challenge of enabling mass-market-scale ubiquitous services and applications remains. The strategic goal of MobiLife is to bring advances in mobile applications and services within the reach of users in their every- day life by innovating and deploying new applications and services based on the evolving capabilities of 3G systems and beyond. The research challenge of MobiLife is to address problems related to different end-user devices, available networks, interaction modes, applications and services MobiLife makes Ambient Intelligence controllable by ordinary people and will have both technological and societal global impact by addressing three main focus areas: self-awareness, which provides support for automatic configuration arrangement of devices, services, and local connectivity in the user's local environment. It also enables automatic and multi-modal inter-faces that greatly enhance the user experience and minimise the active user effort needed in managing the local environment. Group-awareness, which comprises context and presence support enabling individuals to relate to, share, and interact with each other and common artefacts. Also novel privacy and trust models are addressed, which are mandatory for users to be able to rely on and use these new services and applications. World-awareness, which offers automatic support for seamless access to and delivery of services across different domains, enable individuals to retain the accustomed use of their services as they move between different environments and infrastructures. The MobiLife consortium consists of application owners (mostly SMEs), manufacturers, operators, solution providers and academia. MobiLife is part of the Wireless World Initiative.

Project period : Sept 2004 – Jan 2007 (28 months) www.ist-mobilife.org

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MOSAIC	Mobile Worker Support Environments: Aligning Innovation in Mobile Technologies, Applications and Workplaces for Location-Independent Cooperation and Networking	FP6-004341

The key objective of MOSAIC is to accelerate innovation in Mobile Worker Support Environments by supporting future RTD activities in Europe. MOSAIC explores business and societal innovation and prepares Europe for deploying innovative mobile technology in a range of application domains, to support mobile workers in distributed and location-sensitive settings. It focuses on mobile working in four key sectors: Healthcare, Building Construction, Manufacturing and e-Government, covering strategic areas such as collaboration@work, mobility@work, knowledge@work. In addition to established actors, MOSAIC encourages participation of SMEs and small research teams across Europe, plans to execute a series of parallel activities such as expert network building, to identify mobile work best practices and critical success factors in current mobile work pilots and national programmes, to identify future R&D and develop domain-specific roadmaps to support the successful deployment of mobile working within the chosen four application sectors, to develop a generic roadmap and research agenda for mobile working, promote Europe wide collaboration for deploying mobile work environments, run special interest groups and dissemination activities, promote take-up activities etc. Through these multi-disciplinary work activities, MOSAIC aims to influence EU policies and strategies for RTD in the area of mobile worker and mobile work environments.

Project period : Mars 2004 – Mai 2005 (14 months) www.mosaic-network.org

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MuLiMob	Multilingualism and mobility	FP6- 511483

The purpose of MuLiMob Specific Support Action is to enhance the awareness of the wireless community to multilingual and multicultural mobile issues and to stimulate a rapid take up of innovative ideas within the whole mobile value chain - innovative applications, methodology and business models for user-friendly and cost effective multilingual services for mobile users and workers. The project will identify solutions to provide localised services to users and workers, i.e. that best adapt to their multilingual and multicultural needs. It will do so at the technology level, methodology level and business model level and will consult the wireless business community on these issues through a main research study, workshops, conferences, e- dissemination and discussion tools as well as personal talks. MuLiMob will then provide a grid for mobile multilinguism, a set of proposals and guidelines towards a multilingual methodology including possible research orientations and business opportunities based on multilingual users profiling. Demos will be presented with examples of music industry needs, as the basis of mobile applications and solutions fitting to its multilingual European promotion, touring, distribution and professional requirements, both for its users and workers all over Europe. This will apply to many different industries, media and commerce needing to communicate and send multilingual information in the form of text, sounds, still and moving images around Europe.

Project period : Sept 2004 – Jan 2006 (16 months) www.mulimob.com/

Contact		
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NESKEY	New Partnerships for Sustainable Development in the Knowledge Economy	IST-2001-39080

NESKEY establishes the agenda for research on Sustainable Development in the Knowledge Economy. (1) Measurement and reporting project addresses disclosure of information on corporate environmental, social, and economic performance for stakeholders' decision-making. It develops global guidelines for companies in the ICT sector. (2) Intangible assets project defines how to measure intangibles at micro and macro levels. It develops reporting standards facilitating evaluation the soft assets of a company, including the risk and opportunity elements. (3) Sustainable cities project develops socio-economic and environmental indicators and creates communities between companies, projects, individuals, NGOs, experts and cities using ICT' S contribution to Intelligent Houses as a test case. The final report publishing the combined results facilitates the development of EU models and scenarios for sustainable development and the knowledge economy.

Project period : August 2002 – July 2003 (12 months) www.neskey.com

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NEWECONOMY	Tracking the New Economy Transformation-Dynamics of Technology, Business and Society and Roadmaps to eEurope 2005	IST-2001-37325

The emergence of information technologies and electronic business since the mid-1990s has triggered a fundamental economic and societal transformation. The project identifies future research challenges and creates a research roadmap for tracking the transformation. Principally the project focuses on the European experience, but a comparison between the EU and U.S is a crosscutting theme due to the U.S . prominence in the field. The participants provide papers and organise dissemination workshops that analyse the dynamics of technology , business and society and illuminate the policy choices for Europe, especially with a view to providing input for the eEurope initiative. The project creates a virtual think-tank of leading scholars, business strategists, policymakers and other stakeholders.

Project period : Jan 2003 – March 2004 (15 months) www.valt.helsinki.fi/vol/eu/tdt/index.htm

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NEWTIME	New Ework Techniques In Micro-Enterprises	IST-2000-29568

NEWTIME's aim is to provide a factual basis for the specific modalities chosen for migration of micro-business IST networks from first generation low bandwidth, telework-enabled, networks towards networks with broadband IST at their core. Objectives include identifying the tools and techniques most valuable in new generation networks, identifying the individual technical and social skills needs emerging from first encounters between micro-businesses and high bandwidth access (ISDN, ADSL, SDSL, UMTS), reviewing the place of facilitation/mentoring, and linking to economic development and SME facilitation activities. Development guidelines synthesised from NEWTIME results will be widely disseminated in the IST and product design communities and to early adopting micro-businesses.

Project period : July 2001 - October 2003 (28 months) www.openuniversity.com

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NOPIK	Personal Information and Knowledge Organizer Network	IST-2001-33487

The NOPIK Project develops an integrated Information and Knowledge Management Environment that supports personal information and knowledge management needs and enables effective sharing of information and knowledge in the extended/virtual enterprise. The system comprises: an ontology and case-based method for information and knowledge management, a personal information and knowledge organizer, an enterprise cognitive network with semantic navigability. The solution will include thematic features and spaces for the exchange of ideas and creative activity and cater for eworkers and flexible teams. The solution combines both organizational and technical perspectives which have equal weight.

Project period : March 2002 - Aug 2004 (30 months) www.nopik.com

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OPAL	Online Partnership Lens: A Social Browser for Networked Enterprise	IST-2000-28295

OPAL is addressing human capital in firms that need to find partners online, by presenting a specification and development plan for an archive and browser to store and manipulate profiles of partners' competencies, compatibility and trust. This novel resource extends the concept of human capital beyond competence modelling and includes emotional and moral dimensions.

Project period: March 2002 to February 2004 (24 months)

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OPUS	Optimal Public Procurement Services In The Healthcare Marketplace	IST-2001-33464

OPUS creates an efficient eProcurement mechanism that enables hospitals and pharmaceutical suppliers to electronically exchange contractual information, aided by the technologies of optimisation and business rules. OPUS mediation service provider will grasp the market opportunity, as this triggered by consumer?s request, offer the participants the ability to dynamically constellate with other medical suppliers, and promote collective competition among the constellations. Appropriate settlement modules wil address the necessary contractual and/or value sharing arrangements spontaneously or dynamically. OPUS modules, entailing the various business perspectives, policies and market rules, will resolve any apparent conflict. The dynamic pricing module will dsmantle the generated product and disseminate the value among the implicated partners.

Project period : Feb 2002 – Jan 2004 (24 months) http://opus.pouliadis.gr

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PLANET	Network of Excellence in AI Planning	IST-2000-29656

The Planet project is a network of excellence in the field of Artificial Intelligence planning and scheduling. The project undertakes a variety of activities to support both the development of new directions in RTD and the exploitation of the technology, in particular with regard to the emerging ework and ecommerce sectors, and it will promote the transfer of results to the benefit of innovative technological progress and competitiveness for European industry and enterprises.

The main goals of Planet are to increase the awareness of the technology and to promote pan-European and international collaboration, to promote the orientation of research more closely towards application requirements and to open up new application areas, to provide a well-known and internationally recognised expert forum, to support high-quality training and teaching.

European research in the field covers a wide spectrum of research, development, and application areas and there exists a large number of excellent groups with different and complementary expertise. The network, currently with about 50 members in 13 countries, aims to effectively pool these skills.

Project period : August 2001 – October 2003 (27 months) http://planet.dfki.de

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POMPEI	P2P location and presence mobile services for managing crisis and disaster situations	IST-511556

The project aims to develop an integrated architecture and a mobile applications suite for advanced services, to assist mobile teams of safety/security and emergency workers in crisis management and response through the first moments during the occurrence of a natural or man-made disaster. The system will comprise peer-to-peer workflow management models integrated with location and presence services operating transparently on any (surviving the disaster) wide area and local wireless networks, running on off-the-self state-of-the-art mobile phones utilizing sophisticated, appropriately extended operating systems. Test-sites for simulated real life testing and evaluation of the platform are Athens International Airport and the network of power distribution stations of the National Power Distribution Company Transelectrica, in Romania.

