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Statistical Indicators Benchmarking the Information Society

Benchmarking Education in the Information Society in Europe and the US

by



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For further information, contact:

empirica GmbH

Oxfordstr. 2

D-53111 Bonn

E-mail: sibis@empirica.com

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Foreword

For some years now statistical indicators on Information Society have been central in the policy making process. This has been best demonstrated through the benchmarking exercise of eEurope 2002 Action Plan, and its further inclusion as a key activity in eEurope 2005. Having recognised this need and driven by the difficulties in obtaining reliable and appropriate statistics, the IST programme supported a pan-European research effort during Framework Programme 5. The prime objective has been to develop and make available methodologies, tools and new statistical indicators which can help remedy the deficit in this field.

It is in this context that the SIBIS project was launched (IST-26276, "Statistical Indicators Benchmarking the Information Society", www.sibis-eu.org). This document presents some of the project's main findings so far.

There are at least two main reasons that make this document interesting. First, it is one of the few original attempts to have a coherent and comprehensive approach in measuring the Information Society. As such it is expected to stimulate further debate and research among the professional statistical community, leading to an improved statistical competence in Europe. Second, it provides a unique single source of data on real time which supports many of the new IST research areas, at the launch of Framework Programme 6.

Building on the original SIBIS research, in particular on the results of the indicator surveys, the project has produced 9 reports, selected from those addressed by eEurope.

The SIBIS work attracts further interest since it also supports the eEurope 2005 initiative. SIBIS is carrying out an evaluation and a benchmarking of the eEurope 2005 initiative for the 15 EC Member States and the 10 Accession countries which will become available later in 2003. Both the reports and benchmarking results can be obtained from the SIBIS web site.

The publication of the SIBIS project results is a timely and direct contribution to benchmark progress on key issues of the Information Society in general and the eEurope initiative in particular.

Thanassis Chrissafis

athanassios.chrissafis@cec.eu.int

DG INFSO-C6

Preface

This report is a main deliverable of the SIBIS project (*Statistical Indicators Benchmarking the Information Society*), funded by the European Commission under the "Information Society Technology" Programme (1998-2002). The overall goal of SIBIS is to develop and pilot indicators for monitoring progress towards the Information Society, taking account of the "e-Europe action lines". SIBIS focuses on nine topics of interest, i.e. Telecommunications and Access, Internet for R&D, Security and Trust, Education, Work and Skills, Social Inclusion, e-Commerce, e-Government and e-Health.

Within the SIBIS project two surveys (a General Population Survey and a Decision Makers Survey – businesses) were conducted between March and May 2002 covering the nine eEurope topics. This report describes the outcomes with respect to the topic of "Education". The document has two main objectives, i.e. to be a support tool for views shared by experts in the area and, at the same time, to define indicators for quantifying some of the critical variables related to education, especially ICT skills and digital literacy.

The report is organised in six chapters and an annex. The first three chapters give the reader an overview of the main outcomes (*Executive Summary*), the context (*Introduction*) and the indicators developed (*Identification of the Indicator Framework and Hierarchy*). The core of the report is the analysis of indicators, provided in chapter 4. This chapter focuses on the level of skills of digital literacy among the European population, analysed by national level as well as age and gender. The skills measured are competencies in communicating and downloading software via the Internet and competencies in searching required information on the Internet and questioning the sources of information obtained. Further the national use of e-learning among students is measured. Finally, an innovative compound indicator is developed, aimed at measuring the level of digital literacy among the population or – used in a more targeted survey – digital literacy among pupils or students at certain levels of education. For students assessment the index offers an indication of outcome of teaching in computer use and –understanding. For general population assessment it offers an indication of readiness for the Information Society. The final chapters summarise the outcomes of the study as well as areas where future research might be necessary. The annex consists of tables, providing the reader with access to the data referred to in the report, and methodological information.

The main audience should be policy makers, statistical offices at all levels (national, e.g. CBS, Statistisches Bundesamt, Statistics Finland etc., and supranational, e.g. Eurostat, OECD), industry leaders and researchers in the domain and those involved and interested in benchmarking the domain throughout Europe and the world. These institutes should consider the questions posed and the subsequent indicators developed by SIBIS a valuable input for their regular surveys. The project includes a series of workshops with such institutions in the countries represented by the SIBIS consortium. The report is also of interest to the European Commission (in particular DG INFSO) and to government officials dealing with education matters.

For each of the nine topics a separate SIBIS report was issued in 2001. This earlier report was aimed at setting the scene on the topic, defining the gaps in the statistical coverage and suggesting innovative indicators to be developed through the subsequent survey. The current report, although an independent document, is an interim report. The final version will be issued in April 2003.

SIBIS is led by Empirica (Bonn, Germany), and includes the following project partners: RAND Europe (Leiden, The Netherlands), Technopolis Ltd. (Brighton, UK), Databank Consulting (Milan, Italy), Danish Technological Institute (Taastrup, Denmark), Work Research Centre Ltd. (Dublin, Ireland), Fachhochschule Solothurn Nordwestschweiz (Olten, Switzerland).

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For more information about Danish Technological Institute, Competence and IT or this document, please contact:

Soren Eliassen

E-mail: soren.eliasen@teknologisk.dk

Jeremy Millard

E-mail: jeremy.millard@teknologisk.dk

Danish Technological Institute

Competence and IT/Industrial Development

Gregerensvej, P O Box 141

DK-2630 Taastrup - Denmark

Tel +45 72 20 20 00

Fax +45 72 20 20 19

www.teknologisk.dk

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Of course, the authors are fully responsible for all remaining insufficiencies and errors.

1 Executive Summary

1.1 Introduction to the topic

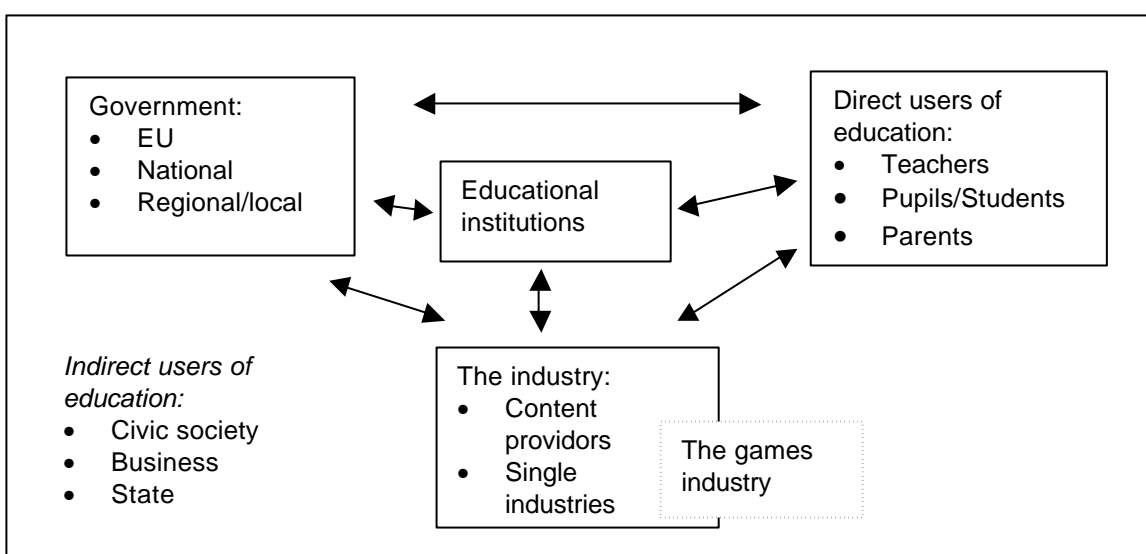
The concept of 'Education' is changing. From the formal and pre-defined curriculum in the industrial society, education today is redefined as life-long learning in the Information Society. Life-long learning certainly reflects a new comprehension of the need for education in society. The "redefinition" seems to be the conceptual answer to the increasingly complex needs and possibilities for development and learning in the Information Society. The focus is changing from learning to do (or know) towards learning to learn. The concept life-long learning also corresponds with the broad political efforts and initiatives on developing education related to ICT, in individual countries, the European Commission, and other supranational organisations.

In this context, education is understood as a formally institutionalised process of knowledge transfer and knowledge development. This is opposed to informal learning arrangements taking place through various community of practice arrangements, on-the-job training and peer learning, which are taken care of in the topic of Work, Skills and Employment.

The changes in how education is provided through increased use of ICT combined with the life-long learning perspective on education emphasises that there is a broad range of educational stakeholders. It is increasingly clear that the educational stakeholders are not limited to the public sector and the institutional school system alone, but every institutionalised and social context a person gets involved with through all stages of life could be regarded as an educational stakeholder.

Four central stakeholders directly involved in the educational system are identified, and their use of indicators discussed: government, the educational institutions themselves, the inhabitants of the institutions (the directly involved individual in education) and finally the industry, primarily the content industry.

Figure 1.1: Relations between the main (direct) stakeholders of education



Source: SIBIS, (DTI) 2002

1.2 Results of the data of the SIBIS GPS on Education

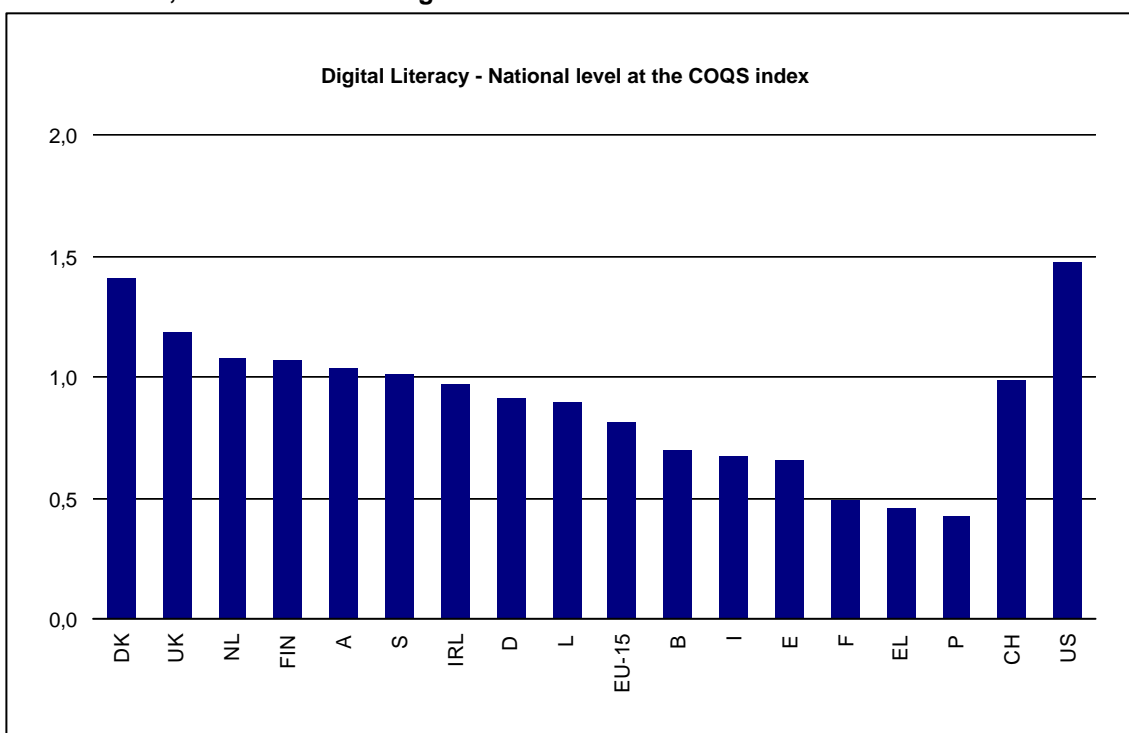
In the General Population survey the level of digital literacy has been addressed as well as students' use of e-learning as an indication of integration of ICT in curriculum.

Four types of skills in using and questioning the Internet are defined as the skills of digital literacy, which is the basis for the compound indicator; the COQS index of digital literacy:

- Communicating with others
- Obtaining (or downloading) and installing software on a computer
- Questioning the source of information obtained on the Internet and
- Searching for the required information

The SIBIS survey shows huge differences in the level of digital literacy between the surveyed countries. Within the EU there is a factor 3 between the EU country with the highest score (Denmark) and the lowest (Portugal). The national scores in digital literacy among the countries surveyed differ between 1.5 (in the USA) and 0.5 (Portugal) measured on a scale from 0 to 3. The EU average is 0.8 on the COQS index. There is still a way to go towards total digital literacy in the EU, even to reach the level of digital literacy in USA (figure 1.2).

Figure 1.2: COQS index of digital literacy in the whole population. EU member states, Switzerland, USA and EU average



Source SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306).

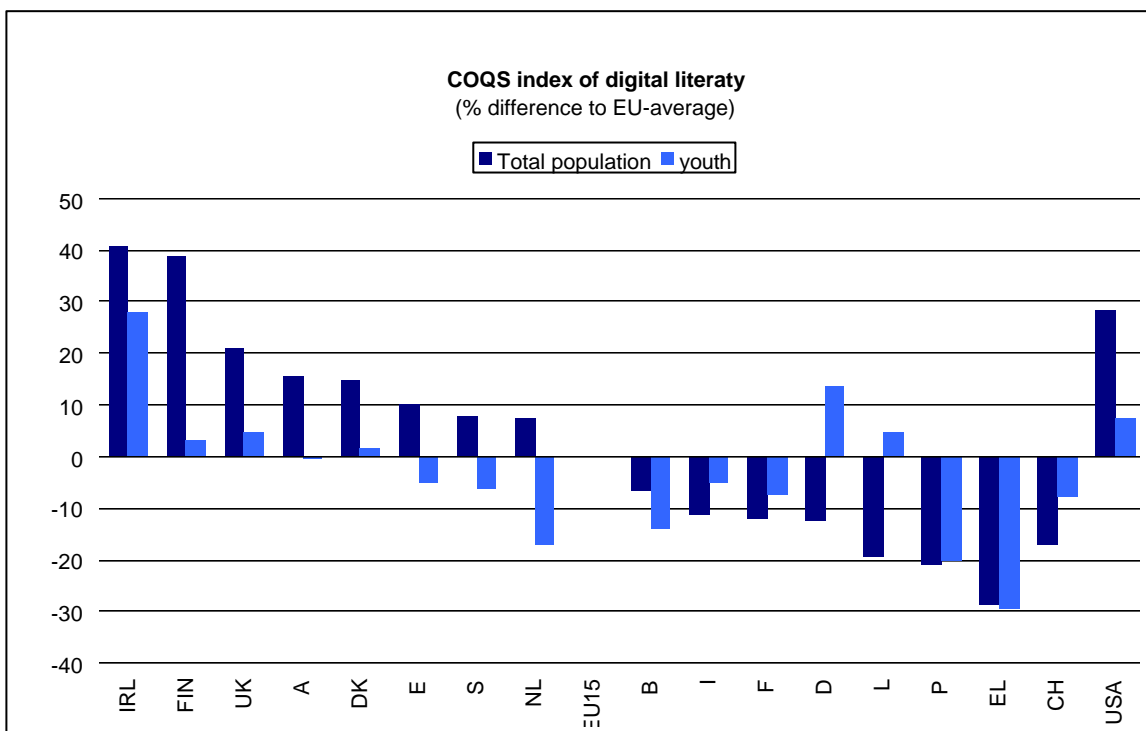
The level of digital literacy also shows gaps regarding age and gender in each country surveyed.

In all the countries surveyed, women on average score lower in the digital literacy index than men. The youth in all countries have a higher score in the digital literacy index than the population as a whole.

The latter gap is quite promising, as the general level of digital literacy among the European population seems to augment in the years to come.

With lower statistical confidence, the data further shows a diminishing gap between the EU countries – the differences between countries are minor among the youth than among the whole population (figure 1.3) and the gender gap is diminishing too.

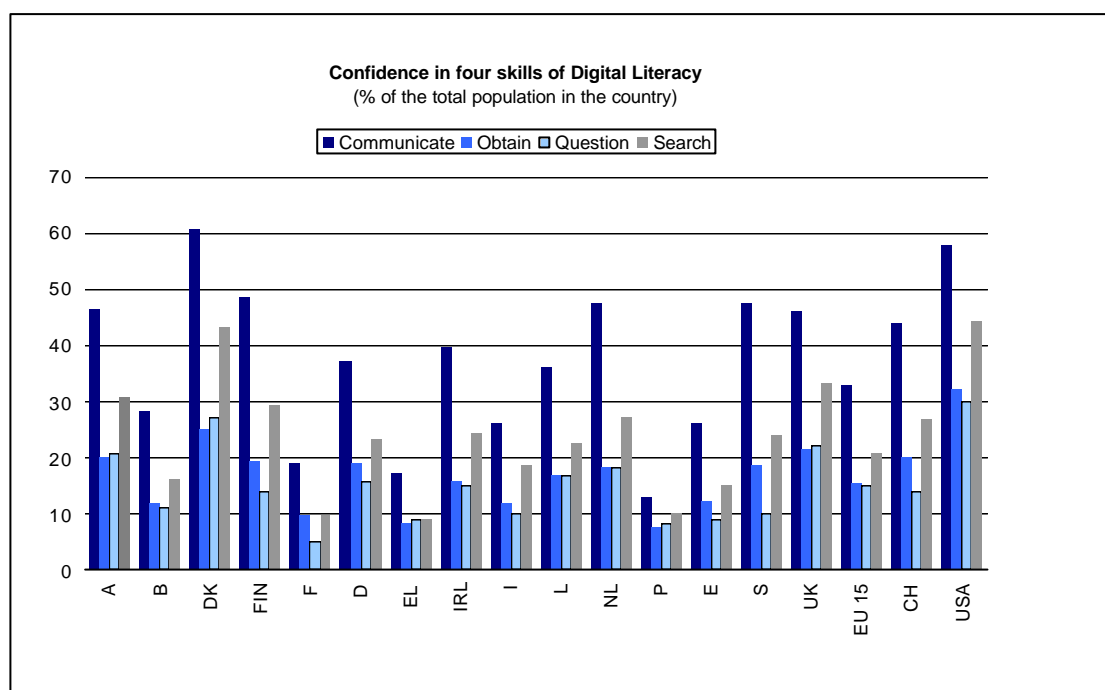
Figure 1.3: COQS index of digital literacy. National differences to EU-average. Total population and youth (age 16-24). EU member states, Switzerland and the USA



Source SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306), Youth (age 16-24) (N= 1878 weighted)

The COQS index of digital literacy is based on indicators of the four skills mentioned above; i.e. communicating with others, obtaining (or downloading) and installing software on a computer, questioning the sources of information on the Internet and searching for the required information. Out of these, the number of respondents being very confident in obtaining and installing software on a computer and questioning sources of information obtained on the Internet is lowest. These skills are the most demanding; the first in terms of technical knowledge about the computer, the second in terms of analytic skills. It is therefore not surprising that the lowest share of the population is confident in these skills. Nevertheless this indicates that both technical skills and analytic/critical skills and competencies should be emphasised in activities for upgrading the digital literacy skills of the population.

Figure 1.4: Confidence in the four skills of digital literacy. % of population, which is 'very confident' in the activity. Separated into countries and activity



Source: SIBIS 2002, GPS base: All respondents (N=11832), EU 15 (N=10306)

Students' use of e-learning is seen as an indicator of the level of integration of ICT in education. In the SIBIS survey, respondents who were still studying were asked if they had been using electronic materials (e.g. CD-ROM, internal computer systems at the school/university or through the Internet) in the course of their studies.

Among all students, 44% had used e-learning materials within the last four weeks before the survey. With the basis in students who had actually used electronic equipment within the last four weeks, a little over half of the students (53%) had used e-learning materials for studying within the last four weeks (see table 1.1).

Table 1.1: Students' use of e-learning. % having used e-learning material within the last four weeks. EU15 average and EU15, USA and Switzerland

	Use of e-learning material the last 4 weeks			
	Respondents still studying		Respondents still studying <i>and</i> having used electronic equipment within the last four weeks	
	%	N	%	N
EU 15	44%	1373	53%	1152
EU15, USA and Switzerland	44%	1687	52%	1437

Source: SIBIS 2002, GPS Base, All students and students, which have used computer etc. within the last four weeks.

At national level the number of respondents in the SIBIS survey was too small to enable conclusions regarding country differences in students' use of electronic learning materials.

1.3 Gaps – missing points in the survey and topics for further study

Due to the population of students being small in the General Population Survey, the evidence about digital literacy for specific educational levels is still missing. In order to evaluate the level of digital literacy as an outcome of educational activities a targeted survey of students (or pupils) should be carried out.

Regarding the four other sub-topics of education identified in this report (see below) there are still gaps in indicator development. Some have not been covered by SIBIS as more targeted surveys or interview methods need to be used (surveys addressing students, teacher/head teachers or central educational administrators). For others further research in the area of definitions and concepts is a prerequisite for indicator development.

'Flexible institutions and virtual mobility' are important institutional frameworks for using the opportunities brought by the use of ICT and are characteristic of an Information Society. Indicators for measuring the frameworks are still to be developed. As a starting point, measurement of the status of capacity/enrolment and institutional arrangement of distance learning has tentatively been discussed in a student's perspective and an institutional perspective. A promising ongoing project, the DELOS project (Developing a European eLearning Observation System) is starting to gather a long list of indicators on this specific topic. Definition of distance learning, types of courses, etc., into new typologies could be inspired by the work of VOCTADE (vocational training at a distance in the European Union).

Regarding *'Materials and sources – Content'*, the first identified gap is if availability and quality of content is a barrier for use of ICT and in teaching. Furthermore, as input regarding development of content, a positive evaluation of the content, qualities of any barriers, as well as an indication of which types of content are used with positive results would be highly interesting especially for content providers and educational institutions.

There is a gap in indicators about the quality of *'training for practising teachers'*. This concerns e.g. the content of the formal ICT training courses of practising teachers. In this regard, the possible shift in focus from the operational, technical aspects of ICT towards the didactic or pedagogical aspects of use of ICT in teaching should be the subject of analysis. For further research, this should be brought even further: seeing training as formal and informal learning, in accordance with the life-long learning approach. The level of ongoing learning practises and routines in educational institutions – formal as well of informal – will be of importance for maintaining and developing competencies among teachers.

With regard to *'Integration of ICT in curriculum'*, a scarcity of indicators on the didactic/pedagogical changes in relation to implementation of ICT has been identified. However, implementation of ICT is just part of the emerging new concepts of learning in the Information Society. Therefore, the next step in further development in this regard would be to indicate changes in the students' working relations – e.g. definition of class, networking with other students within the school or outside the school. Another aspect would be changes in subject definition (e.g. subject integration in curriculum). This involves changes in organisational structures and the institutionalised structures of teaching.

Finally, the perspective of *'Networking between educational institutions and public/private co-operation'* is important in developing the Information Society in Europe and is hardly covered by existing indicators. In a narrow sense, it concerns co-operation focused on development of content for e-learning. In a broader sense, networking is a basic element of the Information Society itself – regardless whether the subject is development of content or development of new courses/new teaching

forms. In both cases, very clear definitions on co-operation and networking need to be developed in order to get reliable and comparable data. A few indicators have been tentatively developed for interviews with national experts or central administrators as target group, but were beyond the scope of the SIBIS surveys. Nevertheless, this is an important field to research and measure as an indication of a very central characteristic of the Information Society as a 'Networked world'.