Project period : Sept 2004 - Aug 2006 (24 months) www.atc.gr/uk/index/index.asp

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PROMODAS	Professional mobile data service	IST-2001-36025

Maintenance service engineers and also medical experts are working outside the fixed working place more and more. To organize their work and to serve end-customers and patients better, flexible, mobile and remote working methods will be used in at least three trial-sites in Europe. The mobile trials are based on 2.5G/3G network and there are different mobile terminals used for normal operations and also for emergency situations. The most advanced tools and software are used and the front organizations are to trial and build the infrastructure for that purpose. Also new integrated service concepts will be used and exploited by the organizations in different countries. The trial was one of the most advanced mWorkforce trials and was a continuous demonstrator of new working methods and serving systems in maintenance and medical care in Europe.

Project period : June 2002 - November 2003 (18 months)

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RESCUE	The Re-Naissance Econmy ; Strategy And Coordination For Europe	IST-2000-29665

The clarity of 20th century markets was based on a system of fixed boundaries, with one-to-one trading relationships, linear value-chains and balance accounting concepts. A number of transformations are at work in the economy today and the impact has far-reaching implications for companies, financial markets and investors, accountants, public institutions and regulators. The search for new modes of competitiveness has opened the way for visionary entrepreneurs to exploit intagibles in previously unforeseen ways. Intangibles - R&D, propriety know-how, intellectual property, workforce skills, world-class supply networks and brands - are now the key drivers of wealth production, while physical and financial assets are increasingly regarded as commodities. The present statistical, accounting and IPR conventions have failed to keep pace with economic reality. A new generation of conceptual and analytical tools is needed to enable company boards, shareholders and investors to judge management performance and differentiate good, bad and delinquent corporate stewardship.

Project period : Oct 2001 – Sept 2003 (24months) www.euintangibles.net

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RESPECT	Professional and Ethical Codes for Technology-related Socio-Economic Research	IST-2001-32227

The development of an Information Society is creating rapid change in the requirements for technology- related socio-economic research, and in the methods used to carry out this research and disseminate the results, with growing requirements for inter- and multi-disciplinary collaborations in international teams. In a context in which there are wide variations in legal and professional requirements and in research practice, RESPECT produces professional and ethical codes of practice for technology- related socio-economic research covering intellectual property, data protection and ethical issues at a Europe-wide level. This is done in close collaboration with practitioners and users, who discussed the draft codes at an international conference. RESPECT produces directories of professional qualifications and professional bodies and a user's guide to socio-economic research for the broader policy and technology communities.

Project period : April 2002 – March 2004 (24 months)

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RIMSAT	Remote Intelligent Management Support and Training	IST-2000-28655

Knowledge is recognised as a firm's most valuable asset. Understanding how to identify, collect, classify and process the knowledge within and between organizations are major hurdles faced by those organizations embarking on a knowledge management programme. By integrating leading-edge and innovative knowledge engineering techniques to support knowledge management, RIMSAT provides a novel way of using the acquired knowledge to improve organizational procedures. The RIMSAT system was validated in a safety-critical environment where the sharing of knowledge is not only vital but is considered the norm. A process to measure the impact of knowledge management on the effectiveness of the decisions taken by an organization in dealing with safety-critical situations is included.

RIMSAT is designed to : provide an innovative, 'intelligent', knowledge based solution aimed at improving the quality of critical decisions; enhance the competencies and responsiveness of individuals and organizations involved in highly complex, safety critical incidents - irrespective of their location.

The partners combine expertise in the management of complex scenarios, the management of knowledge, case based reasoning, model based reasoning, software and hardware development, training and commercial exploitation.

Project period: October 2001 to March 2004 (30 months) www.rimsat.com

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RISESI	The Regional Impact on the Information Society on Employment and Integration	IST-2001-33189

RISESI's objectives are to provide a comprehensive and focused investigation of the relationship between constituencies potentially marginalized in the labour market (i.e. citizens with immigrant backgrounds, immigrants, women, displaced industrial workers, youth, etc.) and employment opportunities in economic sectors related to ICT. The main goals are to examine ways to overcome shortages of qualified personnel and to explore how marginalized constituencies can gain employment in ICT-related sectors in key regions in Sweden, the UK and Italy (Stockholm, Linköping, Cambridge, Cardiff and Rome). RISESI explores the relationships among regional growth poles, demand and supply of labour, social exclusion and economic restructuring, and aims to identify key factors promoting social inclusion. Expected results include policy recommendations in the area of employment and integration aimed at government, industry, university, trade union, and other interested parties (including women, citizens with immigrant-backgrounds, immigrants, workers displaced from non-information society sectors and youth).

Project period: April 2002 – September 2004 (30 months) www.arbetslivsinstituet.se/risesi

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ROADCON	Strategic Roadmap towards Knowledge-Driven "Sustainable" Construction	IST-2001-37278

ROADCON has developed a Strategic Roadmap for future RTD projects and supporting measures in the Construction industry. It is concerned with preparing, from a strategic point of view, future research and developments for ICT in Construction, ensuring that companies from the building and civil engineering sectors achieve maximum business benefits from ICT solutions in the knowledge economy. It is also concerned with harmonising these benefits with environmental issues and quality of life of European citizens. The roadmap will support world-class collaborative research. It will provide mechanisms to ensure that research results are applied in practice in the European Union. It is intended that the strategic roadmap will lead to the development of an 'integrated initiative' to support the needs of the construction industry.

Project period : June 2002 - July 2003 (14 months) www.roadcon.org

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ROCKET	Roadmap to Communicating Knowledge Essential for the Industrial Environment	IST-2001-38245

Rocket has prepared a strategic roadmap for future developments in organizational learning relevant to the education of engineers and knowledge workers.

The project identified the following developments as the key challenges within this domain:

How to link knowledge management (KM) at the level of an organization, with KM and eLearning at the level of people working within an organization or moving between organizations, so that knowledge that is new to someone can be captured and shared more readily and so that people can cope better with changes in their working life and their environment (including new colleagues, ever-changing tasks and processes, certification requirements, etc.)

How to prepare organizations to monitor the fit between the external environment and their capabilities, their knowledge base, their performance and general competitiveness, in ways that enable them to learn more rapidly, cope more readily with change and generally perform better

How (for example, through the use of simulations) to build capability in distributed co-operation in various environments, both for organizations and for individuals

How to prepare engineering students, engineers and knowledge workers for work in organizations that are more dynamic (responsive) than today, including virtual organizations comprising distributed networks of small, medium or large organizations, brought together on a project-by-project basis or to participate on a longer-term basis in a supply chain.

Project period: July 2002 to June 2003 (12 months) http://rocket.vub.ac.be/

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RURAL WINS	Broadband solutions and Applications for Rural Areas and Maritime Regions	IST-2001-39107

This Thematic Network built a strategic RTD roadmap developing an ICT vision which will ensure the economically and technically feasible deployment of ICT solutions for rural areas (including also maritime regions and islands).

The project analysed: trends in technology development of equipment needed and foreseen; deployment of services which integrate the equipment; and knowledge management development which will allow the integration of the above for the globalized rural collaborative work and life environment.

The Thematic Network will analyse different scenarios of joint public and private initiatives and business models to be constituted in the near future for collaboration at work. RURAL WINS solution will lower the discriminatory gap existing nowadays between rural and urban areas as regards broadband accessibility and applications deployment. As a result a broad constituency will have been formed around the proposed Information Society business models.

Project period : July 2002 - June 2003 (12 months) www.ruralwins.org

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SASKIA	Strategic Action for a Sustainable Knowledge and Information Age	IST-2001-38184

SASKIA roadmaps the requirements and actors to ensure that the emerging knowledge society will be sustainable in social, cultural, economic and environmental terms. It identifies ways of unlocking contributions of IST and IST-based processes to sustainability, and how future research agendas can increase that contribution. This is a key component of the EU's Lisbon, Stockholm and Gothenburg strategies. SASKIA is based on networking and the creation of constituencies of RTD stakeholders, through workshops as well as ICT-based collaboration services. In its process dimension, SASKIA first defines a "landing place" scenario - where we want to be in 2030 - achieving a holistic vision through an inter-disciplinary integration of current approaches. From there, it roadmaps implementation models for actors, roles, required R&D and open variables to monitor.

Project period : July 2002 - July 2003 (13 months) www.vtt.fi/ttc/projects.saskia

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SCOOP	Sophisticated Co-operation in Dynamic SME Networks Based on Co-operative Planning and Control	IST-2000-25200

Due to the growing competition in a global market, the importance of close co-operation and collaboration is steadily increasing in working environments, especially between SMEs.
The main objective of the SCOOP project was the development of effective solutions and services to support world-wide manufacturing networks and co-operation, especially between SMEs in rapidly changing working environments. To this end, a co-operative production planning system was developed which facilitates a faster, more efficient, and less expensive execution of business transactions. The entire planning is a dynamic working environment with an enormous potential for rapid adaptation through closed feedback cycles between modelling, simulation, and integration with existing legacy system infrastructures in the virtual enterprise networks. As a result, faster responses to customer demands in the supply network are enabled with a high degree of accuracy.
The end users from print and textile industry form a test bed to achieve the SCOOP goals and transport the benefits through their networks to the potential marketplace.

Project period: January 2001 – September 2003 (33 months) www.ipvs.uni-stuttgart.de

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SEAMATE	Socio-Economic Analysis and Macro-modelling of Adapting to information Technologies in Europe	IST-2000-31104

The project examines the economic and social impact of IST on EU-15, Norway and Switzerland using A variety of analyses including E3ME a dynamic macroeconomic model with detailed treatment of 49 industrial sectors Assess missing data requirements and statistics for monitoring the development of IST and its impact on the EU economies Draw conclusions for policies to ensure successful use of IST for all sectors regions and employment groups.