In a broader sense, the research showed the need for indicators of the Information Society in education – not necessarily directly related to use of ICT. This concerns changes to educational principles, the basic concept of learning, competencies among teachers and students/pupils, and last but not least institutional changes related to both organisations and institutionalised understandings and meanings.

Elements of institutional changes can be seen in the four sub-topics mentioned; as development in didactic methods, content of curriculum, the network organisation of school and teacher interaction – internally as well as externally – and the school as a framework for continued learning for practising teachers. An approach to the institutional changes in schools might be a promising way to develop the understanding of changes toward the Information Society within education and therefore an important process to measure statistically.

At the individual level, a central indication is the outcome of the new methods, structures, etc., into students' competencies, i.e. "digital literacy". An elaborated understanding of digital literacy would emphasise social and cross curriculum competencies such as ability to work in project groups, evolving strategies for problem solving, planning and managing project processes, etc.¹ A further step in measuring the digital literacy in the broad sense, as literacy for the Information Society, would therefore be to conclude on a broader definition of digital literacy and construct indicators based on the(se) definition(s).

Several ongoing large international projects are working in this direction, though not with digital literacy as an explicit goal:

- ETS, Educational Testing Service, has convened an international panel to examine the need for measures of ICT literacy.
- The OECD/PISA project surveying knowledge and skills of 15-year-olds in the principal industrialised countries three times between 2000 and 2006.
- The SITES project (Second Information Technology in Education Study) in the framework of IEA, International Association for the Evaluation of Educational Achievement. The study is based on an understanding of a changed role of the individuals (teachers, students and administrators) as well as of the institutions (schools) in the transition from Industrial to Information Society.

1.4 Conclusions

The topic "Education" has been divided in the context of SIBIS into five sub-topics:

- Digital literacy
- Materials and sources – availability of content
- Training of practising teachers
- Integration of ICT in curriculum

¹ These qualifications are not directly related to the technology per se. One therefore could discuss the relevance of the focus on the word *digital* in digital literacy. In lack of better concept, the term digital literacy in broad sense is maintained.

- Flexible institutions and virtual mobility – distance learning enrolment and capacity.

Within the latter four sub-topics, supplementing indicators to other existing indicators have been discussed. However these have not been further developed, as they did not fit into the survey methods chosen in the SIBIS project.

Digital literacy, defined as confidence in four types of skills, is an area where Europe is lagging behind the USA in almost all areas – measured using the COQS index as well as when using three out of four of the component indicators.

Furthermore, there are huge differences in the general level of digital literacy between EU countries. Using individual skill indicators, the share of persons who are very confident in the skill is three to five times higher in the highest scoring country than in the lowest scoring country. Also measured in the COQS index of digital literacy, there is a factor 3 difference from the highest to the lowest national average index value. The gap between countries is reflected by a similar gap between genders. On average, in the EU the index value for women is only two thirds of that for men.

In this situation, it can be seen as a positive sign that these gaps are likely to close gradually in the future. If the results for today's young citizens are taken as an indicator for future developments, the situation looks much brighter:

- The level of digital literacy is increasing remarkably.
- The national gap, e.g. differences between the national average level of digital literacy, is diminishing.
- The gender gap is diminishing. The gap between average COQS index value of men and of women is diminishing.

Seen in this light, European countries are on the way to preparing for the Information Society, though there is arguably still a long way to go.

Regarding students' use of e-learning, almost half of the students indicate that they use e-learning materials at least once a month. This indicates a relatively wide-spread use of e-learning.

Looking at the statistical measures tested, the indicators about digital literacy seem to be a good first step in measuring competencies for the Information Society, or digital literacy in a simple approach. The indicators move from simple technical skills to some of the (cross curriculum) competencies which will be strongly emphasised in the Information Society. The results from the pilot survey indicated that the module developed is feasible and provides valid and highly relevant data.

2 Introduction

2.1 Definition of the topic area Education

2.1.1 Problem description

In the transition of Europe into the Information Society, the educational system is a key point as the Information Society is seen as a knowledge economy.

The educational system will have to adapt to a knowledge economy both in terms of organisational settings, infrastructures and partnerships, pedagogy, curricula and teachers' qualifications. Also users of education at all levels and ages will need to develop another mind-set, moving from an instruction-based understanding of education to a paradigm, where the individual most likely will be expected to take much higher co-responsibility for identifying and continuously developing his/her skills basis in a variety of ways and settings. Likewise, firms and institutions are in the process of adapting to a business environment where skills and knowledge play a much more central role in overall economic performance.

Whether we talk about policy developments related to educational systems or the adaptation process of the individual, firms and organisations – ICT is viewed as a critical enabler.

For analytic reasons, in this context education is understood as a formally institutionalised process of knowledge transfer and knowledge development, as opposed to informal learning arrangements taking place through various community of practice arrangements, on-the-job training and peer learning. (This part is dealt with in the topic "Work, Skills and Employment"). This has some implications on the formulation of indicators. They tend to focus on institutions and institutionalised learning rather than learning in the learner's perspective, which would be the natural in an understanding of learning as a life-long project.

At the present stage of research on the development of the Information Society in Europe, the development of an ICT infrastructure in the educational system is relatively well measured in comparative data sets (e.g. Eurydice, Eurostat, Eurobarometer). A number of projects focus on developing indicators and measure use of ICT and consequences in a single country or most of the European countries. Due to the depth of the research, the data produced does not cover all European countries, or they will not be updated on a regular basis.

The educational indicators developed within SIBIS tend to be relevant for measuring the development of the Information Society, and at the same time they are so simple and general that they can fit into surveys conducted at a regular basis by all national statistical institutes or supranational statistical institutes. The data will then provide a general and comparable information on development of the Information Society in Europe, which can be updated regularly.

2.1.2 Framework for assessing the area

The concept of 'Education' is changing. From the formal and pre-defined curriculum in the industrial society, education today is redefined as life-long learning in the Information Society. Life-long learning certainly reflects a new understanding of the need for education in society. The "redefinition" seems to be the conceptual answer to the increasingly complex needs and possibilities for development and learning in the Information Society. The concept life-long learning also corresponds with the broad political efforts and initiatives on developing education related to ICT in

individual countries, the European Commission, and other supranational organisations.

Whether we talk about policy developments related to educational systems or the adaptation process of the individual, firms and organisations to living, learning and working in a knowledge economy – ICT is viewed as a critical enabler. This constitutes the background for the development of new and supplementary indicators in the area of education.

Much of the policy debate on education for the Information Society has focussed on an extension of the definition of education in light of changes in from what has been defined from “*an old economy*” to “*a new economy*”. A trend in the new economy is that innovation cycles are getting shorter². This means on the one hand that all innovation and innovation related factors like human capital and education, skills and knowledge increase in importance throughout life, expressed in the policy focus on *life-long learning*. On the other hand, it also means that the nature of demands for skills and knowledge changes with greater focus on construction of new knowledge as a central educational domain rather than primarily focusing on acquisition of existing knowledge repositories. Furthermore, the complexity of problems faced increases vertically (more knowledge on the same subject) as well as horizontally (knowledge on other subjects).

The following table points out some key differences regarding education in the industrial society and the knowledge society.

Table 2.1: Key Differences Regarding Education in the Industrial Society and the Knowledge Society

	Industrial society	New Economy/Knowledge Society
Education structure	Learning of practical skills and factual codified knowledge. Separation of professional and practical skills. School/practical training dichotomy	Learning codified knowledge as well as constructing/discovering new knowledge domains in areas of high innovation. Practice/theory dimensions change through experimentation, testing....
Education goal	Educated/trained for a specific job/trade. Profession concept	Acquire deep and broad competencies with a view to job and competence mobility in an unstable and ever changing job market
Teaching form	Instruction, practical training, classroom, institutional setting	Construction, discovery, simulation, analysis, evaluation in relation to different problems and realities – anywhere, anytime
Organisation of teaching/learning	Subjects class, institutions are the organising elements	Problem areas, multidisciplinary, multiple resources is the given context -
Teacher's role	Professional authority. Conveys knowledge	Supervisor, tutor, “devils advocate” guided learning towards enhanced autonomy
Didactical space	Teacher's responsibility: motivate and activate student	Student shares responsibility for the development of the learning trajectory.
Learning processes	Teacher responsible for reaching determined goals. Goals determined from the outside. Focus on results	Student and teacher co-operate to define and reach goals. Learning to learn is a central process goal.

Source:Hanne Shapiro, “Pædagogisk Grundlægsnotat,” Reform 2000, 1999, Danish Ministry of Education.

² IPTS (2000): The new Economy

So far, the main part of the indication and data on ICT in education has focused on the readiness in form of number of computers and connections in schools. However, *“No miracles derive from the mere presence of ICT in a school... Instead, ICT can be a powerful lever for change when new directions are carefully planned, staff and support systems prepared, and resources for implementation and maintenance provided.”* (Venezky 2002 p. 40.). The indicators will thus emphasise the institutional readiness or the processes enabled by ICT.

2.2 Identification of the Stakeholders and their Interactions

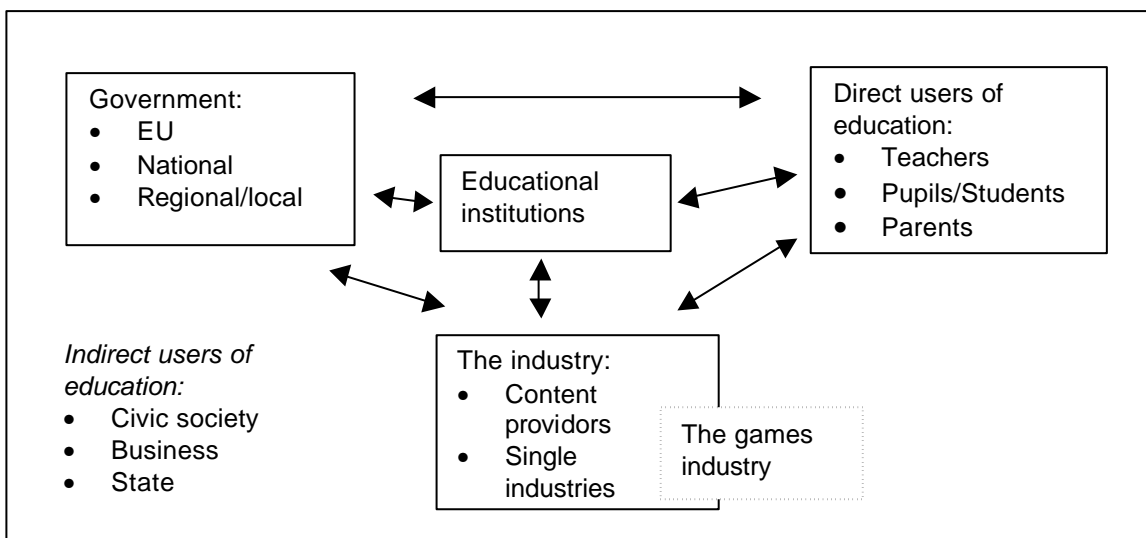
The educational stakeholders are no longer limited to the public sector and the institutional school system alone (if they ever were). Every institutionalised and social context a person gets involved with through all stages of life could be regarded as an educational stakeholder. This could be as a direct participant in the education process: user of candidates (as labour force) from the educational institutions or framework for motivation for learning and/or learning environment. E.g., sectors not directly related to education play a role in motivating to learn about ICT. Not least the games industry, digitised toys as well as mobile telephones seem to be a major driver in children's interest in computers and ICT in a broader sense. In this regard, here the narrow perspective of stakeholders as those direct involved in education is taken.

Table 2.2: Identification of Stakeholders in Education

Directly involved stakeholders	Policy makers	Supranational-, national, regional and municipality policy makers and authorities Political administrators – ministries etc.
	Educational Institutions and their direct users	The Schools at primary, secondary and tertiary level. Administrators Pupils and students Teachers (and their trade Unions)
	Direct users of education	Teachers Students/Pupils Parents
	Business	Content providers Single industries <div style="border: 1px dashed black; display: inline-block; padding: 2px;">Games industry</div>
Indirect stakeholders	Civic society Business State	General users of education output; <ul style="list-style-type: none"> • Candidates • General educational stage of society • Welfare from economic output... Framework for formal and especially informal learning

The relation between the stakeholders can be illustrated in the figure below:

Figure 2.1 Relation between the main (direct) stakeholders of education.



Source: SIBIS, (DTI) 2002

The four main groups of direct involved stakeholders are the educational institutions, the policy makers at regional, national and supranational level, the education users and the industry, especially the content industry.

The educational institutions themselves are important stakeholders (primary, secondary, as well as tertiary school level) as the organisational and physical frame for the formalised education. This concerns the administrative level – budgets and organisation of technological infrastructure and support, as well as the educational practices, which are institutionalised here.

The users, or inhabitants, of the education institutions: pupils, students and teachers are also important stakeholders in relation to ICT in education. The involvement of parents in the school includes them as direct involved stakeholders as well. Training and learning can only take effect if pupils and students want to learn and are motivated. The family takes part in developing this basic motivation, and in many cases parents are also involved in the teaching at school. Despite of more emphasis on learners' co-responsibility for learning, teachers play an important role as the carriers of tools (use of ICT) and understanding of the Information Society, as they do in terms of other subjects and in general in the socialisation in the educational system.

At the political level use of information technology in education is a central political goal. Huge sums have been invested in development of infrastructure and new emphasis has been placed on change of administrative and pedagogical practices within the educational system.

At the high political level the general development of the integration and use of ICT, has a high priority as well as the measurement of outcome of initiatives. The data needed here is general and internationally comparable.

Ministries of education or local authorities need more detailed information than the latter group. In order to identify gaps and new needs for development (in order to make detailed plans for further political programs and initiatives), this administrative level needs information that is more detailed (e.g. broken down on age bands, educational level, subjects, etc.). Quantitative data from surveys will probably serve

as tools for identifying fields for further investigation (qualitative data) or highlight development in known fields.

Finally, industry is an important stakeholder. Large commercial IT players such as IBM, Microsoft, Arthur Andersen today collaborate with educational institutions, from primary school to corporate university, to develop new learning concepts. In the future, we can expect that public-private collaborating will become even more common in this and other regards.

As an important 'shadow' industry, the games industry plays an important role for the motivation of pupils and students for use of ICT, as well as of informal learning of digital competencies.

All sectors can be regarded as indirect stakeholders of education. They are users of education directly by employing the candidates, by the stage of knowledge and enlightenment based on the general education, and equally important as a framework for informal learning.

2.3 Overview of the Report

This report presents the research on the innovative indicators on education carried out by the SIBIS project and the results of the testing of those indicators in the SIBIS general Population Survey. The survey was carried out in the spring of 2002 in the 15 EU member states, Switzerland and the USA.

Chapter 2 introduces the topic by identifying the problems dealt with within the topic education and the definition of the topic. Furthermore, the chapter contains a description of the main stakeholders and their interactions.

Chapter 3 presents the framework used to develop the SIBIS indicators and discusses the motivation for their development and their contribution to understanding of development within education.

Chapter 4 presents the survey results and a compound indicator developed to provide synthetic measure of the field of analysis.

Chapter 5 discusses the gaps that are still remaining in indicating the sub-topics of education and fields of further research of interest.

Chapter 6 outlines the main conclusions resulting from research.

3 Identification of the Indicator Framework and Hierarchy

In order to break down the topic into manageable pieces, five sub-topics are defined based on analysis of scientific research results and analysis of policy documents, demonstrating the scientific and political relevance of the subjects.

In searching indicators of the sub-topics, it became evident that the educational systems differ substantially across Europe and even across regions within the individual member states (e.g. regional educational systems in Northern Ireland and Scotland within the UK). This is caused by the fact that education is a central part of the national system of socialisation, identity, etc. In this relation, however, a consequence is that comparable statistical data at specific levels is hardly available, due to the very different institutional settings and goal of education in the regions and states of EU.

Therefore, in most of the sub-topics there are a number of slightly different indicators on the same principal subjects from many states. However, different indicators and different framework of surveys mean that they cannot be used for comparing through the EU states.

In this situation, new indicators on educational use of ICT and consequences of ICT in education are developed within the SIBIS project. They are meant to be surveyed throughout EU, and therefore need to be able to cover the many different institutional systems. Therefore, the SIBIS indicators need to be more general than many of the existing indicators addressed for a specific regional/national educational system.

3.1 The sub-topics of education

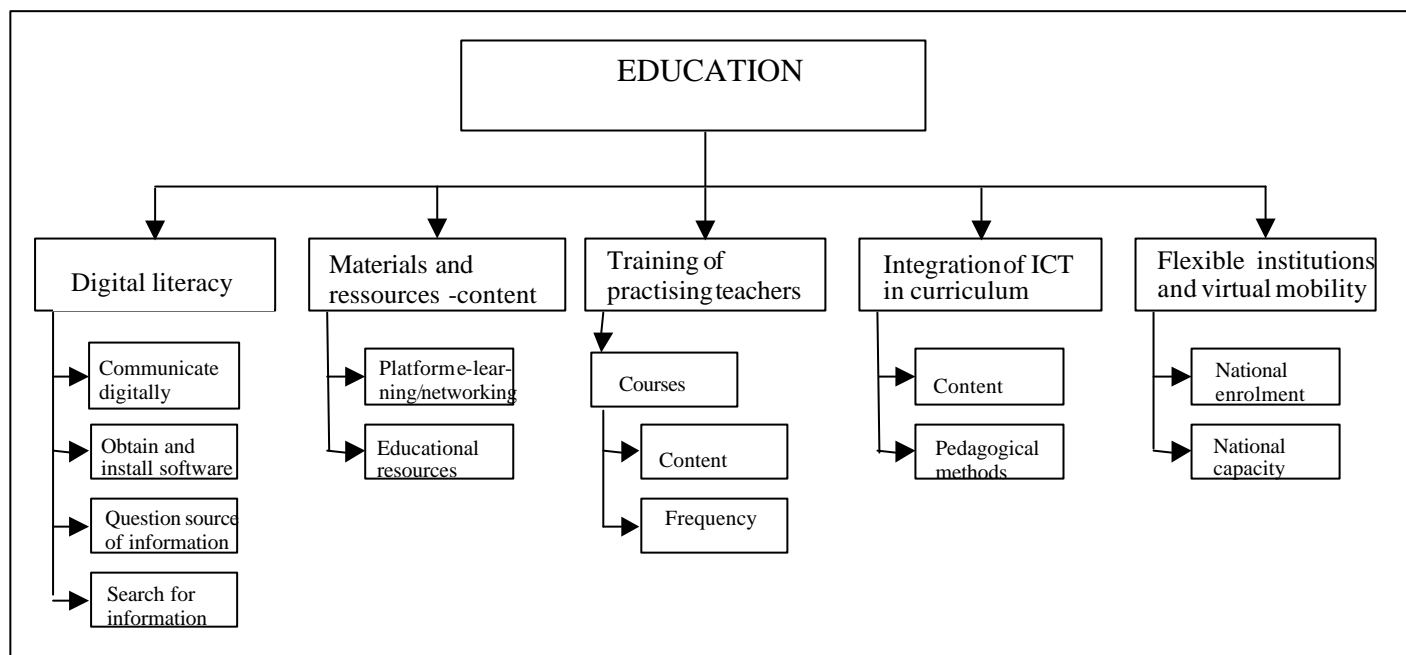
Five sub-topics of education are defined based on an analysis of scientific research results and analysis of policy documents, demonstrating the scientific and political relevance of the subjects. Of these a new set of indicators are developed in one sub-topic, while indicator supplementing sets of existing indicators (but not data due to the national specify most indicators) in the other four sub-topics.

The five sub-topics of education is:

- *Digital literacy.* Skills of being able to read and write are absolutely necessary in the modern society. Equally, a basic necessity in the knowledge-based society is skills of communicating and working digitally, which is called “digital literacy” in this paper. Measuring the digital skills is seen as an outcome indicator.
- *Materials and sources – availability of content* (platforms for e-learning and educational resources). The availability of content is a pre-condition for developing and implementing e-learning and use of ICT in the educational system.
- *Training of practising teachers.* The value of ICT infrastructure in the educational system is ultimately limited if teachers do not have the necessary skills and qualifications to teach the use of ICT and to include ICT in their teaching practice. A key issue is therefore the training of teachers to make them familiar with relevant software, to enable them to plan and manage ICT incorporation into lessons, activities, and sequences to support educational objectives.
- *Integration of ICT in curriculum.* To have any effect on education, ICT should be implemented in the curriculum as plans, and not least, as practices. In this relation, the focus is on consequences in pedagogical and didactic practises of ICT.

- *Flexible institutions and virtual mobility – distance learning enrolment and capacity.* Organisation of learning in more flexible ways is a central possibility in the use of ICT, but there is still a lack of common indicators and they are poorly described statistically. At this stage, the vision is to get data on the extension of distance learning as part of formal education and the capacity of virtual education as part of formal education.

Figure 3.1: Logical tree of sub-topics in Education



Source: SIBIS, (DTI) 2002

3.2 Selection of indicators for SIBIS GPS

In selecting the indicators to be tested in the SIBIS survey, two factors were central:

- Questions, which can be expected to be answered in a meaningful way given the approach of telephone survey (methodology).
- The specificity of the target group regarding education. In a general population survey, only a fraction of the total sample is related to the formal educational system as teachers/administrators or as pupils/students (target group – definition of sample).

The first factor excludes a number of indicators, which more or less presuppose qualitative methods. These were identified by analysing statistical gaps, but were not further developed due to the need of methods not included in the SIBIS approach.

But this factor also excluded one of the originally proposed questions for the digital literacy index, as it was seen as too long and complicated to be put in the general population survey.

Following this, the second discriminating factor is the target group of the surveys:

- Specific knowledge of activities in the educational system is required for filling gaps regarding education. This could be as external observers or mainly as participants in the educational system – administrators, teachers, students, and pupils. As the target groups defined for the surveys are general (due to the

various topics to be addressed in the surveys), the number of participants and observers in the sample is limited, and provide insufficient data to base any meaningful statistical analysis on.

- Only people aged 16 or more are surveyed in the GPS for legal reasons. Therefore, most of the groups actually participating in the formal educational system (pupils and students) are excluded from the survey. This limits the scope of the comparability of school levels, which particularly has consequences for the sub-topic digital literacy.

Due to the specificity of the topic – formal education – most sub-topics and relevant indicators can only be answered with specific knowledge of and/or experience in the educational sector. Consequently these indicators and sub-topics can not be included in the two SIBIS surveys. These should either be included in surveys focusing on students or pupils, or they should be used in surveys among school/university administrators preferably in direct interviews.

The sub-topic digital literacy focuses on general competencies or skills. In relation to the topic focussing (formal) education, the indicators can be tested in the general population survey, bearing in mind that the possibility to evaluate the standard and implementation of digital literacy in the formal educational institutions is impossible as the population of students and pupils is too small.