Project period : Jan 2002 – March 2004 (27 months) www.seamate.net

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SEEMSEED	Study, Evaluate, and Explore in the Domain of the Single Electronic European Market	FP6- 502515

The project will contribute significantly to the development and implementation of future EU Policies about the Single Electronic European Market (SEEM) concept. This contribution will be based on the results of four inter-related activities:

1- e-business space where companies can do business with no technological restraints, based on the definition and development of a flexible technological framework for electronic business collaboration. The definitions of this framework will especially consider the linguistic, cultural and economic aspects of SME's needs.

2- the project will populate and maintain a dynamic, self-managed knowledge base on SEEM-related research policies throughout Europe.

3- the project will develop technology for prototyping the SEEM in a real usage scenario, generating "proof of concept" in an important business sector for Europe and involving both SEEM technical issues (trust, discovery & negotiation, open standards required, authentication and non repudiation of transactions, services for mobile workers,...) and SEEM stakeholders (public authorities, industry, technology providers).

4- with the input of the results from the three tasks above, the project will launch a discussion & dissemination phase with the participation of all the SEEM concept stakeholders in Europe. The results of this discussion phase will be published and submitted as a key contribution to future EC policies on the Single Electronic European Market.

Project period : Jan 2004 – Dec 2006 (36 months) www.seemseed.net

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SHARE	Mobile support for rescue forces, integrating multiple modes of interaction	FP6- 004218

SHARE will develop an advanced mobile service, called Push-To-Share, to support rescue forces during their operation. The new service will apply advanced mobile Push-To-Share architecture involving multimodal user interface, interactive digital mapping in combination with location based services and intelligent information processing and indexing; to allow mobile workers to communicate bi-directionally with each other and to SHARE required and structured information resources (includes audio, video, text, graphics as well as location information) in a simple, intuitive and natural way. The upper level rescue management will be supported by this new service. The SHARE concept will be integrated into a mobile communication infrastructure based on 2.5G, 3G (UMTS) and mobile WLAN networks and will provide a full end to end solution to give the rescue teams an intelligent and easy-to-use mobile working environment. To achieve this goal innovations are as follows: system architecture design to enable bi-directional multimodal communication using Push-To-Share technology; robust speech and image processing in extreme situations; interactive digital maps in combination with location based services; structuring of required information using situation dependent ontology and multimedia data logging capabilities

(Subject to contract)

Project period : (36months)

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SHOENET	Shoe Information Network	IST-2001-35393

Shoenet objectives are related to the capacity of a company managing a trade mark (the parent company) to build a virtual constellation of small companies with a high degree of flexibility, to transform the traditional value chain, into a virtual value chain based in collaborative working environments in the industry. In the shoe industry, a high number of shoe components are present and in most cases each component means the participation of one company.

The project supports SMEs from the shoe sector to collaborate at work using a tool based on the Internet and using multimodal solutions to implement diverse functions in the value chain, starting from the sales process – generating orders (virtual catalogues and GSM or GPRS – connection with the company) and finishing with the integration of a parent company (brand name owner) with subcontractor companies that work in a way that is neither permanent nor exclusive.

Project period: May 2002- April 2004 (24 months) www.inescop.es/shoenet

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SIGIS	Strategies of Inclusion: Gender	IST-2000-26329

The project aims to provide policy-makers, designers, relevant practitioners and communities with a better understanding of the processes involved in the integration of women into the use and design of Information Society technologies. The first stage of the research builds a knowledge base providing a comprehensive overview of current trends, through a review of the available literature and statistics. The second stage explores through empirical work the problems discussed earlier. A number of specific case studies on public and privite efforts to include women in ICT will be carried out to deepen the understanding of the variety of existing needs. Finally, the research involves an extensive crosscutting and synthetic effort to develop more general theoretical insights and explore the policy and design implications of the findings, through consultation with policy makers and practitioners.

Project period : August 2001 – January 2004 (30 months) www.rcss.ed.ac.uk/sigis

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SIMS	Supporting Innovation of SMEs in the Mobile Services and Application Supply Business	FP6-004365
The focus in this project is on SMEs that are developers/suppliers of innovative solutions to providers of Mobile Services and Applications (MSA). They are well known for generating the creative user oriented MSA that business and society wants. This project will stimulate the development and use of mechanisms to support their innovation activities It will conduct studies of the demands of such SMEs for innovation support, the supply of the information and other resources that they will need and the channels that connect the supply and SMEs. Diffusion of the fruits of IST FP6 research to SMEs is required. The project boost such diffusion in a number of ways, encouraging MSA-SMEs and the firms that support their innovations to benefit from FP6 projects. Currently the MSA innovation information and knowledge supply market is underdeveloped and fragmented as is knowledge about the usage and channels. Finding channels and matching them to individual needs are a challenge in too many instances. This project will consider this situation and identify how to improve it. This will be achieved by formulating a set of integrated recommendations for the stakeholders in the MSA market, particularly SMEs to adopt. Project period : July 2004 – July 2006 (24 months)		
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SMART-UP	Small and Medium Sized Enterprise Alliance through Research in Toursim - Take up	IST-2001-34184
SMART-UP provides small and medium sized tourism enterprise with up-to-date tourism management know-how through modern information technologies. Initially, the participating universities design four learning modules which will be integrated into a virtual learning company. Additional dynamic information collected by web-search agent will also be integrated into each learning module. The contents are complemented by constantly updated benchmarking solutions, and chat facilities. The use of an information technology system as a learning tool ensures a fast and cheap know-how transfer amongst tourism SMEs and know-how producers (e.g. universities) throughout Europe. Project period : April 2002 - September 2003 (18 months)		
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SMARTISAN	Smart Artisans	IST-2000-26267

SMEs need an affordable, integrated set of WEB tools to take advantage of the new ways of doing business in the ECommerce environment. SMARTISAN developed a generic XMI based service to facilitate easy access and search to a range of systems, and support synchronised delivery of products against deadlines in the wholesale and retail sectors. This service is piloted in several varied test situations, which include food materials, decorating supplies, and furniture. SMARTISAN supports the participation of both consumers and suppliers in the generation of a new market mediation system aiming at enhanced consumer supplier relationships. Furthermore SMARTISAN provides a Framework for Electronic Commerce implementation and a Road Map to guide SMEs to understand and select the methodologies, tools and architectures.

Project period : Jan 2001 – June 2003 (30 months) www.alfamicro.pt/frontend/project.aspx?id=1

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SME-ROSIN	Small and Medium Enterprises - Robotics Service Inter-Network	IST-2001-55039

The application of industrial robots by SMEs is today hindered by the required high level of expert knowledge that has to be available at the SMEs. As a result, robots are often inoptimally applied, personnel is overtaxed, or the SMEs even still hesitate to benefit from applying robots. For improvement, the project aims at establishing internet based support networks of SMEs. The project creates new, distributed work procedures that allow for combining the special skills of different SMEs. Spatial distance between the SMEs is bridged by the internet. For technical realization, the existing infrastructure of the internet is extended into the equipment of the supplier companies. Tools and services located at suppliers (service providers) are made available to end user companies via the internet. An initial support network is set up by the participating end user companies, system integrator, programming system manufacturer and tool manufacturers. For verifying the new technology, a close-to-practice pilot system is built-up.

Project period : Nov 2002 – Oct 2004 (12 months)

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SMILE	SME oriented Method for successful CRM implementation with Low Effort	IST-2001-34376

In the global market customer satisfaction is one of the key elements. CRM postulates that an important measure for improving customer satisfaction is the efficient organisation of customer communication across departments and communication channels State of the art CRM systems provide groupware functionality, communication facilities, integration with office applications and ECommerce functionality. However adoption thereof in goods producing industries and especially in SMEs has been very low. Facing the challenges of tomorrow's market the consortium addresses within SMILE development of a method for the efficient introduction of CRM systems, which is especially tailored to the requirements of SMEs. The method is supported by a software tool, whch assists CRM consultants in applying the method.

Project period : April 2002 – Sept 2004 (30 months) www.vis.iao.fraunhofer.de/en/projects/smile

Contact		
	Cas Software Ag, Research Department for Basic Technology Wilhem-Schickard-Str 12 D - 76131 Karlsruhe	Spiros Alexakis phone: +49 721 9638 fax: +49 721 9638 spiros.alexakis@cas.de

SNOW	Services for NOmadic Workers	FP6- 511587

SNOW will solve two main hurdles that prevent large scale industrial diffusion of multimodal mobile documentation for maintenance operations: how to author multimodal mobile maintenance documentation; how to exploit this documentation through robust interaction modalities. Existing or emerging telecommunication infrastructures will be used for new maintenance services for European manufacturing industries - direct access to maintenance documentation on various and sometimes difficult work situations, in situ report of operations, expertise projection, cross team communication and remote access to knowledge databases. SNOW will offer full multimodal support from documentation authoring to exploitation to help mobile workers complete maintenance operations, critical for many industrial maintenance processes. The project will define an XML based language for representing device independent multimodal documentation and a common standard-based user interface integration format for exploitation on mobile devices. A maintenance application will be developed for validating these technologies, and assessed with usability tests based on real business scenarios.