Table 3.1: List of indicators on education developed in the SIBIS project

Sub-topic	Indicator Name	No.	Split by	Existing indicators of relevance for SIBIS ³ .	New SIBIS ⁴	
					Select ed ⁵	Not selected
Digital Literacy	Communicate with others on the Internet Using e-mail to communicate with others	1a	<ul style="list-style-type: none"> • Country • Age • Gender 		X	
Digital Literacy	Communicate with others on the Internet Using Internet chat-rooms to contact other people	1b	<ul style="list-style-type: none"> • Country • Age • Gender 		X	
Digital Literacy	Communicate with others on the Internet Using the Internet to make telephone calls	1c	<ul style="list-style-type: none"> • Country • Age • Gender 		X	
Digital Literacy	Communicate with others on the Internet Creating a personal web/Internet page	1d	<ul style="list-style-type: none"> • Country • Age • Gender 		X	

³ From published source

⁴ Developed within the project

⁵ Included in the survey

Sub-topic	Indicator Name	No.	Split by	Existing indicators of relevance for SIBIS ³ .	New SIBIS ⁴	
					Select ed ⁵	Not selected
Digital Literacy	Obtain and installing digital tools	2	<ul style="list-style-type: none"> • Country • Age • Gender 		X	
Digital Literacy	Question the source of information collected digitally	3	<ul style="list-style-type: none"> • Country • Age • Gender 		X	
Digital Literacy	Search for information on the Internet	4	<ul style="list-style-type: none"> • Country • Age • Gender 		X	
Digital Literacy	COQS-index of Digital literacy	5	<ul style="list-style-type: none"> • Country • Age • Gender 			
Materials and sources - Content	Lack of satisfactory e-learning/networking platforms as reason for teachers not using Internet in education	6		X		X
Materials and sources - Content	Lack of satisfactory content in educational ICT resources as reason for teachers not using Internet in education	7		X		X
Training of practising teachers	Practising teachers' ICT training	8		X		X
Training of practising teachers	The content of practising teachers' ICT training	9		X		X
Integration of ICT in curriculum	Development in pedagogical methods resulting from new possibilities offered by ICT	10		X		X
Integration of ICT in curriculum	Students' use of e-learning	11			X	
Flexible institutions and virtual mobility	Extension of distance learning as part of formal education	12		X		X
Flexible institutions and virtual mobility	National capacity of virtual education as part of formal virtual education	13				X

3.2.1 Digital Literacy

Being able to read and write is absolutely necessary in modern society. In the knowledge-based society, being able to communicate and work digitally is also basic necessities. Digital literacy is as important as reading and writing. All groups of society, regardless of age, gender, educational background, etc., must have the opportunity to take part in the societal processes of living, working, and learning to avoid any kind of social exclusion or biases on the labour market.

In a broad understanding of digital literacy, the concept is seen as competencies necessary for operating in the Information Society⁶. The core of the competencies in digital literacy is what in educational research is often called 'cross curriculum competencies'. These include 'soft' competencies which are not directly connected to ICT, but rather brought to the fore by the technical possibilities of ICT and the general development of the Information Society. Currently, the OECD/PISA project, in particular, provides important data on this, based on elaborated observations and tests of students (OECD 2001) as well as the Second Information Technology in Education Study (SITES project) (Pelgrum & Anderson 1999).

In this relation, a narrow approach to digital literacy is chosen. The focus is more narrowly on digital skills, as confidence in using the Internet for certain functions and having a minimum of tools for assessing the value of information provided on the Internet. This data can be gathered within the survey methods of the SIBIS project, which is a model more likely to be conducted EU-wide on a regular basis, than very in-depth methods such as e.g. the PISA and SITES projects mentioned above. This narrow approach-data provides information in itself, but also functions as a supplement to surveys based on the broader understanding of digital literacy.

Four indicators of digital literacy are chosen:⁷

- Communicate digitally. Communicating digitally and thereby being able to participate in networking and other interaction locally or over distances by using the Internet.
- Obtain (find) and install digital tools. Being able to find, download and install digital tools and programs allows the individual to develop a digital toolbox for his or her own purposes. This could be completely new programs or supplements to the major programs, such as office packages, etc.
- Question the source of information from the Internet in regard reliability. The problem in relation to the Internet is to select among the huge amounts of information available. The skill to be critical in relation to the information on the net is therefore important in an individual perspective as well as in a societal perspective⁸.
- Search information needed. Skills in using the Internet as a source for information.

The indicators are seen as different skills, which are all parts of the digital literacy. They are all related to use of the Internet, but differ in character. Searching the

⁶ As discussed in chapter 5, one could discuss if the broader approach of digital literacy should be regarded as a 'Information Society Literacy'.

⁷ This understanding is close to the understanding of the discussion paper from the eLearning summit on digital literacy, European Commission 2001: Digital Literacy workshop, A discussion paper, Brussels 10-11 May 2001.

⁸ If the individual is not able to distinguish between relevant and irrelevant and between trustworthy and untrustworthy information the individual will take wrong decisions or not use the net for information search at all. In a societal, democratic perspective, the ability to questioning information is critical to avoid misinformation and propaganda in political terms.

Internet and sending e-mails are relatively uncomplicated activities when using programs with high user friendliness. Downloading and installing programs is more complicated and demands a better understanding of how the software is structured.⁹ Questioning the source of information has a technical implication, but a more important implication is the competence of being critical about information. In this relation being critical to the source of the information is the first step in a general critical assessment of information provided.¹⁰ The skill of digital literacy therefore bases itself on technical confidence but also on the 'cross curriculum competencies'.

The data is based on a self-evaluation. This means that there is bias in differences regarding how to evaluate oneself and one's own competencies. The biases are partly reduced in the survey by using a question of actual use of the Internet within the last 12 month as a filter¹¹. Only those having used the Internet within the last year were given the self-evaluation questions. In this way, persons who *feel* confident without having tried are eliminated from the sample. In this process, also persons with competencies more than one year old are eliminated from the sample. However, due to the fast development and obsolescence of information technologies, this is not regarded as a problem. Furthermore, there might be systematic biases regard national differences¹², as well as gender differences.¹³ Despite recognising this problem, no systematic way to deal with this has been found. The risk should be regarded in interpretation of the data.

The indicators of digital literacy have been tested in the General Population Survey. It is regarded as fully accepted regarding the formulation of the questions. Within the group of persons having used the Internet within the last 12 month, only few made a spontaneous remark not to 'know what this means'. This indicates that the questions in themselves are understood. The questions are not too complicated or complex to be understood.

The indicators of digital literacy are transformed into the COQS index of digital literacy. The index is proposed to aggregate a measurement of digital literacy, which (as mentioned above is relatively closely related to the use of ICT and the Internet. The compound indicator is described in chapter 4.

The data on each of the indicators of digital literacy and the compound indicator will be most interesting at the policy level for comparing the general output of activities, programmes, etc., in developing digital competencies in the population generally and among the youth in the formalised educational system. The data can be used as an

⁹ This interpretation is backed up by the GPS test. 90% of persons being very confident in obtaining and installing software are very confident in communication. Only 40% of the very confident in communication are confident in obtain and install software. This indicates a growing complexity. They are not sub-groups of each other though. Some persons are very confident in obtaining software, but fairly confident or not confident in communicating via the Internet. Source: SIBIS 2002, GPS survey.

¹⁰ To question the source of information is the first step in being critical to the information provided. This further implies reliability analytic skills to identify the problems and central issues in the information, identify interests and to find possible alternative views at the issues.

¹¹ SIBIS GPS questions A7 and A8.

¹² An example of a possible bias in this relation, is the case of Denmark in the PISA/OECD survey. The Danish youths gave themselves much better grades in a subjective self-evaluation, than showed by the following tests (OECD 2001)

¹³ A Norwegian survey consisted of an objective test and self evaluation of a group of pupils. The difference between the objective and the subjective result was related to the time used in front of a PC. For girls the self-evaluation result was lower than the objective result (at least up to 15 hour a week in front of the PC). For the boys the subjective and objective result balanced up to 5 hour use of PC a week. The rest of the boys (the majority) saw them selves as better than the objective test showed (Utdannings och Forskningsdepartementet (2002).

indicator for evaluating previous activities and as an indicator of the general level at which new activities and initiatives should be based.

Broken down in age bands, the data would be a general indicator of the output of activities in the specific levels of education. The data provided by the SIBIS GPS survey cannot be used for this.

The single indicators could be of interest for commercial content providers, schoolteachers, etc., depending on the actual discussions going on. For example, providers of services based on specific communication media on the Internet would be interested in the national differences and levels of confidence in using the actual media.

3.2.2 Materials and sources – contents

A precondition for developing and implementing e-learning in the educational system is the availability of software that supports the new ways of learning, in technical terms as well as content. Therefore, a central issue regarding education in the Information Society is the development of sources and materials for e-learning.

In this relation, focus has been on the availability of content in relation to the schools: The personal platforms at schools, educational resources and platforms for e-learning or networking.¹⁴

Availability could be measured in absolute terms, in relation to subjects. However, it seems more relevant to ask the teachers whether the supply of high-quality content is good enough, or rather if lack of high-quality contents is a barrier to using ICT in teaching. Two indicators therefore have been proposed as a supplement to an already completed survey. Following the existing structure of the survey, the questions are directed towards those teachers who do not use the Internet or broad ICT in teaching. If they do not use ICT, then is lack of relevant and high-quality e-learning platforms or educational resources the barrier?

These questions focus on barriers towards use of ICT in teaching. Consequently, they will tell if the content is available for the teachers, but not why the teachers feel this lack. The questions should be included in a survey with other indicators regarding the school budget for ICT, which could indicate whether the budget is a reason for this barrier. Other possible reasons could be an actual lack of platforms/educational resources, or simply lack of knowledge about their existence.

The indicators are not tested in the SIBIS surveys, as the target groups are not represented in sufficient numbers.

The indicators are expected to be of relevance at the political level as well as in the content industry:

- At the political level, the indicators will show whether development (or marketing) of content is a relevant subject for investments or programmes for speeding up use of ICT in education.
- The content industry can use these data for a general orientation of demands or needs of content. The industry, however, is expected to need more detailed information for directing development and production of content.

¹⁴ In surveys of infrastructure of the schools often include the internal support services at the school. This factor is therefore generally covered statistically and out of focus here.

3.2.3 Training of practising teachers

The value of ICT infrastructure in the educational system is ultimately limited if teachers do not have the necessary skills and qualifications to teach the use of ICT and to include ICT in their teaching practice. Therefore, it is a key issue to include ICT in the training of teachers to make them familiar with relevant software, to enable them to plan and manage ICT incorporation into lessons, activities, and sequences to support educational objectives.

Including ICT in the curriculum in the initial training of teachers is obviously important. However, equally important is continued upgrading of ICT competencies among practising teachers, because knowledge on ICT is very quickly out-of-date.

In this relation, two indicators are developed on the frequency and content of courses for practising teachers. The latter is increasingly important in order to implement ICT in the teaching (Venezky 2002)

- The frequency of ICT related courses for practising teachers within the last two years. Due to the fast technological development in ICT, courses more than two years old are regarded as of limited relevance.
- Among the teachers having participated in ICT related courses, an indication of choice of technical oriented or pedagogical/didactic oriented courses is desired. This is expected to indicate whether learning new programs is the focus of the schools, or new learning practices (pedagogical practices) is in focus, which can be seen as the step after learning the technology in itself.

The indicators are not tested in the SIBIS surveys, as the target group is not represented in sufficient numbers.

The specific indicators must be included in a broader survey, offering information about the school (level, budget, general use of ICT, etc.).

The indicators are expected to be of relevance for the general political level, particularly within the educational institutions and their actors.

- As a general political indicator focus on pedagogical methods in courses for practising teachers indicates a shift towards changing the learning structure and not only implementing the technology
- Within the educational institutions, the indicators can provide information for ongoing discussions of prioritisation of budgets as well as focus on subjects and way of structuring learning at the institution.

3.2.4 Integration of ICT in curriculum

An important condition for the development of ICT skills among pupils and students is the degree of integration of ICT with curricula at all levels. The first step to integrate use of ICT in curriculum is the formal integration as political intentions and changes of curriculum descriptions¹⁵. The second step is the actual use by practising teachers and the integration and consequences for 'pedagogical methods'. Use of ICT as digital books or typewriters, e.g. digital copies of existing technologies is a limited way to explore the ICT technologies. Changes in pedagogical methods indicate that the whole structure of teaching and therefore speed and especially the qualities of skills stemming from teaching are changing due to use of ICT. Consequently,

¹⁵ These parts are relatively well covered by indicators and data (e.g. By Eurodice).

changes in pedagogical methods can be seen as an intermediate output of use of ICT.

Some countries leave the choice of educational methods to the school or the individual teachers. Therefore, changes in the practised educational methods and learning concepts are not covered by general statistics. Some more specific surveys, however, have included this subject too, but they are not surveyed on a regular basis. One of these, the SITES-M1, has a quite elaborate section on curriculum and pedagogy. The empirical background of this is a question consisting of a list of 13 didactic/pedagogical methods (aspects of learning and teaching)¹⁶.

Two indicators of practical integration are new proposals in SIBIS:

- Students' use of e-learning as a direct indication of integration of e-learning in education
- Teachers' change of didactic/pedagogical methods in teaching as result of use of ICT.

The integration of ICT in curriculum should result in actual use of ICT in teaching and in the students' learning processes. A direct way to measure the degree of integration of ICT would be to measure the use of electronic learning materials by students, e.g. elearning. An indicator of students' use of elearning materials is tested in the SIBIS general population survey among respondents still studying.

The indicator of change of didactic/pedagogical methods following use of ICT is proposed to be implemented as a new question in the framework of the Eurobarometer flash teacher/head teacher survey. This was conducted in 2001 as a one in a time survey, but will be proposed to be surveyed on a regular basis.

The question proposed is an assessment by the practising teacher of the degree of changes in use of five specified methods, which are all closely related to the new pedagogical/didactic possibilities embedded in ICT. The five methods are: class teaching/instruction, individual work, collaborative working between pupils/students in the class, collaborative working between pupils/students in the class and external pupils/students and interdisciplinary projects

In this relation, change of pedagogical methods due to use of ICT is regarded as a positive development. Strong changes in use of the methods are therefore regarded as a high level of integration of ICT in curriculum, whereas no changes are regarded as a low level of integration.

Good or bad pedagogical methods cannot be defined per se (apart from methods from the old 'black school', learning by punishment and humiliation, etc.). The actual use of methods depends of the subject, the school level, the pupils, the institutional framework, etc. However, the four last didactic/pedagogical methods are more in accordance with the paradigm of the Information Society. However, in this relation no such distinction between methods is made. Nevertheless, the indicator shows which pedagogical methods increase by use of ICT, and which diminish. Furthermore, possible different uses of the technology in teaching between countries will be displayed.

The indicator is not tested in the SIBIS survey. The reason is that the question is specific to a certain population group. A targeted survey (as the proposed Eurobarometer flash of teachers and head teachers) is the way to get reliable data.

¹⁶ The teachers (target group) mark if the aspects were present at the school (not at all, to some extent or a lot), and if they were realised through ICT. Pelgrum and Anderson (eds.): ICT and the Emerging Paradigm for Life Long Learning. a Worldwide Educational Assessment of Infrastructure, Goals and Practices. e.g. the SITES.

3.2.5 Flexible institutions and virtual mobility – distance learning enrolment and capacity

In order to exploit the possibilities of ICT, flexible institutions and virtual mobility is regarded as politically important. Common indicators still need to be developed, not least because of the present heterogeneity of the European educational system, which forms a barrier towards virtual mobility; the status of courses from other universities in (or outside) Europe in the home university, how to evaluate and accredit courses, etc.

At this stage, it is the vision to get data on the extension of distance learning as part of formal education (the number of students in such study forms), and the capacity of virtual education as part of formal education. Two sets of questions are developed, which is seen as possible additions to existing surveys towards respectively students and educational experts or central school/educational administrators.

The student questions will indicate the number of formal education enrolments based on distance learning, the scientific area, the degree of distance learning of all and the institutional arrangement of the courses based on distance learning.

The questions for educational experts will indicate the number of educational places in formal virtual education and accredited courses. This is qualified by number of students, educational level, and scientific area. Furthermore, the institutional framework for distance learning is indicated: the degree of specialisation of virtual education and the degree of co-operation between educational institutions as basis for the virtual education and courses.

The indicators are not tested in the SIBIS survey due to the specificity of the questions directed to a small sub-population group.

4 Analysis of Data

Eight indicators are tested in the SIBIS GPS. One of these belongs to the sub-topic 'Integration of ICT in curriculum', while the rest is part of the sub-topic 'Digital literacy'. The result of the survey will be presented here as individual indicators and as an index indicator of digital literacy.

All indicators in this topic are primarily of relevance to citizens and society. However, as the businesses are a (central) part of the society and living in and by the surrounding society, most indicators will be of interest to businesses as well. The results can serve as a framework for general business and as indicators for further and more targeted surveys on specific issues.

4.1 Digital literacy

In the Information Society, where still more information and communication with individuals and institutions is digital, the ability to operate in a responsible and critical way on the Internet is essential for taking part in the societal processes of living, working and learning. To be digitally literate is here indicated by the ability to use the Internet for:

- Communicating with others
- Obtaining (or downloading) and installing software on a computer
- Questioning the source of information search on the Internet and
- Searching for the required information

In total this is expressed in the COQS index of Digital Literacy, i.e. a combination of these skills and is shown at the end of this section¹⁷.

Regarding digital literacy, three groups of the population would be of interest:

- The total population. This will allow measuring the national standard of competencies in the specific fields and later the digital literacy level. This can further be broken down in gender. This data can be regarded as an indication of status.
- The youth (age 16 to 24 year). The youth can be expected to adopt the new technologies fast. Focussing on the youth will thus indicate the possible level of digital literacy in the whole population as this generation grows up – indication of future status.
- Furthermore, data on the youth can possibly be seen as an evaluation indicator of output from ICT activities in the educational system.
- The number of respondents in the survey is limited compared to the whole population. The number of respondents among the youth group in each country differs between 69 and 196¹⁸. Statistics on this group is therefore less confident than data on the whole population. Nevertheless, data on the youth is used for discussion of future developments.

¹⁷ All indicator of digital literacy is based on self-evaluating of skills. See a discussion of bias in this relation in chapter 3.

¹⁸ With only 100 respondents, the level of usikkerhed is up to +/- 16% at a level of 90% significance.

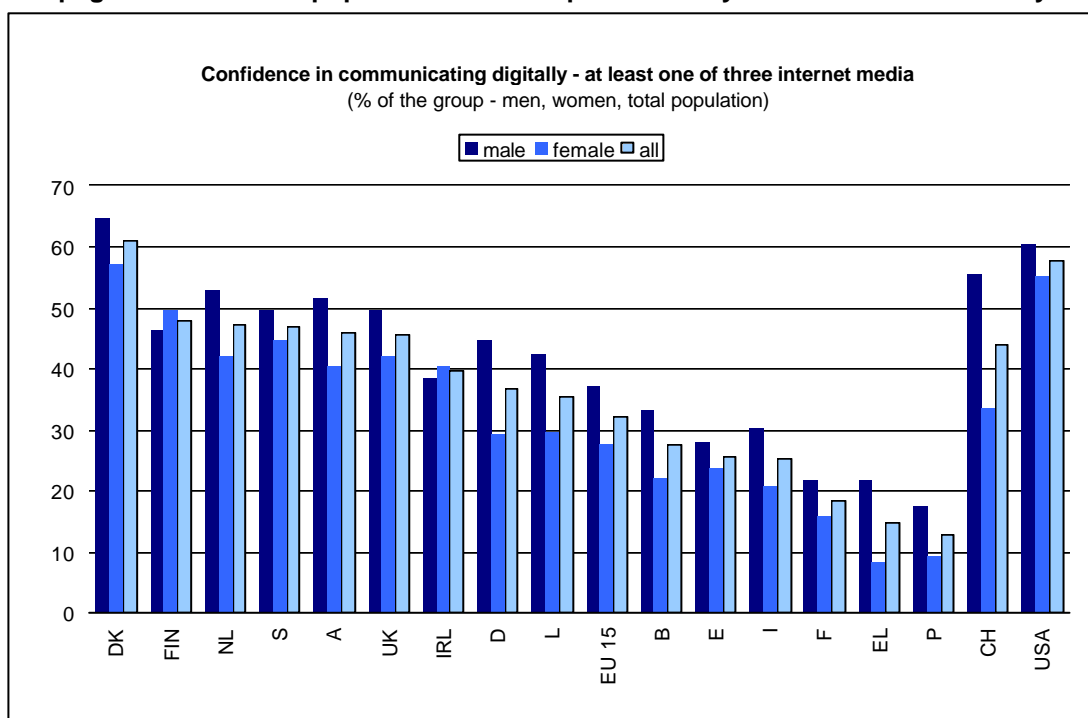
- Single age bands in the youth. To evaluate the outcome of ICT activities in certain levels of the educational system, the level of digital literacy in certain age bands would be needed (e.g. age 15 leaving primary school, 18 leaving secondary school and 24 tertiary school). Breaking the data set down in age bands at a national level leaves too few data to produce reliable statistics. This would need more targeted surveys or larger survey populations.

4.1.1 Communicate digitally with others

The Internet provides possibilities for very elaborate and fast communication, locally or world-wide if wanted. Various forms of communication based on the Internet are possible. In this relation, the ability to communicate digitally is operationalised by getting in touch with others via at least one of three Internet-based media: e-mail, chat rooms or creating a personal web page.

The person evaluates him/herself as 'very confident' in using at least one of the three Internet media is regarded as literate regarding to digital communication.

Figure 4.1: Share of national population, which is confidence in getting in touch with others via the Internet. Based on one of three media; e-mail, chat rooms or personal web page. % of the total population which expresses 'very confident' in the activity



Source: SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306).

Less than 30% of the population in the southern European countries, Portugal, Greece, Spain and Italy, as well as France and Belgium is very confident in communicating digitally. In the northern countries, such as Switzerland, United Kingdom, Austria, Holland, Sweden, Finland, Denmark, and in the USA 40-50% of the population is very confident in communicating digitally. Looking at the youth group, the same pattern is seen, though with much higher level of confidence (table 4.1). Especially Spain seems to break the tendency by having a high level of communication confidence among the youth group. A question for further analysis is why the Spanish youth group seems to have adapted use of communication on the

Internet-based media to a much higher degree than youth from other southern European countries.

Table 4.1: Ability to communicate digitally. Confidence in using one of three Internet-based media for communication (e-mail, chatroom personal web/Internet page)

Digital Literacy indicator: Communication with others via Internet								
Country	Total population				Youth (age up to and 24 year)			
	very confident	fairly confident	not confident	N total	very confident	fairly confident	not confident	N total
A	45.8%	7.5%	46.7%	500	87.3%	10.2%	2.5%	84
B	27.4%	16.7%	55.9%	585	48.3%	28.2%	23.4%	103
DK	60.8%	11.1%	28.2%	501	82.5%	13.7%	3.8%	53
FIN	25.6%	15.2%	59.2%	669	38.9%	24.0%	37.2%	93
F	47.9%	14.0%	38.1%	1000	73.1%	20.1%	6.7%	189
D	18.5%	16.6%	64.9%	1001	74.3%	14.7%	11.0%	159
EL	36.6%	13.8%	49.6%	505	30.7%	24.4%	44.9%	105
IRL	14.9%	11.8%	73.3%	500	63.0%	19.9%	17.1%	126
I	25.3%	13.2%	61.5%	1000	60.6%	23.0%	16.4%	136
L	39.6%	16.6%	43.8%	500	60.5%	29.9%	9.6%	89
NL	35.4%	15.2%	49.4%	530	75.4%	18.2%	6.4%	97
P	47.1%	18.9%	34.0%	500	37.9%	29.3%	32.8%	90
E	12.8%	13.0%	74.1%	1015	61.6%	26.4%	12.1%	178
S	47.0%	19.1%	33.9%	500	84.0%	11.3%	4.8%	88
CH	43.9%	15.0%	41.1%	522	75.5%	17.4%	7.2%	80
UK	45.7%	18.8%	35.5%	1000	72.5%	19.9%	7.6%	141
USA	57.6%	14.7%	27.7%	1004	79.3%	12.6%	8.1%	153
EU 15	32.2%	15.2%	52.6%	10306	61.2%	20.9%	17.9%	1651

Base: all respondents (N=11832), youth (up to, and 24 years) N= 1964. Source: SIBIS 2002, GPS

The sub-indicator of 'communication with others', confidence in use of e-mail equalises in some regard data from surveys which is already launched at national and European level. Generally these surveys focus on *use* of email, not at the *confidence in use* of e-mail. Such surveys can never the less be used as a proxy indicator for validation of the data in the SIBIS survey.

The Flash Eurobarometer survey, Internet and the public at large provide data for use of e-mail for private uses at national level for EU-15 (Flash Eurobarometer 125). For this use the Eurobarometer data is adjusted to reflect the whole population (not only the Internet users) in order to compare to the use of SIBIS data. A difference that can not be adjusted is the purpose for using e-mails. The Eurobarometer survey focus on use of e-mail for private use, while the SIBIS survey focus on use of e-mail regardless of purpose. This means that the SIBIS data also includes use of e-mail in relation to work. This is considered as the main reason for the SIBIS survey registering a considerably higher share of the population using e-mail than the Eurobarometer flash (in average 25 percent points). Comparing ranks between the EU 15 (e.g. a rank of 1 to15), two countries differ 3 steps in the rank, three differ 2. For most countries the difference in ranking is based on a difference of 3-5 percent-points, which is acceptable due to the statistical significance margin. Based on the ranking the SIBIS data on use of e-mail is generally in accordance with the Eurobarometer survey. Comparing the SIBIS data on *use* of e-mail with the SIBIS

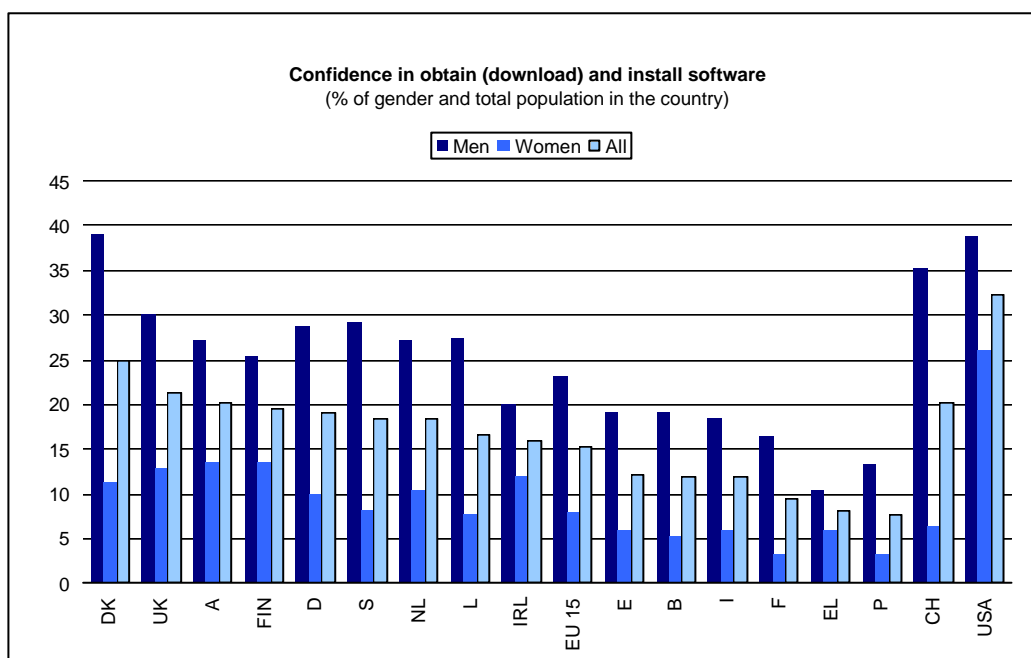
data on *confidence in use of e-mail*, the ranking is identical. This indicates that there is no important national bias between use and self-evaluation confidence in use of e-mail. This of course does not exclude possible other biases as systematic differences between gender in self-evaluation of competencies.

Despite of the lack of directly comparable indicators, the SIBIS data is validated by Eurobarometer data (see annex 1, table annex 1.4 for the data).

4.1.2 Obtain and install software on a computer.

Being able to find, download and install digital tools and programs allows the individual to develop a digital toolbox for his or her own purposes. This could be completely new programs or supplements to the large programs, such as office packages, etc.

Figure 4.2: Confidence in obtaining (downloading) and installing software on a computer. % of the population who is 'very confident' in the activity. Separated into countries and gender



Source: SIBIS 2002, GPS Base: all respondents (N=11832)

The number of persons who feel confident in downloading and installing software on a computer is relatively low, between 32% and 8% of the population. Again, the southern European countries in general show the lowest level of the skill. The level in the USA is remarkably higher than in the European countries. The higher level is primary due to much smaller gender gaps than in most European countries, where huge differences between men and women regarding confidence in obtaining and installing software are found.

Table 4.2: Confidence in downloading and installing software on a computer

Digital Literacy indicator: download and install software on a computer								
	Total population				Youth (age up to and 24 year)			
	very confident	fairly confident	not confident	N total	very confident	fairly confident	not confident	N total
A	20.1%	13.5%	66.4%	500	44.0%	21.0%	35.0%	84
B	11.9%	15.5%	72.6%	585	18.7%	34.6%	46.7%	103
DK	24.9%	21.9%	53.3%	501	33.7%	26.5%	39.7%	53
FIN	19.5%	20.3%	60.3%	669	32.2%	28.0%	39.8%	93
F	9.6%	14.1%	76.3%	1000	15.8%	25.8%	58.4%	189
D	19.0%	17.0%	64.1%	1001	35.6%	29.2%	35.2%	159
EL	8.1%	12.9%	79.0%	505	23.1%	24.4%	52.5%	105
IRL	11.9%	14.6%	73.5%	500	26.4%	29.0%	44.6%	126
I	15.9%	20.7%	63.4%	1000	22.9%	33.1%	44.0%	136
L	16.7%	17.4%	65.9%	500	38.5%	28.8%	32.7%	89
NL	18.3%	20.9%	60.8%	530	37.6%	32.2%	30.2%	97
P	7.7%	8.7%	83.6%	500	19.8%	28.9%	51.3%	90
E	12.1%	13.1%	74.8%	1015	29.0%	24.1%	46.9%	178
S	18.4%	23.2%	58.4%	500	37.8%	29.7%	32.5%	88
CH	20.1%	12.5%	67.4%	522	34.4%	17.3%	48.3%	80
UK	21.3%	23.3%	55.4%	1000	34.1%	29.2%	36.7%	141
USA	32.2%	24.5%	43.3%	1004	49.3%	26.8%	23.9%	153
EU 15	15.3%	16.7%	68.0%	10306	28.2%	27.8%	44.0%	1651

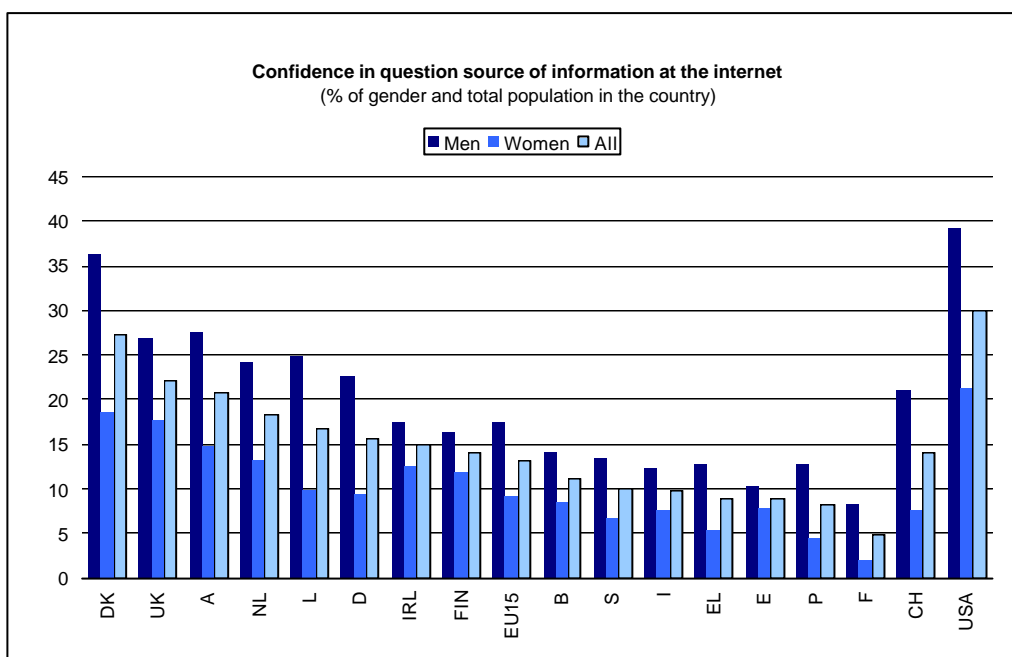
Base: all respondents (N=11832), youth (up to, and 24 years) N= 1964. Source: SIBIS 2002, GPS

4.1.3 Question the source of information from the Internet

Regarding the Internet, the problem is not to get information but to avoid drowning in information and to select among the huge amounts of information. The skill to be critical in relation to the information on the Internet is therefore important in an individual perspective basis as well as in a societal perspective. If the individual is not able to distinguish between relevant and irrelevant and between trustworthy and untrustworthy information, the individual will make wrong decisions or not use the Internet for information search at all. In a societal, democratic perspective, the ability to questioning sources of information and the information itself is critical to avoid misinformation and propaganda in political terms.

Questioning the source of information is operationalised as confidence in identifying the source of information on the Internet. This is a precondition for evaluating the reliability of the information.

Figure 4.3: confidence in question the source of information from the Internet. % of the population, which is 'very confident' in the activity. Separated in countries and gender



Source: SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306).

The identification of sources of information provided by the Internet seems to be quite difficult. Only between 30% of the population in the USA, and down to 5% in France, regard themselves as confident in identifying the source of information on the Internet¹⁹.

This is in some regards not surprising as the technical aspect of this skill is not that important and the intellectual, critical aspect more important. Nevertheless, this could indicate a democratic problem of parts of the population not being able to discriminate between sources of information. However, the picture does not have to be so negative. The question is if there are other types of filters, which is not registered in the question. The conservative filter could be that only information from known sources is accepted as trustworthy, while other sources are regarded with mistrust. If so, the barrier for spreading alternative information is high for groups, which is not already known as trustworthy (in relation to other media).

¹⁹ The level of answers in the categories: 'Don't know' or 'don't understand the question' is slightly, but not remarkable, higher to this question compared to the other questions of the digital literacy indicators. The general low score can therefore not be explained by missing understanding of the indicator question. Portugal is though an exception; 8% of persons which used the Internet within the last year answered: 'Don't understand the question' (SIBIS GPS survey 2002).

Table 4.3: Confidence in question the source of information from the Internet, % and N of total population and youth, separated in countries, EU 15, Switzerland and the USA

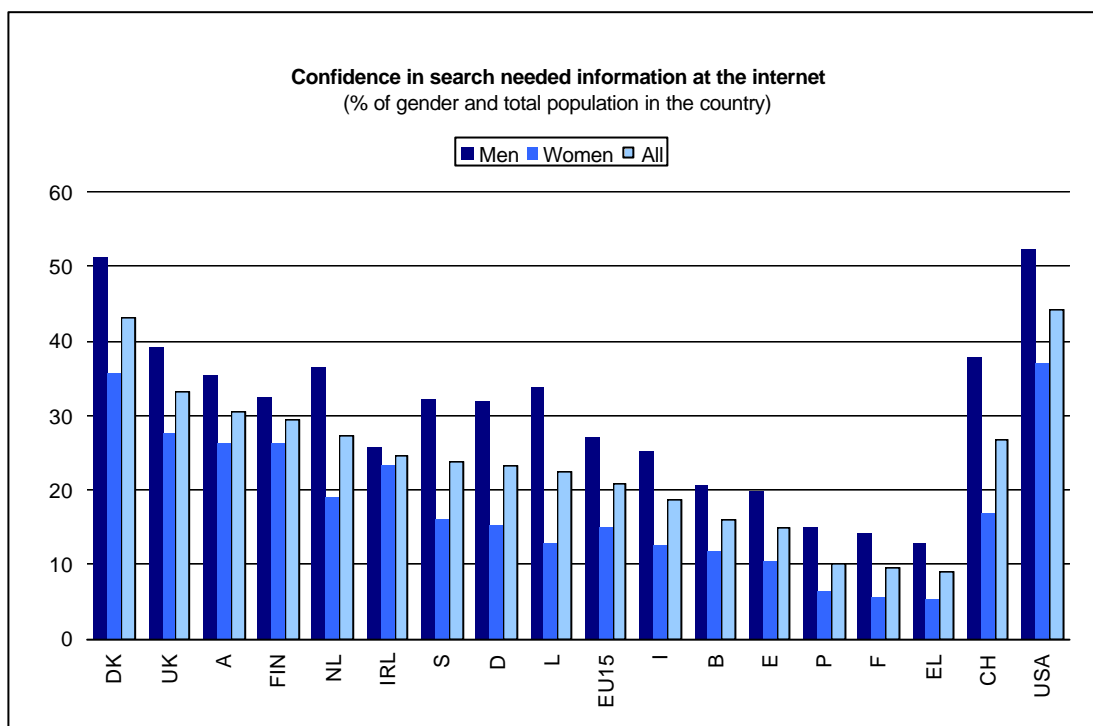
Digital Literacy indicator: identify source of information								
	Total population				Youth (age up to and 24 year)			
	very confident	fairly confident	not confident	N total	very confident	fairly confident	not confident	N total
A	20.9%	24.3%	54.8%	500	39.3%	42.2%	18.5%	84
B	11.1%	23.8%	65.1%	585	18.7%	37.5%	43.7%	103
DK	27.3%	34.6%	38.1%	501	41.2%	42.4%	16.4%	53
FIN	14.0%	35.5%	50.4%	669	18.9%	62.9%	18.2%	93
F	4.9%	19.5%	75.6%	1000	6.2%	41.9%	51.9%	189
D	15.7%	26.5%	57.8%	1001	31.1%	43.5%	25.3%	159
EL	8.9%	18.0%	73.1%	505	17.8%	38.2%	44.0%	105
IRL	9.9%	23.6%	66.6%	500	23.2%	51.6%	25.3%	126
I	15.0%	33.4%	51.7%	1000	26.4%	52.8%	20.8%	136
L	16.6%	26.7%	56.6%	500	35.5%	42.6%	21.9%	89
NL	18.3%	28.6%	53.1%	530	31.4%	42.8%	25.9%	97
P	8.1%	17.7%	74.2%	500	22.7%	44.9%	32.4%	90
E	8.9%	27.4%	63.7%	1015	19.1%	55.6%	25.2%	178
S	9.9%	34.4%	55.7%	500	15.6%	58.2%	26.1%	88
CH	14.0%	27.8%	58.2%	522	19.0%	48.8%	32.2%	80
UK	22.1%	36.7%	41.2%	1000	32.8%	55.4%	11.8%	141
USA	29.9%	35.8%	34.4%	1004	45.1%	45.3%	9.6%	153
EU 15	13.1%	26.6	60.3%	10306	22.7%	48.2%	29.1%	1651

Base: all respondents (N=11832), youth (up to, and 24 years) N= 1964. Source: SIBIS 2002, GPS

4.1.4 Search for the required information

To be able to use the Internet effectively, you have to be able to search –and find– the wanted and required information on the Internet. This is operationalised in the question of confidence in using a search engine to find information²⁰.

Figure 4.4: Confidence in search for required information on the Internet (e.g. use of search machine). % of the population who is confident in the activity. Separated in countries and gender.



Source: SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306).

The confidence in using search engines in order to find required information on the Internet is quite low. The pattern of skills is the same as seen in the other indicators. In general terms a north-south division of the European countries²¹.

²⁰ One could though question if the confidence in using a search engine is a total indication of confidence in getting the required information. A more straightforward question would probably give a better indication (e.g. Your interest in a matter is raised somehow. Do you know how to search for information in the Internet on the topic?). This would allow other ways to find the required information than via search engines.

²¹ Only 2% of the respondents having used the Internet within the last year answered 'Don't know' or 'don't understand the question'. This cannot explain the low level of confidence.

Table 4.4: Confidence in search for required information on the Internet (use of search engine), % and N of total population and youth, separated in countries, EU 15, Switzerland and the USA

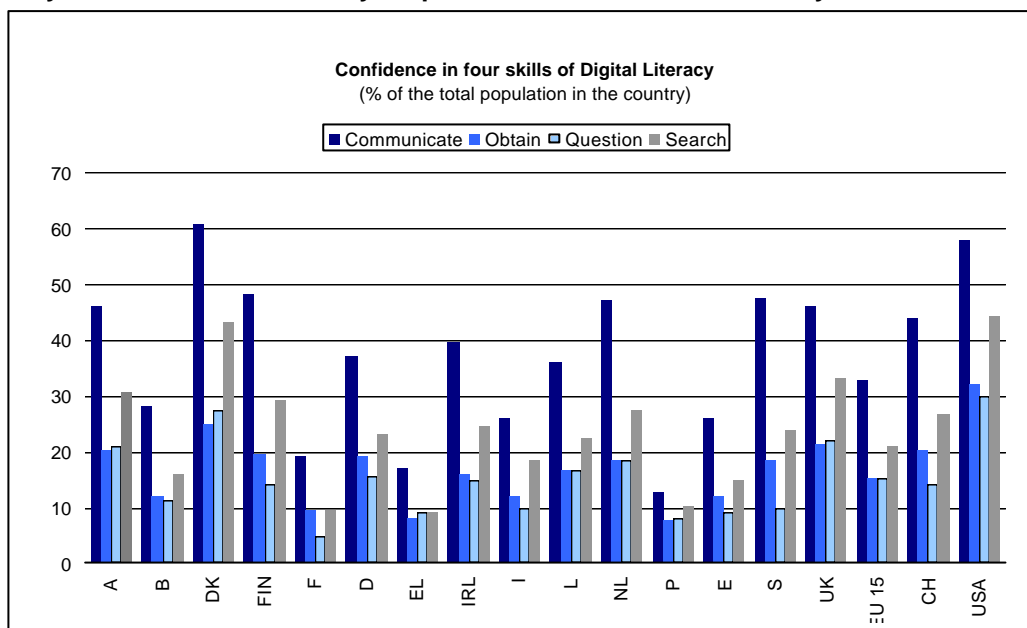
Digital Literacy indicator: search for required information on the Internet								
	Total population				Youth (age up to and 24 year)			
	very confident	fairly confident	not confident	N total	very confident	fairly confident	not confident	N total
A	30.6%	17.7%	51.7%	500	68.9%	25.1%	6.0%	84
B	16.0%	24.4%	59.6%	585	27.9%	42.2%	29.9%	103
DK	43.2%	26.5%	30.3%	501	59.8%	38.2%	2.0%	53
FIN	29.3%	27.1%	43.6%	669	57.9%	31.9%	10.2%	93
F	9.6%	20.4%	70.1%	1000	22.0%	38.5%	39.5%	189
D	23.2%	22.6%	54.2%	1001	51.6%	33.8%	14.6%	159
EL	8.9%	16.2%	74.9%	505	21.8%	34.1%	44.1%	105
IRL	18.6%	20.4%	61.0%	500	42.2%	36.8%	21.0%	126
I	24.5%	29.5%	46.0%	1000	45.4%	43.9%	10.7%	136
L	22.4%	24.4%	53.2%	500	46.8%	37.2%	15.9%	89
NL	27.2%	28.9%	43.8%	530	49.7%	43.4%	7.0%	97
P	10.1%	16.0%	74.0%	500	29.5%	37.5%	33.0%	90
E	14.9%	23.7%	61.5%	1015	37.0%	43.5%	19.5%	178
S	23.8%	30.8%	45.4%	500	52.8%	43.3%	3.9%	88
CH	26.8%	24.1%	49.1%	522	56.3%	26.2%	17.5%	80
UK	33.1%	27.5%	39.3%	1000	57.9%	34.7%	7.3%	141
USA	44.3%	25.0%	30.7%	1004	66.0%	27.4%	6.6%	153
EU 15	20.8%	23.0%	56.2%	10306	41.9%	37.5%	20.4%	1651

Base: all respondents (N=11832), youth (up to, and 24 years) N= 1964. Source: SIBIS 2002, GPS

4.1.5 Comparison of the four skills of digital literacy

The level of confidence differs between the four skills. The share of population which is very confident in the activities 'obtain and install software on a computer' and 'question the source of information found at the Internet' is relatively low (15 % as EU average). These skills are the most demanding, in terms of technical knowledge of the computer to obtain and install software and in terms of analytic skills to identify the source of the information. It is therefore not surprising that the lowest share of the population is confident in these skills. Never the less this indicates that both technical skills and analytic/critical skills and competencies should be emphasised in activities for upgrading the digital literacy skills of the population.

Figure 4.5: Confidence in the four skills of digital literacy. % of population, which is 'very confident' in the activity. Separated in countries and activity

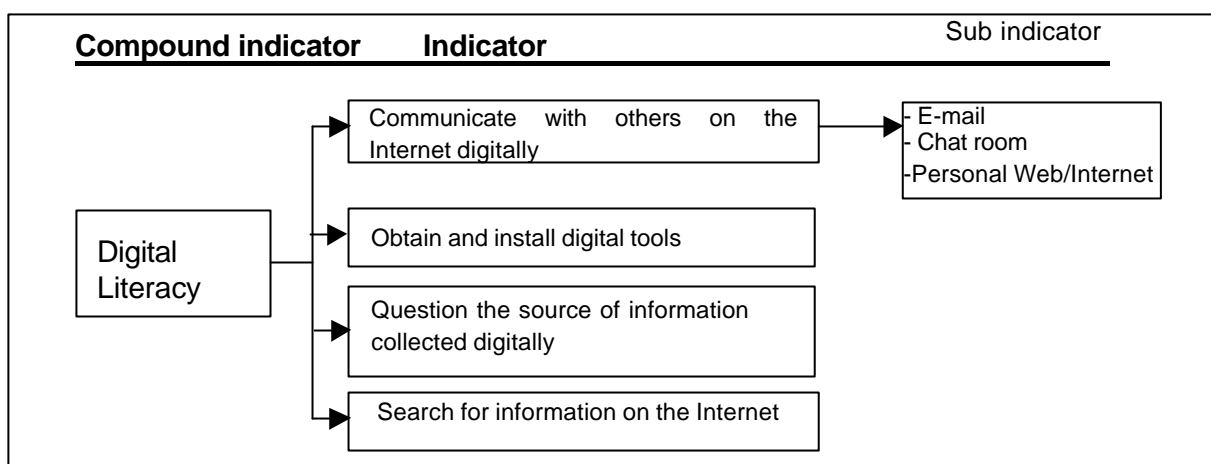


Source: SIBIS 2002, GPS base: All respondents (N=11832), EU 15 (N=10306)

4.1.6 COQS index - Compound indicator of digital literacy

The COQS index is based on weighing the four indicators of digital literacy (Communicate with others on the Internet, Obtain and install digital tools, Question the source of information collected digitally and Search for information on the Internet). The four indicators are seen as parts of a totality and therefore weighted equally against each other (e.g. 25% each)²².