Project period : Oct 2004 – Oct 2006 (24 months)

Contact		
	EADS CCR - Toulouse Centre Engineering and Information Technologies Dept Product Engineering Centreda 1, 4 Avenue Didier Daurat F - 31700 Blagnac	Pascale Hugues phone : +33(0)5 61 18 47 26 fax : +33(0)5 61 18 76 11 pascale.hugues@airbus.com

SOCQUIT	Social Capital, Quality of Life and Information Society Technologies	FP6- 507753

This action will support IST policy and RTD on social capital and quality of life. A decision support software tool will be developed that shows the effect of IST on the development of social capital and quality of life, based on a validated system dynamic model. Current knowledge will be supplied by a meta-analysis at the beginning of the project. Based on these results the system dynamic model will be constructed and internally validated by analyses on the available datasets. An external validation will be carried out by working out the implications of the model for some topics selected by a special interest group in which interested experts with different backgrounds in policy, RTD, or IST industry are represented. In three seminars the results of the meta-analysis, the tool and the analyses on the selected topics will be presented to this special interest group. The interactive set-up of the seminars will provide feedback enabling the project to deliver a usable and useful decision support software tool for specialists in policy, RTD or IST industry. It is intended that the special interests group will evolve into an expert working group that will continue to co-operate after the end of the project.

Project period : Dec 2003 – Aug 2005 (20 months) www.eurescom.de/socquit

Contact		
	TNO Telecom Postbus 6030 2600 JA DELEFT The Netherlands	Jeroen Heres phone : +31 15 269 54 10 fax : +31 5 269 54 60 heres@stb.tno.nl

STAR	Socio Economic Assessment Trends for the Digital Revolution	IST-1999-14122

The main goal of this project is to examine the socio-economic impacts of new technologies and services on the nature of work and business enterprise in the next decade, with a specific focus on the identification of new opportunities for economic and employment growth. The project analysed emerging patterns in the development of the digital economy in Europe and the application of the new technologies to advanced (second-generation) services, assessing their contribution to the competitiveness of European industry and service providers, sustainable social and economic growth. This was done by developing and demonstrating the implications of alternative evolutionary scenarios, in close interaction with the IST community and with a group of first-class international experts (the Future Work and Business Forum).

Project period : September 2000 – August 2003 (36 months) www.databank.it/dbc

Contact		
	Databank Consulting Corso Italia 8 I - 20122 Milan	Gabriella Cattaneo phone : +39 02 7210 7508 fax : +39 02 7210 7402 cattaneo@dbcons.it

SUSTEL	Sustainable Telework - Assessing and Optimising the Ecological and Social Benefits of Teleworking	IST-2001-33228

The project develops a better understanding of the relationship between teleworking and sustainable development. The specific objectives are to:
- Identify the ways in which teleworking supports or prevents the emergence of socially more acceptable ways of working and social inclusion, and the variables which can be influenced in order to ensure positive outcomes
- Assess the persistence of economic, social and ecological benefits of teleworking over time, and identify variables which influence the extent of these benefits
- Assess the ways in which next generation technologies are changing the nature and outcomes of teleworking, and identify and design deployment variables which can influence these.

The work includes surveys of teleworkers as well as six organisational case studies in each of the partner countries. It also includes the development of a sustainability assessment tool to help organisations better understand and manage the sustainability of their teleworking schemes.

Project period : Jan 2002 – Feb 2004 (26 months) www.sustel.org

Contact		
	The Uk Centre For Economic And Environmental Development Priestgate House, 3/7 Priestgate UK - PE1 1JN Peterborough	Peter James phone : 44 1733 311 644 fax : 44 1733 312 782 p.james@ukceed.org

TELEBALT	Teleworking as a Tool for Information Society Technologies Programme Promotion to Baltic States	IST-2001-33041

TELEBALT advertises and promotes the IST Programme to Latvia, Lithuania and Estonia by fast and efficient dissemination and awareness actions targeted on Baltic countries as newly associated states to the EU. This objective is fulfilled using new methods of team work, such as eworking, virtual laboratories, etc. The project carries out technology studies of the present situation with IST development in the three Baltic countries and formulates appropriate recommendations to EU research and marketing communities as far as prospectives of potential Baltic market is concerned. Telebalt will deploy and further develop a system of Information Demonstration Centres in Latvia, Lithuania and Estonia. TELEBALT organized major conferences and workshops in Vilnius, Riga and Tallinn, and introduced new methods of team work to develop project focal points in participating countries able to operate in modern IST at a high level. The project provided training measures (distant and face-to-face) to promote dissemination of IST. CoBrow collaborative browsing virtual presence toolkit and PL@ZA groupware were introduced for EU-Baltic states team work. TELEBALT presented IST results to Baltic countries telematic, business, research and unemployment policy communities, emphasizing the major tendencies of European telematics activities.

Project period : August 2001 - July 2003 (24 months) www telebalt.lv

Contact		
	EDNES 1A Place des Orphelins F - 67000 Strasbourg	Jean Bonnin phone : +33 3 88 60 50 63 fax : +33 3 88 41 64 77 bonnin@selene.u-strasbg.fr

TELESOL	Telework solutions for promotion of EU cooperation in business and research with the Commonwealth of Independent States	IST-1999-29038

TELESOL promotes ework in business and research areas between EU and the eight countries of CIS (Kazakhstan, Kyrgystan, Uzbekistan, Azerbaijan, Armenia, Georgia, Ukraine, Russia). The project uses a system of Information Demonstration Centres, in European CIS countries and create on this base, a system of Telework Competence Centres (TCCs). The core TCC is set up in Russia. TELESOL will create in the CIS countries pilot fully operational online ework systems between EU and CIS participants in business and research areas. The first ework systems are set up around the core TCC, further development in new methods of work follow in TCCs in Central Asian and European countries of CIS. TCCs are the focal points for collecting relevant ework information, training, exchange of experience, establishing contacts with interested parties in the EU. The TCCs generate new ework systems. TELESOL organizes a technology kick-off conference, a central Asian regional workshop and local planning/evaluation meetings and eworkshops; and develops curriculum on technology and on management aspects of new methods of work between EU and CIS. By these training and dissemination actions, TELESOL creates ework awareness and helps overcome barriers to networking and to successful eworking projects between EU and CIS countries.

Project period : January 2002 - December 2004 (36 months) www.ednes.org/telesol

Contact		
	United Nations Industrial Development Organization PO Box 300 Wagramerstrasse 5, Vienna International Center AT - 1400 Vienna	Hans Pruim phone : +43 1 26026 4755 fax : +43 1 26026 6802 hpruim@unido.org

TERRA 2000	Terra 2000	IST-2000-26332

The technological, economic and social changes known as the 'New Economy' pose challenges to sustainable development, economic competitiveness, civil society and quality of life. The project brings together a unique combination of scholars and information technology specialists, founding members of the world modeling and scenario analysis disciplines and some of the most profound commentators on the New Economy.

Terra provides a sound base for European policy deliberations around the emergence of the Globally Networked Society and the unfolding of its consequences for society and sustainable development The project is producing a rich library of outlooks concerning that emergence: models, scenarios, and policy analysis. An active societal discourse is an essential part of Terra's activities. There is an invitation to all interest groups, NGOs, businesses, politicians and individual citizens, and researchers of all disciplines, to participate.

Project period : Jan 2001 - Dec 2003 (36 months) www.terra-2000.org

Contact		
	RAND Europe Newtonweg 1 NL - 2333CP Leiden	Maarten Botterman phone : +31 71 524 5151 fax : +31 71 524 5191 maarten@rand.org

THINK	Towards Handicap Integration Negotiating Knowledge	IST-1999-21179

The main goal of THINK is professional integration of people with disabilities, so that they become productive, profitable and self-sufficient by using information and communication technology. This is done through ework. With the experience obtained from the successful pilot project in Portugal, the project creates and implements a technological, organizational and social model that can be adapted to the particularities of each participating country. A monitoring and support structure is built to provide the eworkers with the necessary tools to develop highly professional services to the final client, which are large and medium sized companies. In the short term, 500 disabled people will be integrated in areas such as accounting, programming, technical assistance to computer systems, etc.

Project period : September 2000 - June 2002 (22 months) + extention Baltic countries (= 36 months)

Contact		
	TELEMANutencao – Assistencia Remota a Computadores, S.A. Apartado 117, Avenida Miguel Bombarda, 8 F PT - 2780 Oeiras	Miguel Reynolds phone : +351 21 441 6965 fax : +351 21 441 5767 global@teleman.pt

TRINE	Development and Implementation of a joined electronic commerce and traceability Internet solution for frozen fish	IST-1999-57460

The project develops and implements a simple combined traceability and ecommerce solution dedicated to the frozen fish industry. This represents a first but tangible step in the integration and use of an eBusiness solution, applicable to SMEs in this traditional industry. The main technical objectives of the project are: the definition of fish traceability framework and eCommerce abilities; and the development of the associated tools and their combined implementation into the European Frozen Fish Industry SME community. The solution combines TRINE software, composed of:

- Minitracer software: a local software for traceability management in frozen fish companies, allowing them to acquire quality and safety parameters based on tracerfish concerted action results, completed with harmonised identification, and adapted selection of data capture and labelling technologies.
- Minitrader software: a simple b2b software, operative on Internet (ASP programming language on oracle database, and XML standard for information transfer) that can be incorporated at the existing web site of each frozen fish company.