Figure 4.6: COQS index of Digital Literacy.



Source: SIBIS, (DTI) 2002

²² Other weights could be chosen as the skills differ in complexity and character. As an example, a weight of 15% for search and communicate on the Internet and 35% for obtain software and question information could be used, as the less complex elements of digital literacy is regarded as almost common qualification. Looking at the test results in chapter 4, such a revision might become a reality in a few years' time. In some countries a very high fraction of the youth are confident in communicating via at least one of the four Internet media.

Based on the four indicators of digital skills the general level of digital literacy can be measured according to the COQS-index of digital literacy²³.

The survey shows a relative low level of digital literacy in EU as a whole, 0,83 at a scale from 0-3. A clear gender gap and an age gap can be seen (measured in youth to rest of population in the EU (figure 4.7a). In the COQS index, EU women in average only score 62 % of the average score of EU men. Another gap in digital literacy is between the youth (age up to and 24) and the rest of the population (age 25+). The average score at the COQS index among youth is 1,5, while the rest of the population scores 0,6. This gap shows that the future level of digital literacy can be expected to increase, as the youth is the carrier of the future levels of digital literacy (Figure 4.7b).

The SIBIS survey shows huge differences in the level of digital literacy between the surveyed countries. Within EU there is a factor 3 between the EU country with the highest score (Denmark) and the lowest (Portugal). The national scores in digital literacy among the surveyed countries differ between 1.5 (in the USA) and 0.5 (Portugal) measured at a scale from 0 to 3. The EU average is 0.8 at the COQS index. There is still a way to go towards total digital literacy in the EU, even to reach the level of digital literacy in USA, Figure 4.8.

Seen at national levels the skills of digital literacy are highest among men in all countries. Still, there are tendencies to differences in the gender gap within EU, with the smallest gap in Ireland and Finland (figure 4.10).

The size of the survey means that clear conclusions cannot be drawn regarding gender and sub-groups (e.g. youth) at a national level. Nevertheless, the data is used to find some tendencies among the youth – bearing in mind the huge uncertainty in relation to the data.

The future seems to be brighter regarding the national level of digital literacy. Studying the youth (age 16-24) as a group shows a much higher general level of digital literacy than the total population. The national scores among the youth are between 1.0 and 2.0 (even higher in the USA and Austria) (figure 4.9). With huge uncertainty, there even seems to be a tendency towards closing the gender gap in digital literacy (average COQS value) in the future (figure 4.10). There might even be a higher level of digital literacy among the young women of Ireland, than among the young Irish men. This is though not to be of significance as the uncertainty in these data is quiet high.

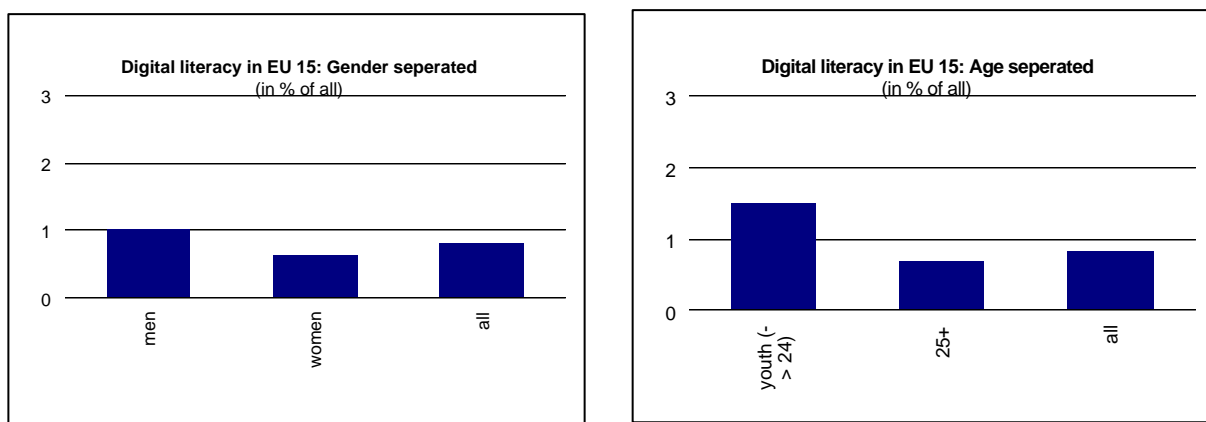
Another positive tendency among the youth is the decreasing gaps between the EU countries regarding digital literacy (figure 4.11).

²³ Digital literacy is defined as a compound indicator consisting of four types of skills, of which the first (skills in communicating digitally) is itself a compound indicator (see chapter 3). Communicating digitally: very confident in at least one: 3 points, fairly confident in at least one 1 point. The other three indicators (which is based on one question only) follows the same system: Very confident: 3 points, Fairly confident: 1 point, Not confident, don't understand the question or don't know: 0 points. The national index of digital literacy (COQS) then is measured as the average of the four indicators, e.g. each of the four indicators are weighted equally 25%.

Figure 4.7a and 4.7b: COQS index of digital literacy. EU 15.

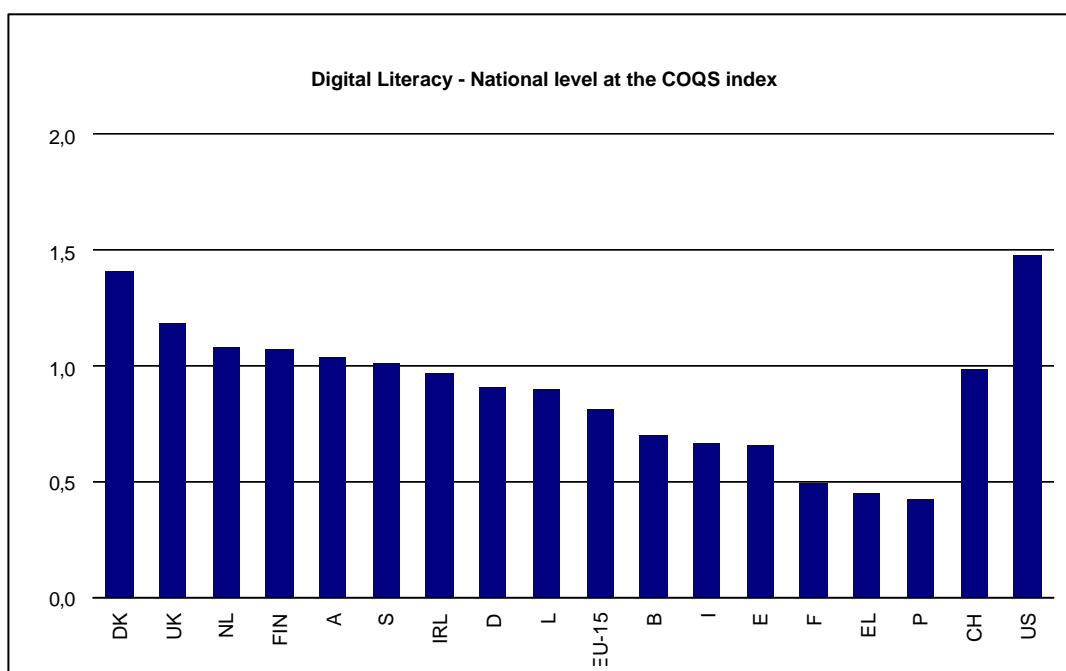
Figure 4.7a: Separated in Gender (Men, Women and all)

Figure 4.7b: Separated in age (age 16-24, +25 and all)



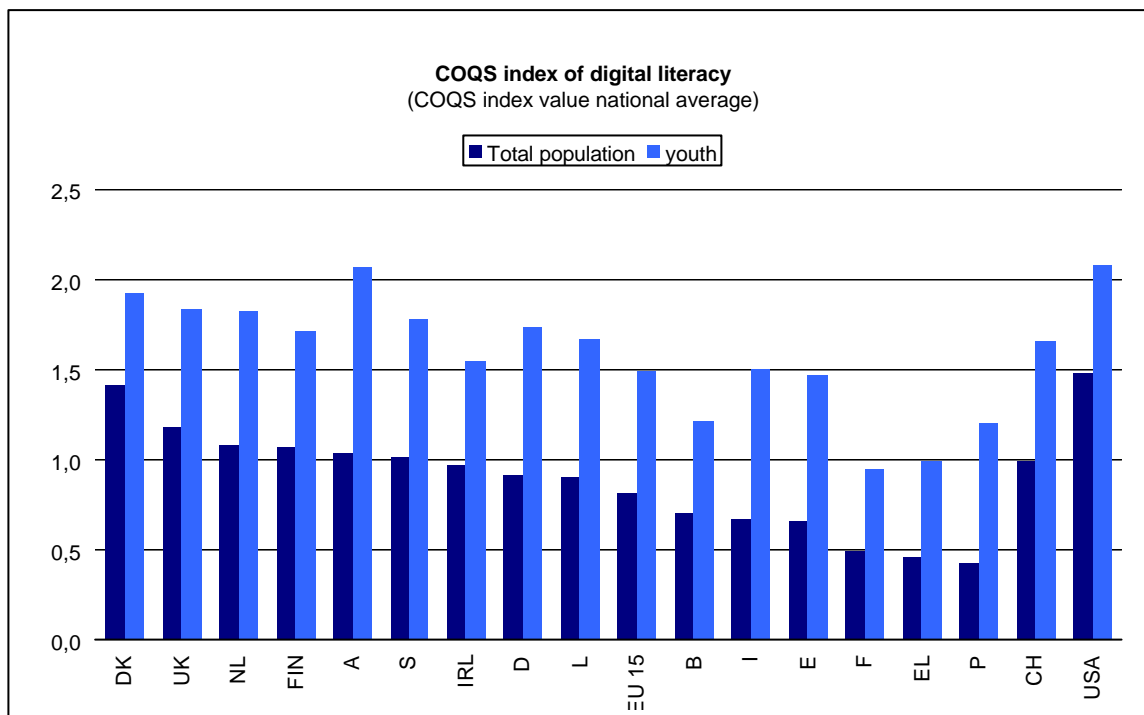
Source: SIBIS 2002, GPS Base: EU 15 (N=10306). Table see Annex 1.

Figure 4.8: COQS index of digital literacy in the whole population. EU member states, EU average and USA and Switzerland. Average national value



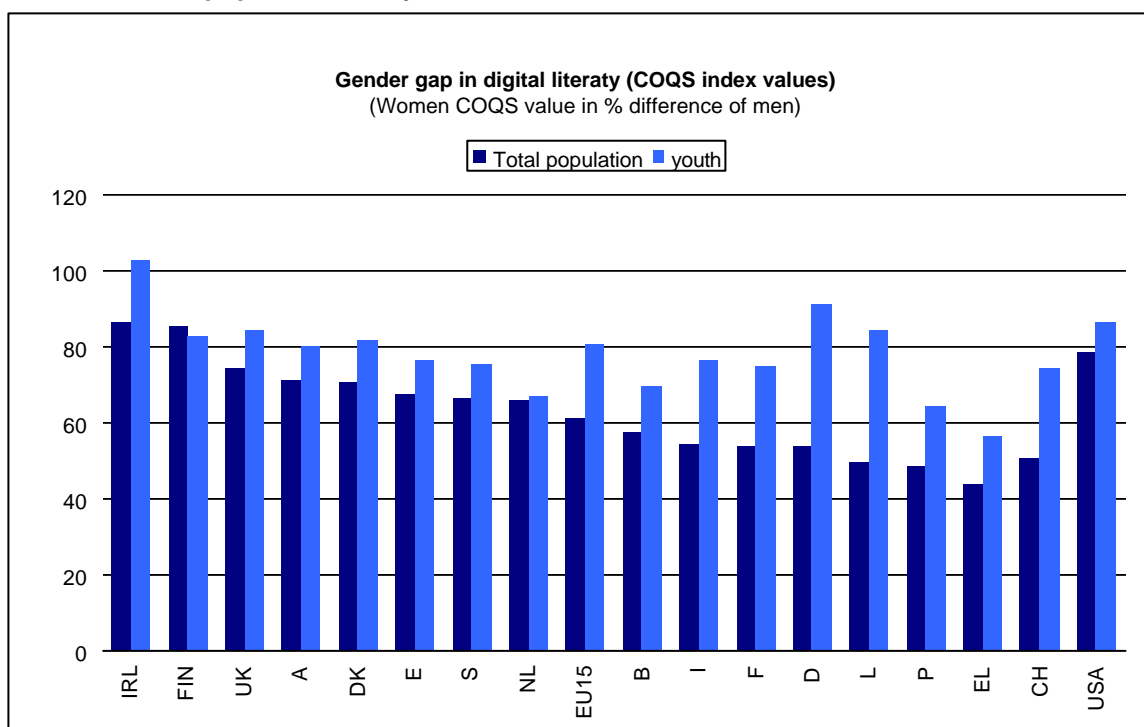
Source: SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306). Table see Annex 1.

Figure 4.9: COQS index of digital literacy. The total population and youth (age up to 24). EU member states, EU average, Switzerland and the USA. Average value of the groups, separated in countries



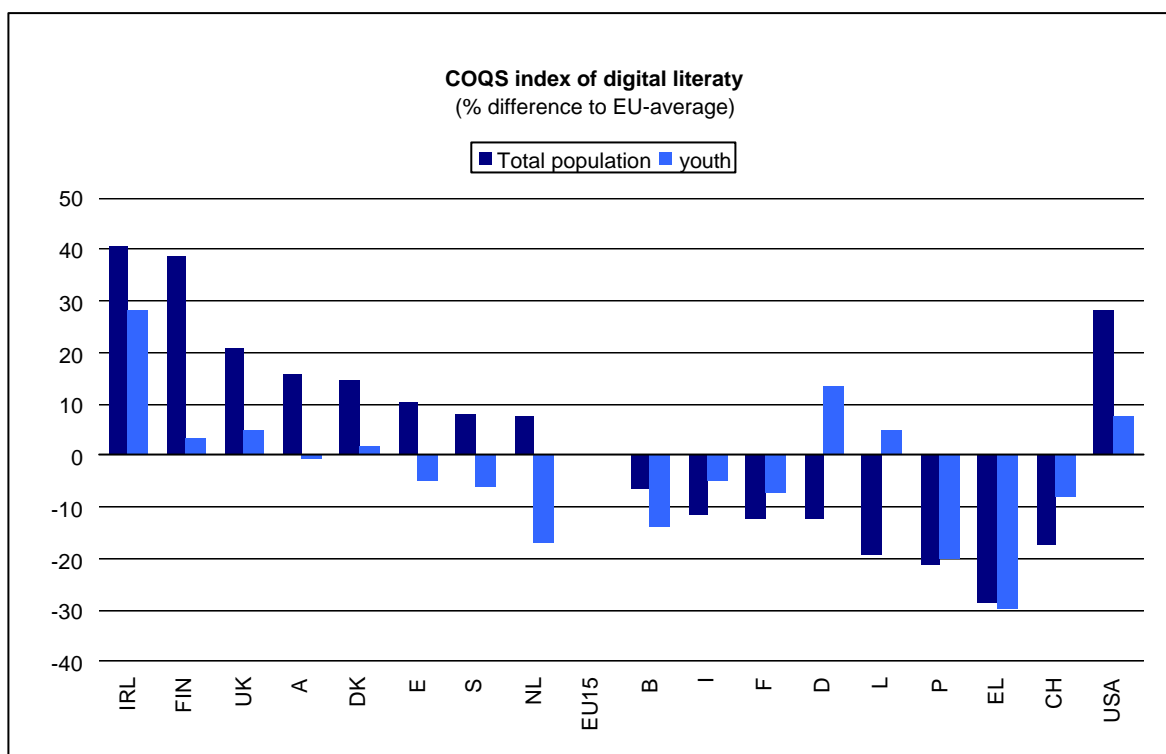
Source: SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306), youth (up to and 24 years): N=1964.

Figure 4.10: Gender gap in digital literacy (COQS index values). Women COQS value in % of men. Total population and youth. EU member states and the USA



Source: SIBIS 2002, GPS Base: all respondents (N=11832), youth (up to and 25 years) (N= 1964)

Figure 4.11: COQS index of digital literacy. Differences to EU-average. Total population and youth (age up to 24). EU member states, EU average, Switzerland and the USA



Source: SIBIS 2002, GPS Base: all respondents (N=11832), EU 15 (N=10306), youth (16-24 years): N= 1878 (weighted).

To better understand factors that might influence the differences in digital literacy, the level is tested up against other factors:

- Total survey level:
 - presence of Internet at home
 - age at termination of education
- National level in the survey:
 - social graduation into work functions

The presence of Internet connection at home is closely related to a high score in digital literacy (index value 1.5 for present at home, against not present index value 0.4). The general level of digital literacy is higher among the youth. It is remarkable that among the youth the actual presence of Internet at home is of less importance for the level of digital literacy, than in the total population.

Supposedly, the educational system is the main reason for the level of digital literacy among the youth from homes without Internet access. Other localities with Internet access – cafes, libraries, etc. could also offer opportunities for learning the skills and especially for maintaining the skills. See table 4.5.

Table 4.5: Cross-tabulation of value in COQS index of digital literacy and presence of Internet at home

		Total population		Youth (age up to and including 24)	
		Average value digital literacy	N	Average value digital literacy	N
Presently Internet access at home	Yes	1.5	5550	1.9	1132
	No	0.4	6266	1.1	831
	DK	0	16	0	1
	Total	0.9	11832	1.6	1964

Source: SIBIS 2002, GPS Base: all respondents (N=11832), Youth (N=1880).

Studying the relationship between the length of education and digital literacy further indicates the role of education. The higher the level of education (higher age when leaving school), the higher the score in the COQS index of digital literacy, table 4.6. The data does not allow any conclusions on *where* the skills of digital literacy are acquired. It could be in during the education or at the job – in the latter case higher education qualifies for jobs in which the skills of digital literacy are learned.

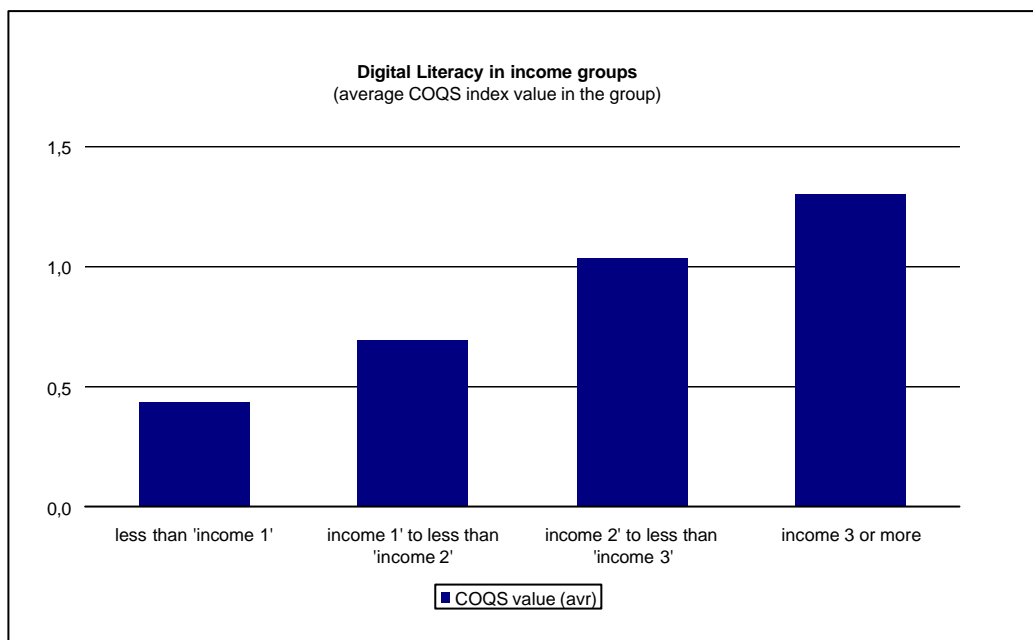
Table 4.6: Cross-tabulation year of terminating education and level of digital literacy

		Index for digital literacy	
		Value	N
Terminal education age (classes)	-13	0.03	695
	14	0.14	715
	15-16	0.50	1794
	17-20	0.80	3587
	21+	1.24	3266
	still studying	1.62	1687
	Don't know	0.37	88
Total		0.90	11832

Source: SIBIS 2002, GPS Base: all respondents (N=11832)

In addition, the household income seems to influence the level of digital literacy. The higher income group for the household, the higher level of score in the COQS-index of digital literacy. Figure 4.12, and table annex 1.2 in annex 1.

Figure 4.12: Digital literacy in income groups



Source: SIBIS 2002, GPS Base: all respondents (N=11832)

Another factor, which could influence the level of digital literacy, is the economic structure. Average education and non-manual work are related to higher scores in the COQS index, according to table 4.7.

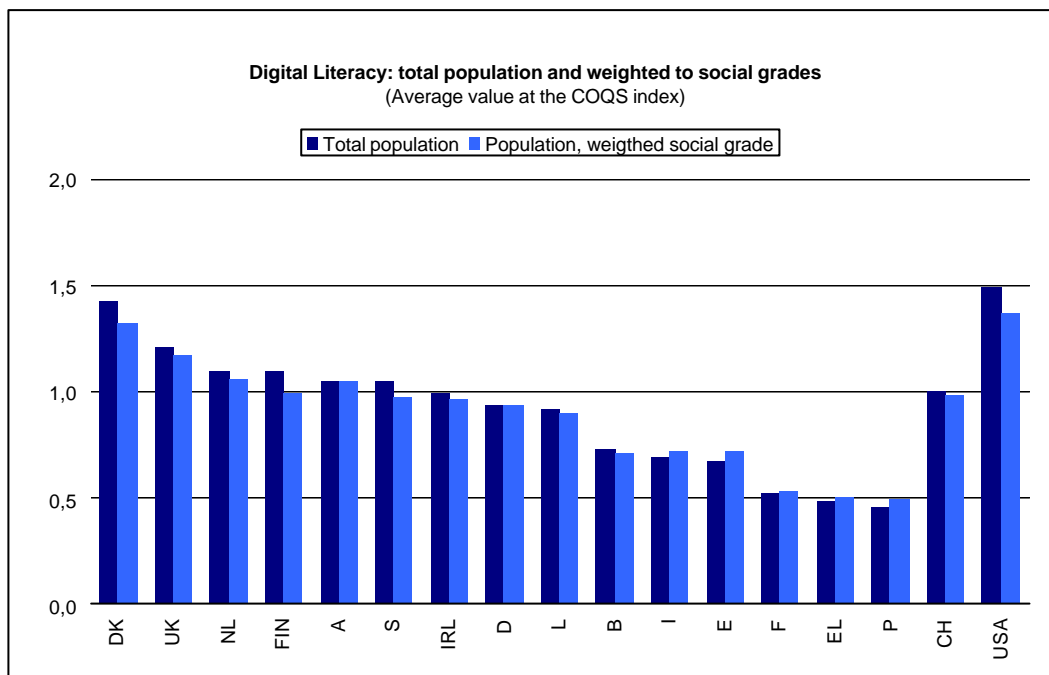
Table 4.7: Cross-tabulation of COQS-index values and social grade of respondents

Social Grade of respondent (ESOMAR)	COQS-index of digital literacy	
	Value	N
Unskilled man. Workers & other less well educated workers/employees	0.53	1332
Skilled workers and non-manual employees	0,99	1525
Well educated non-manual and skilled workers	1.29	1434
Managers and professionals	1.53	1577
Not specified	0.71	5964
Total	0.90	11832

Source: SIBIS 2002, GPS Base: all respondents (N=11830), 2 system missing

If differences in the economic structure (here measured in social grades) were an important factor of differences in national scores in the COQS-index of digital literacy, weighting to an average EU-level would leverage most differences. This is tested and shown in figure 4.11 below.