Project period: Feb 2003 - July 2004 (18 months)
www.cimanti.es/Paginas/sp/Noticias/STValenciaConf.htm

Contact		
	CIMA, Nuevas Tecnologias Informaticas, Sociedad Limitada 48-50 Calle Mayor-Bajo E 31610 Villava-Navarra	Alberto Alfaro Jimenez phone: +34 94 842 6016 fax : +34 94 842 6010 a.alfaro@cimanti.es

ULTRA	Ultra portable augmented reality for industrial maintenance applications	FP6-004734

Augmented Reality is an ideal technology for industrial service and maintenance applications Computer-generated information is blended in the field of view of the technician, so that it appears overlaid to the real scene and demonstrates step by step complex repair tasks. The objective of this project is to develop an ultra portable system by applying augmented reality techniques to pocket-PCs. This will offer a comfortable and unobtrusive solution, integrating augmented-reality functionalities with near-the-eye display, wireless connection, and remote support over integrated mobile phone. The result of the project will be an ultra-light and compact system with appropriate software for authoring, workflow editor/engine, context management, tele-consultation and augmented reality. It will enable efficient production of electronic augmented reality manuals, using the authoring-system and the workflow editor, and the on-site support of the mobile workers. The required information will be presented in a small monocular eye-display as text, animation, and 3d-graphics correctly registered on images of the real scene, which will be taken by the user when required. The interactions will be achieved by pen on the pocket PC-display, for example for the compilation of notes, or will be hand-free and occur over speech recognition during the execution of the maintenance tasks themselves.

Project period : Sept 2004 – March 2007 (30 months) www.ist-ultra.org/

Contact		
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USABILITYNET	Usability Support Network	IST-1999-29067

Despite compelling evidence of the benefits of employing user centred design methods to produce more usable products, most development activity in Europe does not use these methods, with the results that most computer systems are unnecessarily difficult to use. UsabilityNet provides a web site and support network to assist organizations with usability, user centred design and process improvement. The network disseminates information to purchasers, developers and EU projects, tailored to meet local and sector needs. Needs for certification and standardisation are being identified, and the use of a Common Industry Format for usability laboratory test reports is promoted. Dissemination includes organization of high profile European conferences for usability professionals, and setting up a European Usability Professionals Association to institutionalise good practice.

Project period : February 2001 - January 2004 (36 months)

Contact		
	Serco Usability Services 22 Hand Court UK - WC1V 6JF London	Nigel Bevan phone : +44 207 421 6474 fax : +44 207 421 6477 nbevan@usability.serco.com

wearIT@work	Support of Mobile Work by Wearable Computing	FP6-004216

Wearable mobile computing empowers professionals to higher levels of productivity. It provides effective forms of access to knowledge and computing power anywhere and in an increasingly challenging work environment. Because the mobile computing solutions of today are still too complex, too obtrusive, and too demanding on the user to be seamlessly integrated into complex work-processes, their usability in industrial scenarios and their acceptance by the workers is still limited. WearIT@work takes the next important step of innovation: it will develop a new paradigm for wearable mobile computing that supports complex tasks with a minimum of human-machine interaction and thereby enables mobile professionals to keep their attention focused on the interaction with the work environment. A new software and hardware platform will be created in which professionals can be mobile and at the same time fully integrated into the surrounding IT infrastructure. The new technology will have a long-term impact on the organization of individual and collaborative work and create new ways to organize work. The feasibility of the wearIT@work approach will be tested in a set of real-world pilot applications. In a close feedback-loop, experiences from the pilots will be used to prove the usability of wearable mobile computing in industrial settings.

Project period : June 2004 – Dec 2008 (54 months) www.wearable-computing.de

Contact		
	InfoConsult GmbH Universitätsallee 17 D – 28359 Bremen	Peter Knackfuss phone : +49 421 33064-80 fax : +49 421 33064-89 peter.knackfuss@infoconsult.nu

VIEW OF THE FUTURE	Virtual and Interactive Environments for Workplaces of the Future	IST-2000-26089

VIEW performs research and produces methodologies, tools, guidelines, and products to design workplaces utilising VE. Therefore it is necessary to understand the impact of VE technologies on their users. The particular objectives are informational (understanding of potential barriers, roles and impact of VEs), promotional (pilot application demonstrators), developmental (interaction and interface elements, mobile VEs prototype, usability test batteries) and supportive (interactive design support tool and strategic guidance). Industrial users apply the pilot application demonstrators to be able to assess the new work processes and at the same time be a platform to perform tests and evaluations of the methodologies, tools and products developed in VIEW. The intended outcomes are generic to help industrial users across Europe to apply VE systems and tools in different domains. A set-up of a new VE workplace will be produced as a result of the modules developed in VIEW.

Project period : January 2001 – February 2004 (38 months)

Contact		
	The University of Nottingham School of Mechanical, Materials, Manufacturing Engineering & Management University Park UK - NG7 2RD Nottingham	John Wilson phone : + 44 115 951 4004 fax : + 44 115 951 4000 john.wilson@nottingham.ac.uk

WINGS-FOR-SHIPS	Maritime Intelligent Workplace for Weather Information – Network, Guidance and Supervision onboard ships	IST-2001-33107

WINGS-FOR-SHIPS aims to develop, demonstrate and validate a new maritime intelligent workplace based weather information system and decision support for maritime transport and other applications. These are realised by linking fixed/mobile communications with navigation/positioning, efficient transmission and delivery over the network as well as geo-information. These services allow the ship master to have seamless access to, and interaction with intelligent, customised (route based) rich content multimedia information on the efficient and safe navigation passage for passengers, freights and the environment both on board ship and inland. The new and intelligent approach is a decision-support tool looking at forces and stresses on the ship as a function of the local, accurate real-time weather information. Prediction models are also included for detailed estimation of weather parameters in local approach routes. The information is finally presented in a familiar user-friendly ECDIS digital chart on board ships, but also via Internet and WAP for shipmasters on land. WINGS-for-SHIPS includes an automatic system with dynamic calculations using ship and sea area models as well as real-time weather information.

Project period : January 2002 – June 2004 (30 months)

Contact		
	Maritime Eng. & Technology for Transport, Logistics & Education Les Cardoulines Bat 3. 1360 route des Dolines F - 06560 Valabonne Sophia Antipolis	Carmine Giuseppe Biancardi phone : +33 4 93 00 03 39 fax : +39 02 700 405 206 biancardi@mettle.org

WISTCIS	New Methods of Working for Information Society Technologies Programme Promotion to Commonwealth of Independent States	IST-1999-14106

WISTCIS promoted IST to seven European CIS countries (Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russia, Ukraine) by dissemination actions and eworking targeted outside of IST, based on new methods of team work between interested EU and the CIS parties. WISTCIS developed further the system of Information Demonstration Centres deployed in seven CIS countries, organized two conferences and five workshops devoted to IST, introduced new methods of team work in the CIS, and provided training measures to promote IST to the CIS. Certification service for IST proposals preparation and electronic submission were adapted for EU-CIS team work. WISTCIS presented first IST results to the CIS telematics community indicating the trends in European telematics activities.

Project period : November 2000 – October 2003 (36 months) www.ednes.org/wistcis/main_e.htm

Contact		
	Earth Data Network for Education and Scientific Exchange 1a, place des Orphelins F - 67000 Strasbourg	Jean Bonnin phone : +33 3 88 60 50 63 fax : +33 3 88 41 64 77 bonnin@selene.u-strasbg.fr

WWW-ICT	Widening Women's Work in Information and Communication Technology	IST-2001-34520

The project provides a focused investigation of the gender gap in ICT professions and proposes some pathways to improve equal opportunitites, women's participation in the ICT labour market and quality of life in ICT professions. It aims at achieving four scientific objectives : comprehensive understanding of the various aspects of gender disparities in ICT professions; empirical investigation of these disparities; policy implications of equal opportunities in ICT professions; dissemination of results, recommendations and good practices towards agents of change.

The project implements an integrated approach to the various dimensions of gender gaps in ICT professions, covering explicative factors linked to education and training, working and employment conditions, and professional and technical culture. A conceptional framework for analysis is developed with extended reference to the state of the art of existing research. The project focus as on qualitative empirical information, collected through biographical interviews and sectoral case studies in seven countries (Austria, Belgium, France, Italy, United Kingdom, Portugal and Ireland). The work includes an inventory of good practices. Policy recommendations were developed in the following areas: education and vocational training models, employment strategies and work organization patterns, and institutional frameworks. The dissemination of results targets agents of change in human resource management, professional orientation, organization of training and policy making.

Project period : May 2002 - May 2004 (25 months) www.ftu-namur.org/www-ict

Contact		
	Fondation Travail-Université Rue de l'Arsenal, 5 B – 5000 Namur	Gérard Valenduc phone : +32 81 72 51 22 fax : +32 81 72 51 28 gvalenduc@compuserve.com

X-MOB	eXtreme MOBility – Developing a Pan-European ASP-Oriented Open Mobile Platform	IST-2001-37789

In Europe mobility has become a necessity and a competitive advantage, both for citizens and the human capital of companies, and is rapidly evolving to become a complete commodity. Mobility as a commodity can be defined by five main properties: ubiquity (i.e. mobility anywhere), transparency (i.e. the user does not detect the change between fixed and mobile workplaces), fundamental asset (i.e. the user simply can't live without it), universality and m-inclusion (i.e. everybody can join the mobile world), and a value proposition booster (i.e. it is user-governed and adds real value to the user).

This new concept of mobility, also called "eXtreme Mobility" (X-MOB), is realised in this project through the development of an XMOB application platform (XMAP), to host mobile applications, which are multi-device/-channel, multi-network, multi-user, multi-service (ASP-based model), multi-country (federated model), open-standards based (Java/J2EE compliant). XMAP benefits and outputs are validated through the development of two vertical applications (healthcare and logistics) involving 2G, 2.5G, 3G, satellite and multiple different device types.

Project period : July 2002 – February 2004 (20 months) www.x-mob.org

Contact		
	DMR Consulting Pº de la Castellana, 141, 9º 28046 Madrid Spain	Pablo Argaiz Rodrigo phone: +34 9157900 fax : +34 9157901 pablo_argaiz@dmr.com

ANNEX 2 : EUROPEAN WEBSITES FOR COLLABORATION@WORK

EWORK ASSOCIATION SITES

Country	Company	Website
Austria	Austrian Telework Association	www.oeta.at
Belgium	Belgian Telework Association	www.bta.be
Bulgaria	Bulgarian Telework Association	www.bg-telework.org
Ireland	Telework Ireland	www.telework.ie
Italy	Telelavoro Web Italia	www.telelavoro.rassegna.it
Italy	Societa'Italiana Telelavoro	www.societaitalianatelelavoro.it
Netherlands	Nederlands Telework Forum	www.teleWerkforum.nl
Spain	AET	www.aet-es.org
Sweden	European Telework Online Sweden	www.eto.org.uk/nat/se/
UK	Telework Association (TCA)	www.tca.org.uk/

OTHER EUROPEAN COUNTRY SPECIFIC OR LOCAL LANGUAGE SITES

Country	Company	Website
Austria	Austrian Teleweork Website	www.telearbeit.at/
Belgium	Televillage initiative	www.televillage.be
	Televillage initiative	www.telework.televillage.be
	Televillage initiative	www.alcatel.be/telework
Europe	Euro-telework service (supported by DG Employ)	www.euro-telework.org
Denmark	Digital Denmark national programme	www.detdigitaledanmark.dk/english
	Freelancers service	www.freelancer.dk
Finland	National Telework Theme Group	www.ework.fi/english/index.htm
	The Finnish Work Environment fund	www.tyosuojelurahasto.fi/english/
	Finnish Information Society in facts and figures (english)	www.e.finland.fi
	Statistics Finland	www.tilastokeskus.fi/index_en.html
	Ministry of the Labour	www.mol.fi/english/index.html
	Workplace Development Programme	www.mol.fi/tyke/new/english/index.htm
	eWork projects with ESF funding	www.ework.fi/esiraportti/frame_index.html
France	Council of IT (CSTI)	www.csti.pm.gouv.fr
	French administration portal	www.service-public.fr
	Autorité de regulation des télécommunications	www.art-telecom.fr
	9e Assemblée européenne du télétravail	www.ework-in-europe.com/page.cgi?lg=en&page=debut
	eAdministration	www.service-public.fr

Germany	OnForTe (best practice in Telework)	www.onforte.de
	Internet Telework Job Exchange	www.telejobservice.de/default.asp
	TA Telearbeit	www.ta-telearbeit.de www.bitkom.org/
Ireland	Teleworking jobs online	www.exp.ie
	Family Friendly working arrangements	www.familyfriendly.ie
	Information Society Commission	www.isc.ie
	Irish Internet Association	www.iia.ie
Italy	INPS	www.inps.it
	CENSIS Foundation	www.censis.it
	IT Companies Association	www.assinform.it
	Federation Confindustria	www.federcomin.it
	Telelavoro nella Pubblica Amministrazione	www.telelavoro.formez.it
Romania	Sfetcu Home Page with general information on teleworking	www.geocities.com/eureka/park/3622
Spain	Spanish Chamber of Commerce	www.camerdata.es
Slovenia	Research on Internet	www.ris.org/
	eWork Action Plan	www.alppeca.si
	Institute of Macroeconomic Analysis and Development	www.gov.si/umar
Sweden	Facts on ICT	www.sika-institute.se
UK	UK OnLine initiative	www.dfee.gov.uk/ukonlinecentres
	Institue of Employment Studies	www.employment-studies.co.uk
	eGovernment	www.dti.gov.uk

General Sites

Source	Website
European Commission IST programme	www.cordis.lu/ist
IST – New working environments	http://europa.eu.int/information_society /topics/ework/index_en.htm
eEurope	http://europa.eu.int/information_society /eeurope/index_en.htm
IST projects results service	www.istresults.info
eWork IST success stories	www.flexwork.eu.com/members/iststor.html
Statistical Indicators Benchmarking for the IS	www.sibis-eu.org
BT website for flexible working	www.workingfromhome.co.uk
British Telecom - Telework reports	www.labs.bt.com
Connected - Alan McClusky : views/links	www.connected.org
Guide to Flexible Working	www.flexibility.co.uk
Home office partnership	www.hop.co.uk

Telework Links (global)	www.telework101.com/links.htm
eWork 2001 (Conference Helsinki)	www.telework2001.fi
eWork 2002 (Conference Paris)	www.telecom.gouv.fr/9teletrav.htm
eWork archives and projects	www.etw.org
European workplace awards	www.eu100best.org
eChallenges 2004 (Conference Vienna	www.echallenges.org
CSR Europe (Corporate Social Responsibility)	www.csreurope.org
MHC International (CSR)	www.mhcinternational.com

EUROPEAN RTD PROJECT SITES

Project Acronym	Website
AMIRA	www.amira.no
ATTRACT	www.cyberce.gr/gr/rd/attract.shtml
BANCA	www.ibermatica.com
BEEP	www.beep-eu.org
B2B METRICS	www.info.de/b2b
CAPERS	www.posteurop.org
CASCOM	www.ist-cascom.org
COMIC	www.hcrc.ed.ac.uk/comic/
DEESD	www.digital-eu.org
DIECOFIS	www.istat.it/diecofis
E-CONSTRUCT	www.bcxml.org
E-COGNOS	www.e-cognos.org
E-GAP	www.egap-eu.com
E-LIVING	www.eurescom.de/e-living/
E-LOCUS	http://e-locus.fundaciontekniker.com
E3WORK	www.e3work.com
EMERGENCE	www.emergence.nu
EXTERNAL	www.dnu.no
FAMILIES	www.families-project.com
FLEXWORK	www.flexwork.eu.com
FUTURE_WORKSPACES	www.avprc.ac.uk/fws/
HUMANTEC	www.humantec.it
ICCI	http://cic.vtt.fi/projects/icci
INTELCITY	www.scri.salford.ac.uk/intelcity
JANUS	www.janus-eu.org
KNOWCOAT	www.knowcoat.net
MOBILIFE	www.ist-mobilife.org
MOSAIC	www.mosaic-network.org
MOTION	www.motion.softeco.it
MULIMOB	www.mulimob.com/
NESKEY	www.neskey.com
NOPIK	www.nopik.com
OSMOS	http://cic.vtt.fi/projects/osmos
OSP	www.osp-craft.com
POMPEI	www.atc.gr/uk/index/index.asp

PRISM	www.euintangibles.net
ROADCON	www.roadcon.org
SABARECO	www.sabareco.com
SASKIA	www.vtt.fi/ttc/projects.saskia
SEAMATE	www.seamate.net
SCOOP	http://scoop.informatik.uni-stuttgart.de
SIBIS	www.sibis-eu.org
SIGIS	www.rcss.ed.ac.uk/sigis
SOCQUIT	www.eurescom.de/socquit
STILE	www.stile.be
SUSTEL	www.sustel.org
TEAM-HOS	www.team-hos.net/teamhos/home.nsf
TEAMWORK	www.euteamwork.net
TELEBALT	www.telebalt.ee
TELESOL	www.ednes.org/telesol
TERRA2000	www.terra-2000.org
TOWER	http://tower.gmd.de
ULTRA	www.ist-ultra.org
UNITE	www.unite-project.org
VIDEOCOM	www.cancer-network.de/videocom
VIEW OF THE FUTURE	www.view.iao.fhg.de/
VIP	www.unomondo.org
VISION	www.km-vision.org
WEARIT@WORK	www.wearable-computing.de/
WHALES	www.gformula.com
WIST-CIS	www.ednes.org/wistcis
WWW-ICT	www.ftu-namur.org/www-ict

INTERNATIONAL SITES

Group	Website
Asociacion Argentina de Teletrabajo	www.aat-ar.org
Asociacion Uruguaya de Teletrabajo	www.aut-ur.org
Canadian Telework Association	www.ivc.ca
Gil Gordon - telecommuting (USA)	www.gilgordon.com
Jala International (USA)	www.jala.com
Japan Soho Association	www.j-soho.or.jp
Japan Telework Society	www.telework-gakkai.jp
International Telework Academy (successor to Int'l Telework Foundation)	www.telework-academy.org
The International Telework Association & Council (ITAC)	www workingfromanywhere.org
Electronic Russia 2002-2010 program	www.e-rus.ru/eng/index.shtml
US governmental program	www.telework.gov/

ANNEX 3 : PUBLICATIONS OF THE EUROPEAN COMMISSION

Title	Reference	Date
Collaboration@Work The 2003 report on new working environments and practices	ISBN 92-894-5755-4 ISSN 1725-3101	October 2003
CORDIS Focus on Emerging Technologies	ftp://ftp.cordis.lu/pub/focus/docs/supplement_21_en.pdf	September 2004
Impact of ICT on Sustainable Development	www.amiatwork.com	February 2004
ISTAG *Scenarios for Ambient Intelligence in 2010*	ISBN 92-894-0735-2	February 2001
IST Advisory Group Ambient Intelligence: from vision to reality For participation – in society & business	ftp://ftp.cordis.lu/pub/documents_15/natdir0000049/s_2626005_20031013_082134_ADS0000806en.pdf	September 2003
High Level Group on Digital Rights Management Final Report		March - July 2004
Report on the Implementation of the Commission's Action Plan for Skills and Mobility	COM(2004) 66 final	February 2004
Connecting Europe at high speed : recent developments in the sector of electronic communications	COM(2004) 61	03.02.2004
eEurope 2005 *An information society for all*	ISBN 92-894-3782-0 COM(2002) 263	May 2002
Research Networking in Europe *Striving for global leadership*	ISBN 92-894-3859-2	September 2002
Information Society Technologies Work Programme 2003-4	ISBN 92-894-4092-9	January 2003
The European eBusiness Report 2002/2003 Edition *A portrait of eBusiness in 15 sectors of the EU economy*	ISBN 92-894-5118-1	March 2003
eGovernment Resource Book *Synopses of IST projects relating to eGovernment*	ISBN 92-894-5509-8	March 2003
Choosing to grow : Knowledge, innovation and jobs in a cohesive society *Report to Spring European Council* *Commission staff working paper in support of the report*	ISBN 92-894-4802-4 COM(2003) 5 ISBN 92-894-4810-5 SEC(2003) 25	March 2003

Publications obtainable from the Office for Official Publications for the European Communities, http://publications.eu.int/index_en.html.
Electronic versions of Commission documents can be obtained by entering a search process at http://www.cordis.lu/ist/publications/publications.htm.