Figure 4.13: COQS index of digital literacy. The total population and total population adjusted to average EU economic structure (social grades). EU member states and the USA. Value at the COQS-index of Digital Literacy



Source: SIBIS 2002, GPS Base: all respondents (N=11832)

Note: Total population is weighted nationally regarding age, gender, and for most countries region and/or locality size. For weighting in accordance to social grades, the appearance of five social groups is adjusted to the average appearance of these groups between the European countries in this survey. Social grading based on the Esomar classification (ESOMAR 1997).

The figure shows that the differences in national average level of digital literacy are leveraged moderately when the data is adjusted for differences in economic structure. The picture could, however, be disturbed by the group 'not specified' in which 40-55% of the respondents is categorised. This group contains students with high COQS-scores and persons outside the labour market with relatively lower COQS-scores. Furthermore, analysis and research has to be done to conclude on the relationship between economic structure and digital literacy. Can a high level of digital literacy drive the transformation of the industrial society towards the Information Society – or is high level of digital literacy a result of an Information Society with knowledge processing jobs?

4.2 Students' use of e-learning

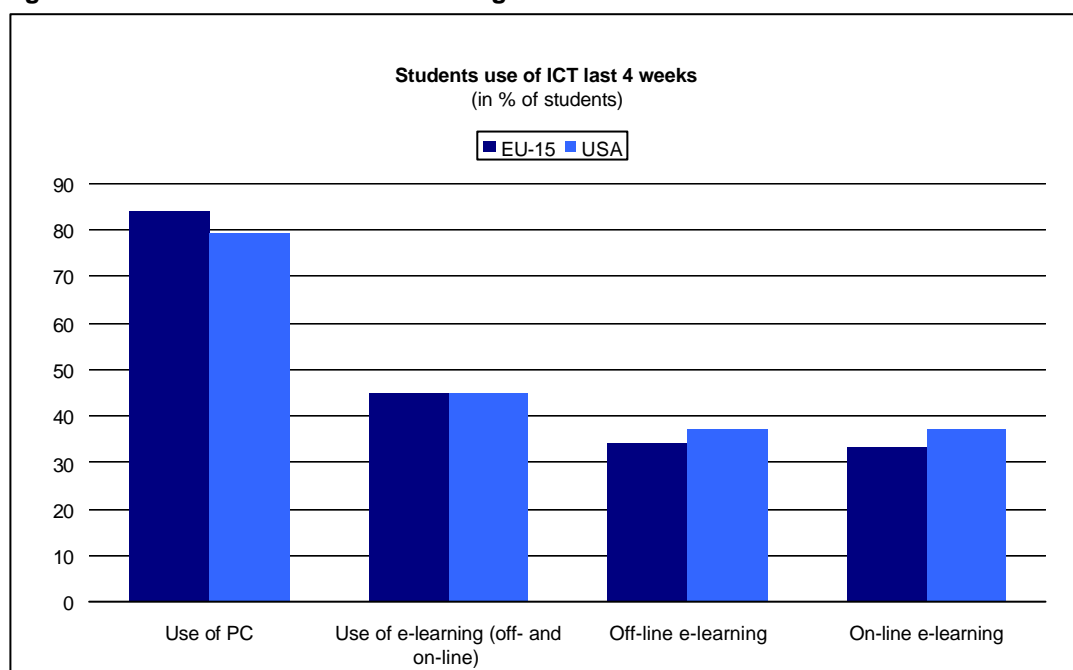
Integration of ICT in education is supposed to result in actual use of ICT: Teachers' use in relation to preparation and teaching, and students' learning processes in interaction with teachers, other students or individually.

Students' use of e-learning indicates the actual intensity in use of e-learning materials, on-line as well as off-line. A student's use of e-learning materials is an indication of the integration of ICT in education seen from the student's perspective. The e-learning materials are divided in two groups of technologies: offline learning materials (CD-ROMs or other medias such as diskettes, audio or video tapes etc.)

and online learning material (provided on the internal computer system of the school/university or through the Internet).

The use of e-learning among European students is at almost the same level as students from USA (due to relative low level of students, especially in USA, the differences are not significant). Among all persons still studying, 45% in the EU 15 have used e-learning within the last 4 weeks. Of the students, 33% have used on-line e-learning materials, while this seems to be a little higher in USA. Due to the low level of respondents, it is not possible to break down the EU result on member states for further benchmarking.

Figure 4.14: Students' use of e-Learning the last 4 weeks in EU 15 and USA



Base: All persons still studying EU15 N=1372, USA N=193. Source: SIBIS 2002, General Population Survey.

Table 4.8: Students' use of ICT the last four weeks. % of all students. EU15 average and USA

	Use of PC- and e-learning material the last 4 weeks				
	Use of PC	Use of e-learning	Off-line e-learning	On-line e-learning	Number of respondents
	%	%	%	%	N
EU 15	84	45	34	33	1372
USA	79	45	37	37	193

Source: SIBIS 2002, GPS Base: All persons still studying EU15 N=1372, USA N=193.

At national level the number of respondents is very low, and therefore it is not possible to make any conclusions regarding the national differences of student use of electronic learning materials. However, the data indicates a high level of student use of e-learning materials in Holland and Luxembourg, and a very high level in Greece. At the other hand, it is low in Finland, which in other regards is seen as countries where ICT and Internet are widely used. In USA the level of use of ICT among students is only slightly over the total average, which is unexpected as USA in most other regards has a high score on use and confidence in ICT. The actual use of e-

learning among these countries should therefore be studied further to see if the unexpected rates of e-learning is result of statistical incidence (table of use of e-learning materials at a national level, se annex 1, table pp 1.3).

5 Further Developments

The research into the topic education and the development of indicators has shown gaps or areas of interest for further development. First, the areas identified within the premises and scope of the SIBIS project are presented. Finally, further developments of indication education in the Information Society in EU are presented.

The heterogeneity of the institutional structure and set-up of the educational system in the EU member states is a factor that produces gaps in comparable data for the whole EU. Huge amounts of data on education, ICT in schools, etc., are available at national level. Variations in indicators and particularly in the surrounding background data (for example definition of educational level) due to the variation in the educational institutional structure, mean that large parts of these data cannot be compared at a European level. Most indicators and data at EU level are at a high and general level, above the differences between the EU countries (or even regions). A future development will be to co-ordinate the indicators already in use in one or few European countries. This is an ongoing job, often taking place between national statistical offices (as an example the DELOS project – Developing a European e-Learning Observation System).

Apart from the gaps in covering comparable data due to the heterogeneity of educational structures, other gaps have been identified within the sub-topics of education.

Digital Literacy

The sub-topic Digital Literacy is regarded as reliable at a national level, for comparing the EU member states and development over time in each country. Nevertheless, there is a gap in data on digital literacy at various levels of schools or age bands. Regarding 'education', this has been a central issue in order to evaluate the output of learning in schools. For comparing the standard of digital literacy at school level, a more targeted survey should be made. In this relation some of the sub-indicators (questions) should be developed and sophisticated as proposed, in accordance with the conceptual understanding in the target group.²⁴

The analysis of digital literacy demonstrated important differences between the national levels of digital literacy between the EU countries. Differences in the economic structure (measured in social grades) seem to be one factor in explaining the differences. The importance of this factor and the relationship between the level of digital skills and the economic structure need to further developed and researched. For example: can a high level of digital literacy drive the transformation of the industrial society towards the Information Society – or is a high level of digital literacy a result of a Information Society with knowledge processing jobs?

Flexible institutions and virtual mobility

Indications of status of flexible institutions and virtual mobility are still to be developed. A starting point is proposed to measure the status of capacity/enrolment and institutional arrangement of distance learning. This indication from a student's perspective and an institutional perspective has tentatively been discussed in the project, without being tested.

The DELOS project (Developing a European eLearning Observation System) is starting to gather a long list of indicators in this specific topic) (DELOS 2002). With

²⁴ E.g. while asking for confidence in cross-questioning information provided on the Internet has been considered too complex in a general population survey, while it most certainly will be understood in a student survey.

only brief knowledge of the DELOS project, there still seems to be further work to be done regarding defining distance learning, types of courses, etc., into new typologies. In this regard, the work of VOCTADE (vocational training at a distance in the European Union) seems to be a good place to start (Fritsch et. al 1998).

Materials and sources - Content

The first thing to survey is if availability and quality of content is a barrier to the use of ICT and in teaching. Tentative work on supplementary questions for an existing survey has been done, but not tested

Furthermore, as input regarding development of content, a positive evaluation of the content, qualities of any barriers, as well as an indication of which types of content are used with positive results would be highly interesting particularly for content providers and educational institutions. In this regard, the Californian project CPTA² (Californian technology assistance project/- assessment profile) is inspiring. Based on teachers' reporting on a questionnaire, state wide data on the use of ICT in specific subjects, types of technology and programs, the teachers' feeling of readiness for using ICT, etc., are gathered. Teachers at the same time produce their own ICT proficiency profile for targeted further development. An evaluation of the use of certain types of content in each subject is possible.

Training of practising teachers

There is a gap in the indicators of the quality of training courses for practising teachers. E.g. the content of the formal ICT training of practising teachers. In this regard, the possible shift in focus from the operational, technical aspects of ICT towards the didactic or pedagogical aspects of use of ICT in teaching should be emphasised by the new indicators.

For further research, this should be brought even further regarding seeing training as formal as well as informal learning in accordance with the understanding of life-long learning. The level of ongoing learning practises and routines in the educational institution – formal as well of informal – will be of importance for maintaining and developing competencies among teachers. Therefore, also the routines and practices of informal learning of ICT competencies and of use of ICT in education are important to measure. This perspective is represented in the SITES project by a focus on 'methods of transferring ICT-related knowledge', though the actual content of the knowledge is apparently focused on the operational use of ICT (Pelgrum & Anderson 1999, p 162 ff.).

Integration of ICT in curriculum

Again, there is gap in indication of the didactic/pedagogical changes in relation to implementation of ICT. A single question supplementing an existing survey has been considered. However, implementation of ICT is just part of the new learning concept of the Information Society. Therefore, the next step in further development in this regard would be to indicate changes of the students' working relations – e.g. definition of class, networking with other students within the school or outside the school. Another aspect would be changes in subject definition (e.g. subject integration in curriculum). This involves changes in organisational structures and the institutionalised structures of teaching.

Networking between educational institutions and public/private co-operation

During the research, it became evident that 'networking between educational institutions and public/private co-operation' is important in developing the Information Society in Europe. In a narrow sense, it regards co-operation focused on development of content for e-learning. In a broader sense, networking is a basic element of the Information Society itself – regardless of the subject being

development of content or development of new courses/new teaching forms. In both cases, very clear definitions on co-operation and networking need to be developed in order to get reliable and comparable data. A few indicators were tentatively developed for interviews with national experts or central administrators as target group, but left out due to the lack of a clear definition of collaboration (and conceptualisation of character of diverse forms), as this work is beyond the scope of SIBIS. Nevertheless, this is an important field to research and measure as an indication of a very central characteristic of the Information Society as a 'Networked world'.

This leads to what might be seen as the most important field for further development regarding the indicators of the Information Society in Education. This involves changed educational principles, basic understanding of learning and competencies among teachers and students/pupils, and not least institutional changes, regarding organisation as well as institutionalised meanings.

Elements of the institutional changes can be seen in the previously mentioned gaps, as development in didactic methods, content of curriculum, the network organisation of school and teacher interaction – internally as well as externally and the school as a framework for continued learning for practising teachers. An approach to the institutional changes of schools might be a promising way to develop the understanding of changes toward the Information Society within education and therefore an important process to measure statistical (Abrahamsen & Shapiro 2001, Venezky 2002).

At the individual level, a central indication is the competencies of students, i.e. "digital literacy". The 'narrow' approach tends to be operational. The elaborated understanding of digital literacy emphasises social and cross curriculum competencies as ability to work in project groups, evolving strategies for problem solving, planning and managing project processes etc. (Abrahamsen & Shapiro 2001, Hautamäki 2001).²⁵

A further step in measuring the digital literacy in the broad sense, as literacy for the Information Society would therefore be to conclude on a broader definition of digital literacy and construct indicators based on the(se) definition(s).

Several ongoing large international projects are working in this direction, though not with digital literacy as an explicit goal:

- ETS, Educational Testing Service, has convened an international panel to examine the need for measures of ICT literacy, and develop a workable framework for assessing and studying ICT literacy (ETS 2002). No survey projects have been developed based on the framework yet.
- The OECD/PISA project is surveying the knowledge and skills of 15-year-olds in the principal industrialised countries three times in 2000, 2003 and 2006 (OECD 2001). The approach is to look at real life challenges and cross curriculum competencies along with literacy in reading, mathematics and science. Though digital literacy was not originally a theme in this project, there is a discussion in the project group after the first survey round of implementing this 'literacy' in the project (OECD 2002).
- The SITES project (Second Information Technology in Education Study) in the framework of IEA, International Association for the Evaluation of Educational Achievement. The study is based on an understanding of a changed role of the

²⁵ These qualifications are not directly related to the technology per se. One therefore could discuss the relevance of the focus on *digitality*. In lack of better concept, the term digital literacy in broad sense is maintained.

individuals (teachers, students and administrators) as well as of the institutions (schools) in the transition from Industrial to Information Society. Despite of the concept, 'Digital literacy' is not used explicitly in the project, though many of the processes, competencies and qualifications related to 'digital literacy' are surveyed²⁶ (Pelgrum & Anderson 1999).

²⁶ This can especially be expected in module 3, a survey of schools, teachers and students, focusing on the impact of ICT on the skills and competencies they will need in the Information Society, which will take place in 2001-2005.

6 Conclusions

The topic of 'Education' has been divided into five sub-topics:

- Digital literacy
- Materials and sources – availability of content
- Training of practising teachers
- Integration of ICT in curriculum
- Flexible institutions and virtual mobility – distance learning enrolment and capacity.

Within the last four sub-topics, supplementing indicators to other existing indicators were proposed. In general, comparable EU data is non-existing. There are no general conclusions to be drawn regarding the status of the Information Society in the EU in these sub-topics.

Some indicators that have not been tested and point for further development are proposed:

- Regarding flexible institutions and virtual mobility, further work to be done on defining distance learning, types of courses at comparable EU level. A few tentative indicators for measuring the capacity and enrolment are proposed.
- Materials and sources. Two indicators to be implemented in an existing survey are proposed. A more positive formulation regarding evaluating content instead of just identifying barriers is proposed.
- Training of practising teachers. Focus on qualifying the content of practising teacher's formal training sources as technical or didactic/pedagogical is proposed. Furthermore, research should emphasise the informal learning in the educational institutions as a learning organisation quality.
- Integration of ICT in the curriculum. An indication of pedagogical changes following the use of ICT is proposed for an existing survey. Furthermore, a new step would be to develop indication of students' working relationships as well as development of new curricula based on integration of former separate subjects.

Especially the first sub-topic, digital literacy, has been tested in the SIBIS GPS survey: The indicators proposed in the other sub-topics have to be measured by other methods or target groups than the SIBIS survey and have therefore not been tested in this relation. The conclusion will therefore concentrate on results from the sub-topic digital literacy.

Digital literacy is not only a result of formal education. In general terms, digital literacy among the European population can be seen as an indication of readiness for qualified use of ICT in education, working and private life.

Among the European youth, however, the level of digital literacy can be seen as an indication of ICT activities in the educational system, despite of other sources for learning digital literacy too.

Europe is lacking behind USA regarding digital literacy.

The USA is in the forefront as the most digitally literate country in the survey in three out of four indicators and the COQS-index. This is the situation for the USA compared to the EU15 average. Even compared to the EU countries with the highest score in digital literacy, the USA has the highest score in the separate indicators and

the COQS-index, except for the indicator 'confidence in communicating digitally', where Denmark has a higher score.

Huge differences in digital literacy between the EU states.

Within the European countries, there are huge differences in the general level of digital literacy. In the individual skill-indicators, the % of persons who are very confident in the skill is 3 - 5 times higher in the highest scoring country than in the lowest scoring.

Also measured in the COQS index of digital literacy, there is a factor 3 difference from the highest to lowest national average index value.

The gap between countries is also seen between gender. In an EU average, the index value of women is only two thirds of that of men.

Gaps are closing in the future – gender and national differences

If only the youth is measured, the situation looks much brighter:

- The level of digital literacy is increasing remarkably
- The national gap, e.g. differences between national average level of digital literacy, is diminishing.
- The gender gap is diminishing. The gap between average COQS index value of men and of women is diminishing.

Seen in this light, the European countries are on the way to preparing for the Information Society, though they still have a long way to go.

Some factors have been identified that might influence the differences in the level of digital literacy.

- The presence of Internet access at home indicates a higher score in digital literacy. This holds for the general population, while the importance of Internet access at home is of less importance among the youth. This indicates that other factors, where ICT use and teaching in the educational system could be the most decisive, through other places with Internet access Internet cafés, libraries, friends etc., could be of importance.
- The length of education seems to influence the level of digital literacy as well. The average COWS index value for persons leaving the educational system after the age of 20 (upper secondary or tertiary education) is 75% higher than persons leaving the educational systems school at the age of 15-16 (secondary school). This could mean that digital literacy skills are learned in school. Another possible interpretation is that people with higher education qualify for jobs where digital literacy skills are needed and learned.
- The level of household income (partly dependent on the length of education) also influences the level of digital literacy.
- At an EU average, the social grade can indicate the level of digital literacy. Unskilled manual workers and other less well-educated workers and the unemployed score three times lower in the COQS index than managers and professionals. The higher the education and the lower the level of manual work, the higher score at COQS-index.

The social and economic structure (measured in social grades) only explains a minor part of the differences in digital literacy between the European countries. Weighted in accordance with an EU average distribution of social groups (ESOMAR social grades), the national differences between the EU countries diminish, though only marginally. Furthermore, research and analysis have to be done to make any

conclusion about the importance of this factor, and whether it depends on the level of digital literacy or – the other way round the level of digital literacy depends on the economic structure.

At EU level e-learning materials seem to be relatively widespread. Almost half the respondents still studying (44%) had used e-learning materials within the last four weeks. A little over half of the students, who have had the opportunity by using a PC, etc., actually did use e-learning materials.

However, there appears to be important differences at national level – differences that do not follow the pattern of use of the Internet or the level of digital literacy. This data has a low level of confidence in statistical means. Therefore, further research has to be done to find out if this is real differences, and if it shows a pattern of use of e-learning independent of factors such as digital literacy and general Internet use.

Looking at the tested indicators as such, the indicators of digital literacy seems to be a good first step in measuring the competencies for the Information Society, or digital literacy in a simple approach. The indicators of the index measure technical skills and a few analytic skills part of the (cross curriculum) competencies, which will be strongly emphasised in the Information Society. The answers from the test indicated that the questions are understood.²⁷

Regarding the students' use of e-learning materials, the results show a surprising pattern of diffusion of elearning, though at the national level which has a low reliability. Further research needs to be done before concluding at the indicator value and the results.

²⁷ Differences in interpretation due to national, social or other biases could be tested for further use of the indicators.

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8 ANNEX 1 - tables/graphs with data (analysing data)

Table annex 1.1: COQS index of digital literacy in the whole population ref. Figure 4.8

index for digital literacy						
	Total population		Men		Women	
	COQS value (avr.)	N	COQS value (avr.)	N (weighted)	COQS value (avr.)	N (weighted)
A	1.04	500	1.23	240	0.87	260
B	0.73	585	0.92	283	0.54	302
DK	1.42	501	1.67	245	1.18	256
FIN	1.09	669	1.18	336	1.01	333
F	0.52	1000	0.68	480	0.38	520
D	0.93	1001	1.22	484	0.66	517
EL	0.48	505	0.69	246	0.29	259
IRL	0.99	500	1.06	245	0.93	255
I	0.69	1000	0.90	481	0.49	519
L	0.91	500	1.24	231	0.63	269
NL	1.10	530	1.34	250	0.89	280
P	0.45	500	0.62	222	0.32	278
E	0.67	1015	0.81	479	0.55	536
S	1.04	500	1.27	245	0.83	255
CH	1.00	522	1.33	250	0.70	272
UK	1.20	1000	1.38	488	1.04	512
USA	1.49	1004	1.68	487	1.32	517
EU 15	0.84	10306	1.04	4957	0.64	5349

Source: SIBIS 2002, GPS Base

Table annex 1.2: Level of digital literacy in income groups. COQS index a scale from 0 to 3. ref. figure 4.12.

Level of digital literacy separated in income groups, (values in COQS index and N)		
Income groups	COQS value (avr)	N
less than 'income 1'	0.43	1774
income 1' to less than 'income 2'	0.69	2132
income 2' to less than 'income 3'	1.03	2536
income 3 or more	1.30	2968
dk/refusal	0.79	1214
Total	0.91	11832

Source: SIBIS 2002, GPS Base

For definition of income groups see the general presentation of survey methodology in annex 2.

Table annex 1.3: Students' use of e-learning, divided in states. Number of answers, expected number of answers and % of counted national answers, ref. Figure 4.13.

		Use of electronic learning material by students			
		yes	no	DK and no answer	Total: N (weighted) and%
A	Count	30	24	1	55
	Expected Count	29	26	0	55
	% within Country	55%	44%	2%	100%
B	Count	32	20	6	58
	Expected Count	30	27	0	58
	% within Country	55%	34%	10	100%
DK	Count	28	41	0	69
	Expected Count	36	32	1	69
	% within Country	41%	59%	0	100%
FIN	Count	37	71	2	110
	Expected Count	57	52	1	110
	% within Country	34%	65%	2	100
F	Count	41	55	1	97
	Expected Count	51	46	1	97
	% within Country	42%	57%	1	100%
D	Count	48	44	0	92
	Expected Count	48	43	1	92
	% within Country	52%	48%	0	100%
EL	Count	38	4	0	42
	Expected Count	22	20	0	42
	% within Country	90%	10%	0	100%
IRL	Count	42	50	1	93
	Expected Count	48	44	1	93
	% within Country	45%	54%	1	100%
I	Count	52	48	0	100
	Expected Count	52	47	1	100
	% within Country	52%	48%	0	100%
L	Count	46	17	1	64
	Expected Count	33	30	1	64
	% within Country	72%	27%	2	100%
NL	Count	47	18	0	65
	Expected Count	34	31	1	65
	% within Country	72%	28%	0	100%
P	Count	28	27	0	55
	Expected Count	29	26	0	55
	% within Country	51%	49%	0	100%
E	Count	85	73	0	158
	Expected Count	82	74	1	158
	% within Country	54%	46%	0	100%
S	Count	29	43	0	72
	Expected Count	38	34	1	72
	% within Country	40%	60%	0	100%

		Use of electronic learning material by students			
		yes	no	DK and no answer	Total: N (weighted) and%
CH	Count	26	42	0	68
	Expected Count	35	32	1	68
	% within Country	38%	62%	0	100%
UK	Count	73	51	0	124
	Expected Count	65	58	1	124
	% within Country	59%	41%	0	100%
USA	Count	87	66	0	153
	Expected Count	80	72	1	153
	% within Country	57%	43%	0	100%
Total	Count	769	694	12	1475
	Expected Count	769	694	12	1475
	% within Country	52%	47%	1	100%

Source: SIBIS 2002, GPS Base

Table annex 1.4: Validation of SIBIS data on use of e-mail/confidence in use of e-mail

Share of Internet users which use e-mail							Confidence in use of e-mail	
	Flash Eurobarometer (FEB)*	SIBIS **	Rank FEB	Rank SIBIS	Difference in rank FEB-SIBIS	Difference in % points FEB-SIBIS	'very confident' in use of e-mail	Rank
DK	63	85	1	1	0	-22	78	1
NL	63	84	2	2	0	-21	65	2
SW	60	83	3	3	0	-23	62	3
UK	51	78	6	4	2	-27	64	4
A	53	76	5	5	0	-23	74	5
FIN	55	75	4	6	-2	-20	65	6
L	50	73	7	7	0	-23	56	7
D	42	73	9	8	1	-31	59	8
IRL	47	68	8	9	-1	-21	58	9
B	36	66	11	10	1	-30	49	10
IT	30	64	14	11	3	-34	45	11
FR	37	62	10	12	-2	-25	42	12
SP	32	56	13	13	0	-24	48	13
GR	12	51	15	14	1	-39	39	14
P	33	46	12	15	-3	-13	37	15
CH		73					63	
USA		82					72	

Note: Switzerland and USA is excluded of the Eurobarometer list

* Use of e-mail for private use is measured. Note data is adjusted to all population, Flash Eurobarometer 125, May/June 2002

** use of e-mail (within last 4 weeks of all respondents are measured, SIBIS GPS survey)

9 ANNEX 2 - Methodology of the General Population Survey (GPS)

9.1 Outline of the study

The survey was conducted in April-May 2002 in all 15 EU Member States plus Switzerland and the USA, using computer-aided telephone interviews. The survey was co-ordinated and executed by INRA, Germany. The population for this study is all persons aged 15 and over living in private households in the respective countries and speaking the respective national language(s). Subject discussed included ownership and use of ICT equipment, use of the Internet and e-commerce activities, competence in the use of new media, questions on health and the Internet, the Internet and security concerns, e-government, telework, mobile work and other new ways of working, as well as further education and satisfaction with working conditions. 11,832 interviews were successfully completed. The average interview length per country varied between 10 and 20 minutes.

9.1.1

Subject of study	Topics of this survey were statements on interviewees' ownership and use of ICT equipment, use of the Internet and ecommerce activities, competence in the use of new media, questions on health and the Internet, the Internet and security concerns, e-government, telework, mobile work forms, as well as further education and satisfaction with working conditions.	
Study concept	The study was conceived and executed as a cross national study. The co-ordination was carried out by INRA Deutschland GmbH, Mölln, on behalf of the client. The study consisted of two parts, a trial in Germany with a subsequent main survey in all participating countries.	
Overall responsibility and co-ordination	INRA Deutschland GmbH, Mölln	
Countries and executing institutes	Belgium:	INRA Belgium Kroonlaan 159-165 Avenue de la Couronne 1050 Brussels
	Denmark:	Gallup A/S Sundkrogsgade 10 2100 Copenhagen
	Germany:	INRA Germany GmbH Papenkamp 2-6 23879 Mölln
	Finland:	Taloustutkimus Oy Lemuntie 9 00510 Helsinki
	France:	BVA B.P. 59 78222 Viroflay Cedex

Greece:	MEMRB – K.E.M.E 24 Ippodamou St. 11635 Athens
Great Britain:	BMRB International Saunders House, 53 The Mall, Ealing London W5 3TE
Ireland:	Lansdowne Market Research Ltd. 49 St. Stephens Green Dublin 2
Italy:	INRA Demoskopea Via Salaria, 290; Via Rubicone 41 00199 Roma
Luxembourg:	ILReS. S.A. 46, Rue du Cimetière 1338 Luxembourg / Bonnevoie
Netherlands:	NIPO Grote Bickersstraat 74 1013 ks Amsterdam
Austria:	Spectra Brucknerstr. 3-4/5 4020 Linz
Portugal:	METRIS Av. Eng. Arantes e Oliviera, No. 3-2 1900 Lisboa
Sweden:	GfK Sverige AB Box 401 22100 Lund
Switzerland:	Link Institut Spannortstrasse 7/9 6000 Luzern
Spain:	INRA España S.A. Calle Alberto Aguilera 7-5º 28015 Madrid
USA:	I.C.R 605 West Street Media, Pennsylvania 19063-2620

Survey methodology The study was carried out as a telephone survey (Computer Assisted Telephone Interview – C.A.T.I) in all countries.

Population

The population for this study is all persons aged 15 and over living in private households in the respective countries and speaking the respective national language(s).

Switzerland: Here the survey was carried out in both the German and French speaking parts of Switzerland.

USA: The population includes English speaking people in the 48 continental federal states of the USA (excluding Alaska and Hawaii).

Finland: Finnish speaking population.

Random sampling and selection process

Belgium: 3-stage selection process based on the INFO BEL telephone directory. Addresses in 10-fold translation, random sampling of households, selection of the target person via a birthday key.

Denmark: Geographically stratified sample based on telephone directories. Telephone numbers are generated so as to also include unlisted numbers. The selection of the target person results from a birthday key.

Germany: Within the ADM telephone sampling system a representative, multistage random sample is drawn for each survey area. The selection data is based on the batch of all registered fixed network telephone numbers. Master numbers are formed by detaching the two final digits. Through the generation of new final digits from 00 to 99 number blocks are produced which contain listed as well as non listed numbers. As far as possible, business numbers were removed from this sampling frame. All telephone numbers were given an area code number, either the original or according to the known distribution in the number block. In this way numbers can be sorted regionally, thus increasing the precision of the sample. By means of the relation between sample size and distribution of households per regional cell an allocation table is produced which determines the number of samples to be drawn for each cell. Assuming a random starting point, all areas are processed with a fixed step width through set stages until the number to be selected from which areas for each cell has been determined. Subsequently the numbers are drawn randomly in a second selection stage. The selection of the target person results from a birthday key.

Finland: Geographically and socio-demographically stratified random sample based on information from official statistics. The selection of target households takes place at random. The selection of target persons results from a birthday key.

France: Geographically and socio-demographically stratified random sample of 8000 starter addresses based on France Telecom directories. The selection of target persons results from a birthday key.

Greece: Multistage stratified random sampling. The geographical stratification takes place on the basis of NUTS 1, NUTS 2 and location size. The size of each unit is determined on the basis of official statistics. The selection of the target person results from a birthday key.

Great Britain: The sample is based on a draw data-file. Through the generation of new final digits a sample frame is established which contains listed and unlisted as well as so far non-existent numbers. The selection of target households takes place at random. The selection of the target person is via quota.

Ireland: Geographically sorted random sample based on the

"Eircom" telephone directory. Additional telephone numbers are also generated in order to include unlisted numbers. The selection of the target person results from a birthday key.

Italy: Geographically and socio-demographically stratified random sample. 705 sample points result from the stratification. Additional telephone numbers are generated in order to also include unlisted numbers. The selection of the household results from Random Digit Dialling and the selection of the target person results from a birthday key.

Luxembourg: The sample is based on a draw data-file. Through the generation of new final digits from 00 to 99 a sample frame is established which contains listed and unlisted as well as so far non-existent numbers. The selection of target households takes place at random. The selection of the target person results from a birthday key.

Netherlands: Geographically stratified random sample. The geographical sorting is based on post code areas. Target person selection takes place through an algorithm which selects the interviewee on the basis of age and gender of people living in the household.

Austria: Geographically stratified random sample. The selection of the target household takes place through RDD (Random Digit Dialling). The selection of the target person results from a birthday key.

Portugal: Geographically and socio-demographically stratified random sample. 200 sample points result from the stratification. The selection of households takes place via Random Digit Dialling, the selection of target persons via a birthday key.

Sweden: Geographically and socio-demographically stratified random sample. 200 sample points result from the stratification. The selection of households takes place via Random Digit Dialling, the selection of target persons via a birthday key.

Switzerland: Geographically stratified random sample based on post codes. Each post code represents a sample cell. The selection of households takes place via Random Digit Dialling and the selection of the target person via an algorithm which selects the interviewee at random on the basis of a list of household members.

Spain: Geographically stratified random sample based on NUTS2 areas. 148 randomly selected sample points result from the sorting. Within these sample points addresses of target households are randomly drawn. Selection of target persons results from a birthday key. After about two thirds of the fieldwork the screening was targeted towards male members of the household due to a disproportionate number of female interviewees.

USA: Geographically stratified random sample based on the MSG-Genesys sampling process. The selection of households takes place via Random Digit Dialling and the selection of the target persons via a birthday key. After the 758th interview the screening was targeted towards male members of the household due to a disproportionate number of female interviewees.

Survey period

The interviews were carried out in the following period:
04.03.-18.05.2002

**Interviews
undertaken**

Total: 11,832

Average interview length	Belgium	16.0 min	Luxembourg	16.2 min
	Denmark	18.1 min	Netherlands	18.4 min
	Germany	17.5 min	Austria	15.8 min
	Finland	17.3 min	Portugal	12.1 min
	France	12.0 min	Sweden	20.2 min
	Greece	10.2 min	Switzerland	19.0 min
	Great Britain	18.0 min	Spain	12.5 min
	Ireland	17.7 min	USA	18.3 min
	Italy	14.0 min		
	Interviewers used	Total:	632	
Additional comments to the data set	Belgium:	In order to improve the sample, an additional 85 interviews were carried out in some cells.		
	Finland:	In order to improve the sample, an additional 169 interviews were carried out in some cells.		
	Netherlands:	In order to improve the sample, an additional 30 interviews were carried out in some cells.		
	Switzerland:	In Switzerland respondents were not asked to deduct tax from income (Z19), as that is not the norm there.		
Data supply	One labelled SPSS data set of the main survey of all interviews.			

Field report and outcomes

	B	DK	D	FIN	F	EL	UK	IRL	I	L	NL	AT	P	S	CH	E	USA
Method	C.A.T.I.																
1 gross sample (utilised addresses)	4506	3154	9999	2621	7300	5022	11392	3890	12006	8764	3640	4669	1403	5177	2327	6494	18162
1.1. non-contacts – thereof:	311	242	1701	40	3401	2346	139	1111	4436	5023	803	193	91	455	638	1239	4192
1.1.1 unobtainable	0	235	1202	0	2342	2077	123	654	4436	3748	522	124	43	113	638	644	3656
1.1.2 engaged	3	7	436	0	57	206	1	316	0	705	164	8	32	55	0	5	536
1.1.3 answer phone, fax, modem	308	0	63	40	1002	63	15	141	0	570	117	61	16	287	0	590	0
1.1.4 other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.2 sample neutral non-response – thereof:	1874	1917	4492	984	511	1022	5088	1051	2659	1316	805	2322	410	2808	322	1095	8789
1.2.1 invalid telephone numbers	955	1516	3760	97	60	529	4308	498	1657	790	652	858	334	2297	230	398	5725
1.2.2 not in the population	472	202	41	782	374	176	119	405	364	0	153	1248	47	16	0	164	478
1.2.3 business numbers	300	82	285	12	27	220	437	0	340	455	0	75	15	193	0	434	1331
1.2.4 other	147	117	406	93	50	97	224	148	298	71	0	141	14	302	92	99	1255
2 net sample – thereof:	2321	995	3806	1597	3388	1654	6165	1728	4911	2425	2032	2154	902	1914	1367	4160	5181
2.1 refusal	1470	468	2451	912	2231	747	5012	1134	3592	1000	1248	1609	364	1246	529	2255	3198
2.2 termination	114	0	87	0	30	0	80	11	201	0	0	1	6	19	0	115	143
2.3 target person contacted but interview	152	26	267	16	127	402	73	83	118	925	254	44	32	146	316	775	836
2.3.1 possible appointment outside field time	0	23	14	1	23	9	26	14	106	763	208	7	6	30	80	321	156
2.3.2 appointments to continue interview outside	152	0	200	0	104	295	47	65	12	17	11	34	18	24	194	179	669
2.3.3 other	0	3	53	15	0	98	0	4	0	145	35	3	8	92	42	275	11
2.4 complete interviews	585	501	1001	669	1000	505	1000	500	1000	500	530	500	500	503	522	1015	1004
3 exhaustion rate (%) (2.4/(2.1+2.2+2.4))	27.0%	51.7%	28.3%	42.3%	30.7%	40.3%	16.4%	30.4%	20.9%	33.3%	29.8%	23.7%	57.5%	28.5%	49.7%	30.0%	23.1%

9.1.2 Weighting

1. Transformation from household sample to person sample:

As only one person per household is interviewed, the described sample procedure provides a household sample, i.e. each household of the base population has the same likelihood of being in the sample but not each person. With the weighting stage of the transformation the equal likelihood of households is replaced mathematically by the equal likelihood of the individuals. To this end, each data set is multiplied by the amount of people in the household aged 15 or over. This number is subsequently divided by the average household size in order to obtain the actual case number.

2. Adjustment of unweighted sample structure to the official statistic:

Because random samples are not evenly distributed across all population strata, the distribution of unweighted samples regularly and systematically deviate from the population distribution from official statistics. Through the mathematical weighting the sample distribution is adjusted to the official statistics. The national weighting factor (P10) which results from the iterative weighting was included in the data material. To this end the following criteria are used in the respective countries.

Austria: age, gender, region; **Belgium:** age, gender, region, locality size; **Denmark:** age, gender, region; **Germany:** age, gender, region, locality size; **Greece:** age, gender, locality size; **Finland:** age, gender, region; **France:** age, gender, region, locality size; **Ireland:** age, gender, region; **Italy:** age, gender, region, locality size; **Luxembourg:** age, gender, region, locality size; **Netherlands:** age, gender, region; **Portugal:** age, gender, region, locality size; **Sweden:** age, gender, region; **Switzerland:** age, gender, region; **Spain:** age, gender, region, locality size; **UK:** age, gender, region; **USA:** age, gender, region, locality size.

3. Adjustment of weighted sample structure to the EU15-member states population:

This weighting factor was necessary to calculate total figures according to the whole population of the European Union member states. Furthermore it is useful to compare the EU with the US. Population sizes of each member state are weighted to reduce the distortion based on the sample sizes in each country. The different country-specific weighting factors are the following:

Austria	0.44	Italy	1.63
Belgium	0.48	Luxembourg	0.02
Denmark	0.29	Netherlands	0.80
Germany	2.29	Portugal	0.55
Greece	0.59	Spain	1.09
Finland	0.21	Sweden	0.48
France	1.56	United Kingdom	1.57
Ireland	0.20	Switzerland, USA	none

9.1.3 Sample characteristics and effect of weighting

	Total				EU15			
	un-weighted	weighted	% un-weighted	% weighted	un-weighted	weighted	% un-weighted	% weighted
Total sample	11832	11832	100.0	100.0	11832	10306	100.0	100.0
Country								
Austria	500	500	4.2	4.2	-	-	-	-
Belgium	585	585	4.9	4.9	-	-	-	-
Denmark	501	501	4.2	4.2	-	-	-	-
Finland	669	669	5.7	5.7	-	-	-	-
France	1000	1000	8.5	8.5	-	-	-	-
Germany	1001	1001	8.5	8.5	-	-	-	-
Greece	505	505	4.3	4.3	-	-	-	-
Ireland	500	500	4.2	4.2	-	-	-	-
Italy	1000	1000	8.5	8.5	-	-	-	-
Luxembourg	500	500	4.2	4.2	-	-	-	-
Netherlands	530	530	4.5	4.5	-	-	-	-
Portugal	500	500	4.2	4.2	-	-	-	-
Spain	1015	1015	8.6	8.6	-	-	-	-
Sweden	500	500	4.2	4.2	-	-	-	-
Switzerland	522	522	4.4	4.4	-	-	-	-
UK	1000	1000	8.5	8.5	-	-	-	-
USA	1004	1004	8.5	8.5	-	-	-	-
EU15	-	-	-	-	10306	10306	87.1	100.0
Age groups								
up to 24	1964	2019	16.6	17.1	1731	1651	16.8	16.0
25 to 49	5511	5309	46.6	44.9	4817	4593	46.7	44.6
50 to 64	2515	2495	21.3	21.1	2191	2209	21.3	21.4
65 and more	1833	2000	15.5	16.9	1558	1839	15.1	17.8
don't know	9	9	0.1	0.1	9	14	0.1	0.1
Terminal education age								
up to 13	695	717	5.9	6.1	693	728	6.7	7.1
14	715	742	6.0	6.3	701	881	6.8	8.5
15 to 16	1794	1750	15.2	14.8	1641	1820	15.9	17.7
17 to 20	3587	3515	30.3	29.7	2997	2937	29.1	28.5
21 and more	3266	3275	27.6	27.7	2743	2495	26.5	24.2
still studying	1687	1751	14.3	14.8	1463	1372	14.2	13.3
don't know	88	81	0.7	0.7	77	73	0.7	0.7
Household type								
one person household	2006	1611	17.0	13.6	1682	1408	16.3	13.7
household with kids aged under 6	1723	1754	14.6	14.8	1451	1440	14.1	14.0
household with kids aged 6+	2970	3152	25.1	26.6	2653	2655	25.7	25.8
two person household without kids	5063	5240	42.8	44.3	4467	4768	43.3	46.3
no answer on household size	70	75	0.6	0.6	53	35	0.5	0.3

	Total				EU15			
	un-weighted	weighted	% un-weighted	% weighted	un-weighted	weighted	% un-weighted	% weighted
Household income (according to national household income quartiles by Eurobarometer)								
First quartile (lowest income)	1774	1580	15.0	13.4	1548	1299	15.0	12.6
Second quartile	2132	2084	18.0	17.6	1878	1764	18.2	17.1
Third quartile	2536	2521	21.4	21.3	2214	2087	21.5	20.3
Fourth quartile (highest income)	2968	3102	25.1	26.2	2502	2725	24.3	26.4
don't know	1214	1295	10.3	10.9	993	995	9.6	9.7
refusal	1208	1249	10.2	10.6	1171	1436	11.4	13.9
Employment status								
paid employment	4966	4853	42.0	41.0	4291	4133	41.6	40.1
self-employed	935	941	7.9	8.0	809	799	7.8	7.8
unemployed/ temporarily not working	701	683	5.9	5.8	621	631	6.0	6.1
in education	1687	1751	14.3	14.8	1463	1372	14.2	13.3
retired or other not working	3441	3510	29.1	29.7	3034	3292	29.4	31.9
don't know	102	94	0.9	0.8	88	80	0.9	0.8
Social grade (ESOMAR classification)								
unskilled manual workers and other less well educated workers/ employees	1332	1318	11.3	11.1	1238	1323	12.0	12.8
skilled workers and non-manual employees	1525	1445	12.9	12.2	1316	1287	12.8	12.5
well educated non-manual and skilled workers	1434	1402	12.1	11.8	1254	1121	12.2	10.9
managers and professionals	1577	1586	13.3	13.4	1265	1167	12.3	11.3
not specified	5964	6081	50.4	51.4	5233	5408	50.8	52.5

9.2 Questionnaire for the General Population Survey (GPS)

Structure of the questionnaire:

Module IN: Introduction and screening

- Age
- Educational attainment
- Employment status
- Occupation
- Type of organisation
- Main working place

Module A: Basic ICT equipment access and use

- Use of computer
- Use of e-mail
- Internet access and use
- Methods of Internet access
- Effects of Internet use
- Barriers to using the Internet
- Access to mobile phone
- Mobile data services
- Effects of mobile phone use

Module B: E-commerce and other uses of the Internet

- Online activities

- Barriers to buying online

Module D: Skills

- Internet user experience and know-how

Module L: e-Health

- Use of online health information
- Perception regarding the trust placed in online health information provider
- Rationale for health info search

Module J: Security

- Security concerns
- Reporting of security violations
- Security-related awareness and behaviour

Module K: e-Government

- Preference for e-Government services
- e-Government experience
- Barriers to e-Government

Module E: Telework

- Home-based telework
- Intensity of home-based teleworking
- Duration of telework:
- Financing of tele-workplace
- Interest in telework:
- Perceived feasibility
- Effects of telework

Module F: Mobile work

- Mobile work (Intensity)
- Mobile telework

Module G: Tele-cooperation/Tele-collaboration

- Co-operation with external contacts using ICTs
- e-Lancing

Module H: Outcomes of work

- Work-family balance
- Job quality
- Job satisfaction

Module C: Educational attainment and lifelong learning

- Company-provided training
- Training provided by other organisations
- Self-directed learning
- Modes of training (use of eLearning)

Module Z: Standard demography

- Household size
- Disability
- Income

No <i>Branching</i>	Question	Answer categories
Module IN: Introduction and Screener questions GPS		
INTRO TEXT <i>ALL</i>	Hello my name is ... calling for ... We are presently conducting a scientific survey for the European Union in fifteen countries. I would like to talk to the person in your household, that is at least 15 years old, and whose birthday is up next. <i>[INTERVIEWER: IF NECESSARY]</i> To topic of this survey is the Internet and the work life. <i>[INTERVIEWER: IF NECESSARY]</i> Your answers will be held strictly confidential and will be used only for scientific purposes. <i>[INTERVIEWER: IF NECESSARY]</i> Your participation is very important to us, because you have been selected through a statistical procedure that will result in a typical selection of people in [COUNTRY] <i>[PROMPT: The interview will last about 15 minutes]</i>	
IN1 <i>ALL</i>	Would you please tell me in which year you were born?	_1_ _9_ _ _ [DK]
	<i>PROGRAMMING: IF respondent born after 1986 END INTERVIEW!</i>	
IN2 <i>ALL</i>	Have you finished your full-time education or are you still studying?	(1) finished education already (2) Is still studying (3) DK
IN3 <i>IF IN2=1</i>	At what age did you finish full-time education? <i>[PROMPT: HOW OLD WERE YOU WHEN YOU STOPPED FULL-TIME EDUCATION]</i>	_ _ years [DK]
Transition X1 <i>IF IN2=1</i>	I would like to ask you a few questions regarding your employment situation.	
IN4 <i>IF IN2=1</i>	At present are you in paid work either as an employee, civil servant or as self-employed?	(1) yes (2) no (3) DK
IN5a <i>IF IN4=1</i>	Do you have one job or more than one job at present?	(1) only one job (2) more than one job (3) DK
IN5b <i>IF IN5a=2,3</i>	How many hours per week do you normally work, including paid overtime and taking all your jobs together?	_ _ _ _ [DK]
Transition X2 <i>IF IN5a=2</i>	For answering the following questions, please consider only your main job, i.e. the job you spend most of your working time on.	
IN6 <i>IF IN4=1</i>	And are you ... [in your main job] <i>[INTERVIEWER: Read out answer categories]</i>	(1) self-employed (2) in paid employment (including civil servants) (3) DK