ANNEX 4 : EWORK ASSOCIATIONS IN EUROPE

Country	Address	e-mail / ULR / Phone / Fax
Austria Austrian Telework Association (ÖTA - Österreichische Telearbeitsvereinigung)	Akademistra. 2/4 A-1010 Vienna	info@oeta.at www.oeta.at P +43 1 5852300-23 F +43 1 5852300-11
Belgium Belgian Teleworking Association	c/o Teleport Brussels Buro&Design Centre Esplanade du Heysel B-1020 Brussels	info@bta.be www.bta.be P +32 2 475 2000 F +32 2 475 2010
Bulgaria Bulgarian Telework Association	Vesselin Spiridonov Khan Asparuh Street 49 Entrance A, Apt. 7 Sofia 1000, Bulgaria	bgta@virtech-bg.com www.bg-telework.org P +359 2 981 4762 F +359 2 981 5541
Ireland Telework Ireland (TWI)	Siobhan Duffy Ballaghanna Mountnugent Co. Cavan	siobhan@telework.ie www.telework.ie P +353 47 72069 F +353 47 72070
Italy Associazione Lavoro & Tecnologia	P.O. Box 2395, 00100 Rome	dinicola@mclink.it www.telelavoro.rassegna.it P +39 338 87 59 486 F +39 06 4 91 066
Italy Societa'Italiana Telelavoro (SIT)	Corso Vittorio Emmanuele II 209 I-00186 Roma	sit.telelavoro@tin.it www.societaitalianatelelavoro.it P +39 066 88 099 44 F +39 066 82 131 14
Netherlands Nederlands Telework Forum	Pompmolenlaan 10A NL-3447 GK Woerden	info@telewerkforum.nl www.telewerkforum.nl P +31 348.483858 F +31 348.482288
Portugal Associacao Portuguesa para o Desenvolvimento do Teletrabalho	Av. Miguel Bombarda 8 F, Apartado 117, 2780 Oeiras	global@apdt.pt www.teleman.pt/apdt P +351 1 4416965 F +351 1 4415767
Portugal Associacao Portuguesa de Teletrabalho	Av. D. Nuno Alvares Pereira 27 2735 Cacem	telework@automail.pt www.teletrabalho.com P +351 1 913 85 03 F +351 1 913 70 99
Spain Asociación Española de Teletrabajo	Las Calas 3 28016 Madrid	aet@aet-es.org www.aet-es.org P +34-639-486 332 F +34-91-435 62 70
Sweden Distansforum - Swedish Teleworking Association	Box 70 S-184 03 Ljustero	info@distansforum.se www.distansforum.se P +46 8 542 421 20 F +46 8 542 421 99
United Kingdom TCA – Telework Association	Freepost CV2312 WREN Warwickshire CV9 2RR	www.tca.org.uk teleworker@tca.org.uk P +44 24 76 69 6986 F +44 1453 836174

ANNEX 5 : DEFINITIONS AND GLOSSARY

DEFINITIONS

eWork

There are many definitions of ework. This causes difficulties when trying to compare the results of different ework surveys and research. The common element across all aspects of ework is "the use of computers and telecommunications to change the accepted geography of work."

It origins can be traced to the introduction of the term "**telecommuting**" by Jack Nilles in the USA in his publication The telecommunications transportation trade-off (John Wiley & Sons, 1976), to denote this type of working arrangement. It was popularised by futurist Francis Kinsman in his book The Telecommuters (John Wiley & Sons, 1987).

The term "**telework**" had been popularised in Europe through its use by the European Commission, which from the late 1980s and early 1990s had sponsored considerable research in this field, particularly into the use of telework as a means to develop economic activity and create work opportunities in rural areas or places with economic problems.

The year 1999 saw the introduction of the eEurope initiative and of a new phase of European co-operation in the shift to a digital, knowledge-based society. The broadening in scope of ICT enabled work styles was reflected by the introduction of the term "**ework**". The most commonly encountered terms are explained below.

Telecommuter
Generally interpreted to mean someone with an arrangement to avoid commuting by working at home, or closer to home.

Flexible Working
An employer-centred concept that encompasses a wide spectrum of new working practices, including flexible working hours as well as flexibility of work location, flexible contracts of employment. It can also mean flexible use of office space, such as 'hot-desking', where a group of people don't have personal desks but share a smaller number of desks, and use whichever one is free.

Telecentres
These are shared office facilities that provide a range of office services, often for employees of several companies, or different departments of the same company. It means that employees can use the office that's most convenient to him or her, rather than specific office space owned by their company or department.

Telecottages
A special class of telecentre, named because of its origins in rural villages. The telecottage movement started in Scandinavia and has now spread to many other parts of Europe, such there are now estimated to be over 500 telecottages across Europe. Telecottages perform multiple roles including offering training in teleworking technology and relevant skills, attracting work that uses

these skills and hence being a stimulus to local economic development. They also provide local organizations and businesses access to more expensive office and hi-tech equipment.

Home-based Telework, Home Teleworking

In this mode of telework, the home is the locus of work and the main work location or base of a teleworking employee or self-employed teleworker. Part of the home is an 'office' workplace, with typical office facilities, such as filing cabinet, business phone, fax and a computer, plus of course, a modem or ISDN link into computer networks.

Nomadic (peripatetic) eWork

These eworkers have no obvious single location where more work takes place than any other. Armed with mobile telephone and/or portable computer, their office is where the nearest phone plug is (or anywhere if they are on battery power and radio communications). Their work is location independent.

Remote Office eWork

A location physically distant from the main office, where one or more workers work. Such work may be individual work e.g. a member of a team who has not relocated to be physically close to the rest of their team, or a whole 'back-office' team. Such workers typically have 'remote access' to computer systems at the main office.

Offshore telework

A term coined by Management Technology Associates during their 1992-1993 Telework Study for the UK Department of Trade & Industry. A variant of the remote office idea where work is split across several countries. Jobs are shifted from one region, town or country to another. Pan-European call handling centres are an example of this.

Televillage

This concept is an extension of the telecottage and is very much about lifestyles and preferences. A televillage is a whole community highly geared to the future work and lifestyles. The whole village is 'wired' and each home is fully equipped with an internal network connected to the village network and through broad band communications to the 'global village'. As portable and mobile technology become more pervasive, the wide range of working modes considered as one form of telework or another, start to blur, as does their comparison with 'conventional' work.

Teletrade

Teletrade literally means "doing business over networks". It uses advanced information and communications technologies (such as the Internet) to market and sell goods and services, enhance customer relationships and reach distant markets without the overhead of a local 'physical presence'. Although similar in concept to electronic commerce, the latter most often refers only to the actual trading transaction e.g. the placing of an order. EDI (Electronic Data Interchange) is an example of a technique that exemplifies the narrow view of electronic commerce. Teletrade covers all aspects of the selling cycle and the buyer-seller relationship. It includes making potential customers aware of products and services, such as through the Internet; providing means of ordering and in some case making payment over electronic networks; providing online support and generally enhancing customer relationships via focused two-way communications (e.g. via email or electronic communities) between buyer and seller.

Telecooperation

Telecooperation is the application of information and communications' technologies by individuals and organizations to enhance communications and access to information. People working collaboratively over a networked as part of a virtual team are an example of telecooperation. So is alliance building to create a network of dispersed individuals who come together to cooperate for a shared purpose. When more formal, this network may be considered a virtual organization (see glossary). Telecooperation entails new skills and changes to organizations. In particular the information and communications flows of traditional organizational hierarchies are undermined, and the barriers of communication across organization boundaries are dissolved.

GLOSSARY

AET (Asociación Española de Teletrabajo). Spanish Telework Association.

AFTT (Association Française de Teletravail et des Téléactivités). French Telework Association.

Ambient Intelligence. The concept of ambient intelligence (AmI) provides a vision of the Information Society where the emphasis is on greater user-friendliness, more efficient services support, user-empowerment, and support for human interactions. People are surrounded by intelligent intuitive interfaces that are embedded in all kinds of objects and an environment that is capable of recognising and responding to the presence of different individuals in a seamless, unobtrusive and often invisible way.

Broadband. Generally data transmission speeds in excess of 1 Mbps. Contrast modem speeds of 28.8Kbps and an ISDN channel of 64Kbps.

Browser. The software used to display HTML pages on the World Wide Web. Netscape's Navigator and Microsoft's Internet Explorer are the world's most widely used browsers.

BTA. Belgian Telework Association.

Cable modem. A device that interfaces between coaxial cable television/voice channel and home computing equipment. Holds the potential for providing high speed Internet access.

Call Centres. An example of remote office working, where work previously dispersed is centralised into one centre, often located in an area with available labour, lower costs and good telecommunications connections. Calls to local customer service centres are automatically diverted to the centre, which typically covers a large region or continent.

CRM. Customer Relationship Management

CSR. Corporate Social Responsibility. The business contribution to sustainable development and CSR is a concept whereby companies integrate social and environmental concerns in their business operations and in their interactions with their stakeholders on a voluntary basis. CSR is complementary to other approaches of ensuring high environmental and social performance in an ongoing learning process for companies and stakeholders.

CSCW (Computer Supported Cooperative Work). The software tools and working methods used to support team work, especially virtual teamwork (q.v.). It includes the use of computer conferencing, electronic 'white board' systems and use of Intranets. A more popular, though restricted, term is groupware (q.v.).

CTI (Computer Telephony Integration). The integration of computer systems with telephones. This may be dial-out facilities from a computer, or more typically use of intelligent exchange facilities that brings up caller information and database records on a computer screen when a telephone is answered.

Cyberspace. A term used to describe the imaginative "space" where people communicate electronically using email and other online services, normally over the Internet. The name was originally coined by William Gibson in his science fiction novel Neuromancer to describe the "world" of computers, and the society that gathers around them.

Desk Top Conferencing (DTC). Videoconferencing where communications is from computer-to-computer, rather than remote video camera to local monitor.

Digital economy. Characterisation of the new global economy dominated by digital infrastructures, i.e. electronic or digital networks based upon ICT infrastructures and especially the Internet. (See also network economy).

DRM. Digital Rights Management

eCommerce. Sales and purchase of goods or services over telecommunications networks, notably the internet.

EDI (Electronic Data Interchange). The exchange of structured electronic messages (such as orders or invoices) over special telecommunications networks to replace paper transactions.

eEurope. An initiative by the European Union to accelerate the development of the knowledge economy.

eGovernment. The use of information and communication technology in public administrations combined with organizational change and new skills in order to improve public services and democratic processes and strengthen support to public policies.

EITO. European Information Technology Observatory.

Email. Electronic mail. Sending and receiving messages over computer networks, such as the Internet.

ERDF (European Regional Development Funds). One of the four Structural Funds of the European Union.

ESF (European Social Funds). One of the four Structural Funds of the European Union.

eWork. Work practices making use of information and communication technologies to increase efficiency, flexibility (in time and place) and the sustainability of resource use.

Extranet. A network using Internet protocol, that allows external organizations, such as suppliers or customers, access to selected internal information. In essence, it is an Intranet (q.v.) which gives external users restricted access (for example using password protection) to particular information through the firewall.

Free agent. A US term for an individual similar to the traditional free-lance worker but extended over a much wider geographical range and a greater number of interlocking markets because of new networking capabilities.

ftp (File Transfer Protocol). The process for transferring binary files (e.g. documents or software) across a network.

Groupware. A class of computer software that allows several users to collaborate through sharing information. Computer conferencing and group decision support systems are types of groupware

GSM. A European standard for cellular phone digital communications. Allows mobile phones to be used in countries across Europe and certain other parts of the world (over 130 in total).

HTML (HyperText Mark Up Language). The code used on WWW pages to instruct the browser how to display the text.

http (Hypertext Transfer Protocol). The protocol used to transfer information across the World Wide Web. It indicates that the information is encoded in HTML (q.v.).

ICT (Information and Communications Technology). A generic term that covers both information technology (computer hardware and software) and telecommunications equipment and services. Its increasing use indicates the growing convergence between these strands of technology.

Information Society. The term adopted the European Commission to indicate a society where information is a key component of economic and social activity. Citizens, both consumers or workers, use information intensively.

Intelligent Agent. A piece of software using artificial intelligence techniques that operates autonomously using a set of rules. A common type of agent is one that roams the Internet and searches out information. Other types filter incoming information and messages for items of relevance to particular users.

Internet. A network of computer networks, estimated to be around 10 million world-wide. Any computer can join the Internet and exchange information, provided it makes an appropriate physical connection and operates the TCP/IP protocol . See also Intranet and Extranet.

Intranet. An internal Internet. In other words an internal computer network that runs the Internet Protocol (TCP/IP). Most Intranets have a computer 'gateway' to the wider (external) Internet and deploy a 'firewall' to prevent unauthorised access to a company's information.

IPR (Intellectual Property Rights). Rights to intellectual material normally in the form of content on electronic networks where it can be difficult to control copying and use without the IPR holder's knowledge and/or permission.

IPv6. Internet protocol, version6, which significantly extends the web address space and provides extra functionality on quality of service, security, simplified network management etc.

ISDN (Integrated Services Digital Network). Services that allow sharing of multiple devices on a single line, e.g. telephone, fax and computer access to online services. Basic rate ISDN service (ISDN-2) consists of two 64kbps digital communications channels, while primary consists of 32. Although ISDN offers significant benefits for certain kinds of telework, their costs and ease-of-use have deterred many home workers when contrasted with high speed modems.

ISP (Internet Service Provider). A supplier of Internet services including access. Originally distinguished from IAPs (Internet Access Provider) since they provided the major back-bone connections between countries, and sold on bandwidth to smaller local IAPs.

ISPO (Information Society Project Office). A service unit established by DG Enterprise and DG Information Society to act as a bridge builder between Commission Services and external counterparts active in Information Society issues.

IST (Information Society Technologies) Programme. A European Union research, technology development and demonstration programme under the Fifth Framework (1999-2002) and Sixth Framework (2002-2006). The IST 5th Framework Programme was based around four Key Actions, including Key Action II on New Methods of Work and Electronic Commerce, as well as a number of cross programme activities and accompanying measures. The IST 6th Framework Programme includes the area of IST for economic challenges and the subarea of eWork.

IT (Information Technology). Strictly speaking is only computer hardware and software not including telecommunications equipment and services (cf. ICT), but is often used synonymously with ICT to mean both these types of technology especially as they are now substantially converged.

LAN (Local Area Network). A network that connects computer together within a small area, usually a single office. Facilities such as printers and disks can be shared. Many LANs have gateways to connect their users to external services such as the Internet.

MPEG (Moving Picture Expert Group). A group that defines compression standards for video (moving) images, notably MPEG-2. A new standard, MPEG-4, defines images in terms of objects and their attributes, making it easier to manipulate audio-visual objects remotely over networks.

NACT. National Advisory Council on Teleworking - National Council established by the Irish Government to advise it on the development of teleworking employment opportunities in Ireland and to recommend attainable actions which will contribute to the realisation of those opportunities.

NAS. New accession states – the 13 countries negotiating accession to the European Union (the 10 that are due to join in May 2004 plus Bulgaria, Roumania, Turkey).

NC (Network Computer). A computer that relies on a computer network for its ongoing operation and software, which is downloaded as required.

Network economy. Characterisation of the new global economy dominated by networks, i.e. multifarious nodes and connections in contrast to hierarchical and otherwise controlled economies. Normally means the electronic or digital network based upon ICT infrastructures and especially the Internet. (See also digital economy).

NTF (Nederlands Telewerk Forum). The national teleworking association in The Netherlands.

P2P. Peer to peer

QoS. Quality of Service

RISI (Regional Information Society Initiatives). Part of the Article 10 of the Structural Funds.

SIT (Societa Italiana Telelavoro). A national society for teleworking in Italy.

Social Partners. Organized representatives of labour market interests such as employers associations' and trades unions.

SEEM. Single European Electronic Market.

SOHO (Small Office Home Office). Defined by marketers as a segment of buyers with common characteristics. This is a small office, that may be part of a person's home. The amount and size of equipment used is generally lower than that in large offices, and users more cost sensitive.

SME (Small to Medium Enterprise). In European Union terms this is defined as an enterprise which has less than 250 employees, is less than 25 per cent owned by large companies, and has a total turnover of less than 40 MECU or annual balance sheet of less than 27 MECU. This definition dates from 1996, and replaces and earlier definition that included enterprises less than 500 employees. It includes medium, small (less than 50 employees) and micro-enterprises (less than 10 employees).

Sustainable Development. "Development that meets the needs of the present without compromising the ability of future generations to meet their needs". Sustainable development is as much directed at governments as it is at business and society and as such is a broader concept than social responsibility initiatives which is solely directed at businesses.

TCA (Telework Association). The biggest telework association in the UK. Although its roots are in the telecottage movement and its full title was previously The Telework, Telecottage and Telecentre Association.

Teleactivity. A generic term, not widely used, to include all types of teleactivity that are part of telework, teletrade or telecooperation. Examples of teleactivities are teleshopping, telebanking, telemedicine etc.

TWI. Telework Ireland, the professional association of Teleworkers in Ireland

UMTS (Universal Mobile Telecommunications System). The third generation mobile standard that supports speeds up to 2 Mbps, and designed as a successor to GSM. Its name is slightly misleading in that one of its aims to provide seamless services to users across both fixed and mobile networks.

UPnP. Universal plug and play – an industry forum with the objective of enabling simple and robust connectivity among stand-alone devices and PCs from many different readers.

Videoconferencing. The use of camera (with microphone) and monitor to allow visual communications over a high-speed communications link (typically 1Mbps or higher) instead of proximity face-to-face communications.

Virtual Organization. An organization of various independent members that operates cooperatively (and may have been created) without the constraints of space and/or time.

Virtual Communities. Communities that have been developed around an area of common interest, and use online techniques to sustain themselves.

VPN. Virtual private network

Virtual Teams, Virtual Teaming. The concepts of virtual working applied to a work team. Members of the team work at different locations and use telecooperation methods to progress their joint work.

Webcasting. Broadcasting live video and audio data over the Internet. For example, speeches and talking heads from conferences can be received by Internet users over the ordinary telephone network in real time.

WWW (World Wide Web). The collection of HTML pages that reside on Web servers across the world. It is estimated that there are over 100 million publicly accessible WWW pages on the Internet, a number that has been more than doubling every year.

European Commission

Collaboration@Work 2004 – The 2004 report on new working environments and practices

Luxembourg: Office for Official Publications of the European Communities

2004 — 211 pp. — 21 x 29.7 cm

ISBN 92-894-8029-7