No Branching	Question	Answer categories
IN7 IF IN4=2,3	And are you ... [INTERVIEWER: Read out answer categories]	(1) temporarily not working, e.g. because of unemployment, paternal leave or illness (2) retired (3) not working, because you are responsible for ordinary shopping and looking after the home. (4) DK
IN8 IF IN6=1	What kind of work do you do? Are you a ... [INTERVIEWER: Read out answer categories]	(1) Professional (eg doctor, lawyer, accountant, architect) (2) Farmer, fisherman (3) Business proprietor, owner of company/shop, craftsmen, other self-employed person (4) DK
IN9 IF IN8=3	How many employees do you have?	_ _ _ _ _ _ _ _ [DK]
IN10 IF IN4=1	[In your main job,] Are you working full-time or part-time?	(1) full-time (2) part-time (3) DK
IN11 IF IN4=1	How many hours per week do you normally work in your main job, [PROGRAMMER: Skip the following if IN6=1] including <u>paid</u> overtime?	_ _ _ _ [DK] [PROGRAMMER: INCLUDE CHECK WITH IN5B]
IN12 IF IN6=2,3	Are you employed ... [INTERVIEWER: Read out answer categories]	(1) on an unlimited permanent contract (2) on a fixed term contract (3) on a temporary employment agency contract (4) on apprenticeship or other training scheme (5) other (6) DK
IN13 IF IN7=2,3,4	Would you like to be in paid work?	(1) yes (2) no (3) DK
IN14 IF IN8=3 or IN6=2	What kind of work do you do? Are you ... [INTERVIEWER: Read out answer categories]	(1) working mainly at a desk (2) not working at a desk, but travelling (salesmen, driver, ...), (3) not working at a desk, but in a service job (retail shop, restaurant, ...) (4) doing some other kind of work (5) DK
IN15 IF IN6=2	What position do you hold? [INTERVIEWER: Read out answer categories]	(1) Employed professional (employed lawyer, medical practitioner, accountant, architect etc.), (2) Management (3) Other non-manual employee (4) Manual worker (5) DK

No <i>Branching</i>	Question	Answer categories
A3 <i>IF A1=1</i>	Have you sent or received any e-mail messages, for work or for private purposes, during the last four weeks?	(1) yes (2) no (3) DK
A4a <i>IF A3=1</i>	How many of your friends and relatives have their own email address? <i>[INTERVIEWER: Read out answer categories]</i>	(1) all or almost all (2) about three quarters (3) about half (4) about one quarter (5) only few or no-one (6) DK
A4b <i>IF A4a<5</i>	And with how many of your friends and relatives do you communicate regularly via email? <i>[INTERVIEWER: Read out answer categories]</i>	(1) all or almost all (2) about three quarters (3) about half (4) about one quarter (5) only few or no-one (6) DK
A5 <i>ALL</i>	Do you have access to the Internet in your home?	(1) yes (2) no (3) DK
A6 <i>IF A5=2</i>	Did you once have Internet access in your home?	(1) yes (2) no (3) DK
A7 <i>ALL</i>	Have you used the Internet at least once in the last four weeks, at home, at school or work or at any other place?	(1) yes (2) no (3) DK
A8 <i>IF A7=2,3</i>	Have you used it in the last 12 months at least once?	(1) yes (2) no (3) DK
A9 <i>FOR (a): IF A7=1 and A5=1 FOR (b)-(f): IF A7=1</i>	How much <u>time</u> do you spend in a typical week on using the Internet ... [item] <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) at home? (b) at the workplace? (c) at school, university or another educational institution? (d) at a public place where Internet access is free? (e) at an Internet café or other place where you have to pay for access? (f) at another place not mentioned yet	FOR EACH (1) none (2) less than 1 hour (3) between 1 and 5 hours (4) between 6 and 10 hours (5) between 11 and 20 hours (6) more than 20 hours (7) DK
A10 <i>IF A7=1 or A8=1</i>	When did you use the Internet for the first time? <i>[INTERVIEWER: Read out answer categories]</i>	(1) < 6 months ago (2) 6 - 12 months ago (3) 1 year - 2 years ago (4) 2 years + ago (5) DK

No <i>Branching</i>	Question	Answer categories
A11a <i>IF A5=1</i>	Do you know what technical method you use at home to connect to the Internet?	(1) yes (2) no (3) NA
A11b <i>IF A11a=1,3</i>	I will read to you a number of methods to access the Internet. Which of these do you use at home? <i>[INTERVIEWER: Read out and code those that apply]</i>	MULTIPLE ANSWERS (1) Dial-up with modem (2) Cable Modem (3) Leased line (4) xDSL (5) ISDN (6) T1 or T3 line [TRANSLATOR: Digital Multiplex connection] (7) Internet access via satellite (8) Other not mentioned (e.g. mobile) (9) DK
A12 <i>IF A11b=2,3,4,5,6,7</i>	At home, did you have a connection before which was slower than your current one?	(1) yes (2) no (3) DK
A13 <i>IF A12=1</i>	Since moving to this faster type of connection, has the amount of time you spend online per week decreased, increased or remained roughly the same?	(1) Decreased (2) Increased (3) Remained roughly the same (4) DK
A14 <i>IF A7=1</i>	In the last four weeks, have you accessed the Internet in any other way than via PC or Mac, at least once?	(1) yes (2) no (3) DK
A15 <i>IF A14=1</i>	Which devices did you use for that: Did you use ... <i>[INTERVIEWER: Read out and code those that apply]</i>	MULTIPLE ANSWERS (1) Digital TV*, (2) a PDA or palmtop, (3) a mobile phone with WAP or 2.5G** capability, (4) a game console (5) other (6) DK <i>[* TRANSLATOR: Make sure that you take local brand names and colloquial terms into account]</i> <i>** TRANSLATOR: Use term used in your country (e.g. Germany: GPRS)]</i>

No Branching	Question	Answer categories
A18 IF A7=2,3	<p>Now I will read to you a list of statements about the Internet.</p> <p>Please tell me for each statement whether you agree completely, agree somewhat or do not agree.</p> <p>The Internet ... [item]. Do you ...</p> <p>(a) requires advanced computer skills,</p> <p>(b) is not easy enough to get access to,</p> <p>(c) is too time consuming,</p> <p>(d) is too expensive to use,</p> <p>(e) lacks useful or interesting information</p> <p>(f) is not something for me</p>	<p>FOR EACH</p> <p>(1) agree completely</p> <p>(2) agree somewhat</p> <p>(3) or do you not agree</p> <p>(4) DK</p>
A19 ALL	Do you have a mobile phone for your own personal use?	<p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>
A20 ALL	<p>How many of your friends and relatives have a mobile phone for their personal use?</p> <p>[INTERVIEWER: Read out answer categories]</p>	<p>(1) all or almost all</p> <p>(2) about three quarters</p> <p>(3) about half</p> <p>(4) about one quarter</p> <p>(5) only few or no-one</p> <p>(6) DK</p>
A23 IF A19=1 and A15--=3	<p>Have you used your mobile phone to view webpages or WAP pages, or to read your email, at least once in the last 4 weeks?</p> <p>[TRANSLATORS: Confusion with SMS* to be avoided!]</p>	<p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>
A26 IF A23=1	Have you used your mobile phone at least once in the last 12 months to make any purchases in the Internet, to download online information you are charged for or to make online payments?	<p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>
A27 IF A19=1	<p>Have you, in the last four weeks, used SMS* messages for ...</p> <p>(a) communication with other people?</p> <p>(b) paying for purchases, admission tickets or something similar?</p> <p>(c) paying for downloads such as ringing tones?</p> <p>(d) receiving financial information, sport results or other subscription services?</p> <p>[* TRANSLATOR: Check if another term is more common in your country]</p>	<p>FOR EACH</p> <p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>

No Branching	Question	Answer categories
A30 IF A19=1 (For (d) and (e): IF A19=1 and (A8=1 or A7=1) and IN4=1)	Now, think about what your everyday life would be like if you didn't have a mobile phone. Please tell me how much you agree that if you didn't have a mobile phone (ITEM). Would you say that you ... <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) you would often not be able to contact your friends and family, or be reached by them (b) you would be less exposed to dangerous electromagnetic radiation (c) you would be more helpless in case of emergencies (d) you would not receive some of the information you need for your job (e) you would have less exchange with some of your business contacts (f) you would have less fun	FOR EACH: (1) agree completely (2) agree somewhat (3) do not agree (4) DK
Module B: E-commerce and other uses of the Internet		GPS
Transition B IF A8=1 or A7=1	Now I would like to ask you a few questions about the Internet.	
	<i>PROGRAMMING: B1 to B2: for each item in B1=1 ask directly B2, then go to next item in B1</i>	
B1 IF A8=1 or A7=1	You can use the Internet for many purposes. I'm going to read you a list of things you can do online and ask you whether you have done this online for your private purposes. For your private purposes, have you used it in the last 12 months... (a) to find information about a product or service (b) to order a product or service (c) to conduct online-banking or to buy financial products (d) to search for any health-related information (e) to look for a job	FOR EACH (1) yes (2) no (3) DK
B2 IF B1=1 and A7=1	<i>[FOR EACH B1 ITEM]</i> Have you done so in the last four weeks?	(1) yes (2) no (3) DK
B5 IF A7=1 (For (c) and (d): IF A7=1 and IN4=1)	Many people in this country still do <u>not</u> have access to the Internet yet. Now please imagine our country were without the Internet for one month. What would it mean for your everyday life? Please tell me how much you agree that if our country were without the Internet for a month you would (ITEM). Would you say that you would ... <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) be less well informed as a consumer (b) feel socially excluded (c) not receive some of the information you need for your job (d) have less communication with some of your contacts at work / your business contacts (e) have less contact with some of your friends (f) have less fun	FOR EACH: (1) agree completely (2) agree somewhat (3) do not agree (4) DK

No Branching	Question	Answer categories
Module D: Skills GPS		
D1 <i>IF A7=1 or A8=1</i> <i>[Do not ask item (h) in UK, IRL, USA]</i>	I would like to ask you a few questions about your skills in using the Internet. How confident would you feel... [item] Please tell me whether you feel.. <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) using a search engine (such as Google or Yahoo) to find information on the Internet <i>[TRANSLATORS: List two most widely used search engine brands in your country²⁸]</i> (b) identifying the source of information provided on the Internet (c) using e-mail to communicate with others (d) using Internet chat-rooms to contact other people (e) using the Internet to make telephone calls (f) creating a personal web / Internet page (g) downloading and installing software onto a computer <i>[PROGRAMMING: Do not ask item (h) in UK, IRL, USA]</i> (h) understanding the content of websites written in English	FOR EACH (1) very confident (2) fairly confident (3) not confident (4) Do not know what this means [DO NOT READ OUT] (5) DK
Module L: e-Health GPS		
Transition L <i>IF B1(d)=1</i>	You said before, that you have used the Internet to search for health-related information:	
L1 <i>IF B1(d)=1</i>	Have you been able to find health related information on the Internet?	(1) yes (2) no (3) DK
L2 <i>IF L1=1</i>	Was the information suitable for your needs?	(1) yes (2) no (3) DK
L3 <i>IF L2=1</i>	Websites with health related information are available in many languages. When you searched, did you find Websites in your mother tongue sufficient or did you have to expand your search and consult sites in other languages, or did you even have to rely solely on sites in other languages?	(1) Websites in mother tongue were sufficient (2) Had to expand my search and consult websites in other languages too (3) Had to rely solely on websites in other languages (4) DK
L4 <i>IF B1(d)=1</i>	And for what reasons did you search health-related information on the Internet? Did you search health-related information on the Internet to ...[item] (a) seek a second opinion on your own, a family member's, or a friend's medical diagnosis? (b) be better informed on your general health? (c) gather additional information since you care for an ill person or a person with a disability?	FOR EACH (1) yes (2) no (3) DK

²⁸ For example, check <http://www.jupitermx.com/europelanding.html>

No <i>Branching</i>	Question	Answer categories
L5 <i>IF B1(d)=1</i>	How trustworthy would you consider each of the following providers of health-related information: [Item] : Are those ... <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) Universities and other non-profit organisations active in the health sector / the health field (b) pharmaceutical companies (c) private health insurance providers (d) patient advocacy and self-help groups (e) hospitals (f) professional medical associations	FOR EACH (1) very trustworthy (2) fairly trustworthy (3) not trustworthy (4) DK
Module J: Security		GPS
Transition J <i>IF A7=1</i>	Now the topic is Internet security.	
J1 <i>IF A7=1</i>	How concerned are you about .[item]: Are you ... <i>[INTERVIEWER: Read out answer categories]</i> (a) data security on the Internet, i.e. the loss or manipulation of your data? (b) privacy and confidentiality on the Internet, i.e. personal information about you being misused by third parties?	FOR EACH (1) very concerned (2) somewhat concerned (3) not concerned (4) DK
J2 <i>IF J1(a)=1,2 or J1(b)=1,2</i>	Are these concerns stopping you from using the Internet to buy goods or services online: often, sometimes, or never?	(1) often (2) sometimes (3) never (4) DK
J3 <i>IF A7=1</i>	Would you report violations of your on-line security, privacy and confidentiality to a third independent party, for example a public agency created for this task? <i>[INTERVIEWER: Read out answer categories]</i>	(1) yes, very likely (2) maybe (3) no (4) DK
J4 <i>IF J3=1,2,3</i>	Would it be easier for you to do so if you could do it anonymously?	(1) yes (2) no (3) DK
J5 <i>IF A7=1 & (B1(b)=1 or B1(c)=1)</i>	How often are you aware of security features of websites when you use the Internet to buy online: often, sometimes or never?	(1) often (2) sometimes (3) never (4) DK
J6 <i>IF A7=1 & (B1(b)=1 or B1(c)=1)</i>	And how often do you take security features of websites into account when deciding about whether to buy online: often, sometimes or never?	(1) often (2) sometimes (3) never (4) DK
Module K: e-Government		GPS
Transition K <i>IF A7=1</i>	Now I would like to ask you a few questions about the contact to government agencies through the Internet.	

No <i>Branching</i>	Question	Answer categories
	<i>PROGRAMMING: K1 to K3: for each item in K1=1 ask directly K2, if K2=1 ask directly K3, then go to next item in K1</i>	
K1 <i>IF A7=1</i>	<p>Here is a list of activities that require citizens to get in touch with public administration.</p> <p>For each activity, please answer whether you would prefer to use the Internet or prefer to use the traditional way, that is face-to-face, by postal mail, fax or phone:</p> <p><i>[INTERVIEWER: Repeat answer categories for the first 2 items]</i></p> <p>(a) Tax declaration / filing your income tax return</p> <p>(b) Use of job search services of public employment service</p> <p>(c) Request for passport, driver's licence, birth certificates or other personal documents</p> <p>(d) Car registration</p> <p>(e) Declaration to the police, e.g. in case of reporting theft</p> <p>(f) Searches for books in public libraries</p> <p>(g) Announcement of change of address</p>	<p>FOR EACH</p> <p>(1) Internet</p> <p>(2) traditional way</p> <p>(3) do not use this service [DO NOT READ OUT]</p> <p>(4) DK</p>
K2 <i>IF K1=1</i>	<p>FOR EACH</p> <p>Is it possible to use the Internet for this in the area you live?</p>	<p>FOR EACH</p> <p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>
K3 <i>IF K2=1</i>	<p>FOR EACH</p> <p>Have you ever tried using the Internet for this?</p>	<p>FOR EACH</p> <p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>
K4 <i>IF A7=1</i>	<p>For each of the following statements about online services of public administration, please indicate whether you agree. Public services on the Internet ...[item].</p> <p><i>[INTERVIEWER: Read out answer categories for the first 2 items]</i></p> <p>(a) are not useful enough</p> <p>(b) are faster than the traditional way</p> <p>(c) require that you install special equipment or software</p> <p>(d) reduce the number of mistakes public authorities make</p> <p>(e) do not seem as safe as using the traditional way</p> <p>(f) make it possible to deal with the authorities at more convenient times</p> <p>(g) make it possible to deal with the authorities at more convenient locations, e.g. from home or from the workplace</p> <p>(h) are difficult to use</p>	<p>(1) agree completely</p> <p>(2) agree somewhat</p> <p>(3) do not agree</p> <p>(4) DK</p>
Module E: Telework		
Transition E <i>IF IN4=1 or IN13=1 or IN7=1</i>	<p>Now let's talk about another topic:</p> <p>With the help of telephone, fax and computer, many types of work can be done from home. If work results are transferred electronically, this is sometimes called telework.</p>	GPS

No <i>Branching</i>	Question	Answer categories
E1 <i>IF IN4=1</i>	Do you presently telework from home, for at least some of your working time?	(1) yes (2) no (3) DK
E2 <i>IF E1=2,3</i>	Have you teleworked on a regular basis before, in the last five years?	(1) yes (2) no (3) DK
E3 <i>IF E2=1</i>	Did you spend, on average, at least one full working day a week at home when you were teleworking?	(1) yes (2) no (3) DK
E4 <i>IF E1=1</i>	Do you spend, on average, at least one full working day a week teleworking from home?	(1) yes (2) no (3) DK
E5 <i>IF E1=1</i>	You indicated before that you work on average [<i>PROGRAMMER: Insert result from IN5b, if blank insert result from IN11</i>] hours per week. How many of these do you spend at home in a typical week?	_ _ _ [DK] <i>[PROGRAMMER: Insert check with IN5b or IN11]</i>
E7 <i>IF E1=1 and IN6=2</i>	Has the equipment you use for teleworking at home been mainly, not mainly but partly, or not at all been paid for by your employer?	(1) mainly paid for by employer (2) not mainly, but partly paid for by employer (3) not at all paid for by employer (4) DK
E8 <i>IF IN7=1 or IN13=1 or (E1=2,3 or E4=2,3)</i>	If it was offered to you, how interested would you be in ... [item]. Would you be ... <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) doing almost all your work teleworking at home (b) telework where you did not spend all your working time, but at least one full working day per week at home (c) work in an office provided near your home which would allow you to reduce commuting?	FOR EACH (1) very interested (2) somewhat interested (3) not interested (4) DK
E9a <i>IF E1=2,3 or E4=2,3</i>	Would you say that your job is feasible for telework, under the assumption that you spend at least one full working day per week at home?	(1) yes (2) no (3) DK
E9b <i>IF E9a=2 and N6=2</i>	What are the main reasons why you consider your current job not to be feasible for telework? Is it because ... <i>[INTERVIEWER: Read out answer categories and code all that apply]</i>	MULTIPLE ANSWERS (1) your company does not permit telework? (2) your superior does not approve of telework? (3) your job requires face-to-face contact with customers, colleagues or other persons (4) your job requires access to machines or other things which cannot be accessed from home (5) Other reasons (DO NOT READ OUT) (6) DK

No <i>Branching</i>	Question	Answer categories
E10 <i>IF E1=1</i>	<p>For what reasons did you start teleworking? Please indicate for each of the following aspects how important it was for your decision to start teleworking. [item] Was this ... for you.</p> <p><i>[INTERVIEWER: Read out answer categories for the first 2 items]</i></p> <p>(a) I needed a more peaceful working environment (b) I want to participate more in family life (c) I want to be closer to clients or customers (d) I need to look after a child or an other person who needs care (e) My company asked me to start teleworking (f) I want to reduce commuting (g) I wanted to have more flexibility in how to organise my work</p>	(1) very important (2) somewhat important (3) not important (4) DK
E11 <i>IF E1=1</i>	<p>Most working people are not allowed to work from home. Please consider you would <u>not</u> be allowed to telework from home, for whatever reasons.</p> <p>What would that mean for your ability to do your job? Would it mean that you...[item]. Do you ...</p> <p><i>[INTERVIEWER: Read out answer categories for the first 2 items]</i></p> <p>(a) could not be in paid work at all (b) could not do your job as well as with telework (c) would have to look for another job which is located closer to your home (d) would have to reduce your working hours per week</p>	FOR EACH: (1) agree completely (2) agree somewhat (3) do not agree (4) DK
<p>Module F: Mobile work GPS</p>		
Transition F <i>IF IN4=1</i>	<p>Now let's talk about the topic of mobile working.</p>	
F1 <i>IF IN4=1</i>	<p>In the last four weeks, have you spent any of your working time away from your home and from your main place of work, e.g. on business trips, in the field, travelling or on customer's premises?</p>	(1) yes (2) no (3) DK
F2 <i>IF F1=1</i>	<p>You indicated before that you work on average <i>[PROGRAMMER: Insert result from IN5b, or if blank result from IN11]</i> hours per week. How many of these do you spend away from home and your main place of work?</p>	_ _ _ _ [DK] <i>[PROGRAMMER: Insert check with IN5b or IN11]</i>
F3 <i>IF F2>5</i>	<p>In the last four weeks, have you used online computer connections when travelling? By this I mean have you accessed the Internet for business purposes, or electronically transferred data to colleagues?</p>	(1) yes (2) no (3) DK
F4 <i>IF F3=1</i>	<p>For what purpose did you use these online connections? Have you used these to ...</p> <p>(a) access the Internet (b) send or read e-mails (c) connect to your company's internal computer system</p>	FOR EACH: (1) yes (2) no (3) DK

No Branching	Question	Answer categories
F5 IF F3=1	Where did you use an online computer connection? Have you used it in the last four weeks at ... (a) a hotel, conference site or similar location? (b) another company's premises? (c) an Internet café or an other commercial teleservice center? (d) or on the move, using a mobile device for data transfer?	FOR EACH: (1) yes (2) no (3) DK
Module G: Tele-cooperation/Tele-collaboration		GPS
Transition G IF IN4=1 and (A1=1 or A7=1)	And how about the use of telecommunication technology at your work place:	
G1 IF IN4=1 and A1=1	When you communicate with external contacts, do you sometimes use e-mail, video conference or electronic data transfer? <i>[PROGRAMMER: skip the following if IN6=1]</i> By external persons we mean customers, clients, suppliers, other business contacts, but also colleagues working at other locations of the same company.	(1) yes (2) no (3) DK
G2 IF G1=1	In a typical week, how often do you ...[item] for these external contacts? <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) use e-mail (b) use video-conferencing (c) use e-mail attachments or other electronic data transfer	FOR EACH (1) 10 or more times a day, (2) at least once a day, (3) at least once a week (4) less often than once a week (5) never (6) DK
G4 IF IN6=1 and A7=1	I would like to know about the role the Internet plays in your business. Do you sometimes attract new business through the Internet or via e-mail?	(1) yes (2) no (3) DK
G5 IF IN6=1 and A7=1	Do you sometimes deliver work results to your clients or customers through the Internet or via e-mail?	(1) yes (2) no (3) DK
G6 IF G4=1 and G5=1	Does it sometimes happen that you communicate with clients or customers exclusively by electronic means, i.e. via Internet, e-mail, phone or fax and <u>without</u> meeting face-to-face?	(1) yes (2) no (3) DK
Module H: Outcomes of work		GPS
Transition H IF IN4=1	I would like to ask you a few more questions about your work.	
H1 IF IN4=1	Please tell me for each of the following, how often you experience this. How often do you .. [item]? <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) Find your work stressful (b) Come home from work exhausted (c) Find your job prevents you from giving the time you want to your partner or family (d) Feel too tired after work to enjoy the things you would like to do at home (e) Find your partner/family gets fed up with the pressure of your job	FOR EACH (1) often (2) sometimes (3) never (4) does not apply [DO NOT READ] (5) DK

No Branching	Question	Answer categories
H2 IF IN6=2,3	In your current work arrangement, do you agree with the following statements about your job? [item] Do you ... <i>[INTERVIEWER: Read out answer categories for the first 2 items]</i> (a) I have a lot of say over what happens in my job (b) I need to keep learning new things continuously (c) I have concerns about whether my job is secure (d) I have a high income (e) I can adapt my starting & finishing times to my personal preferences (f) I can adapt the number of weekly working hours to my personal preferences	FOR EACH: (1) strongly agree (2) somewhat agree (3) disagree (4) DK
H3 IF IN4=1	On the whole, are you very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied or very dissatisfied with your job / your main job?	(1) very satisfied (2) somewhat satisfied (3) neither satisfied nor dissatisfied (4) somewhat dissatisfied (5) very dissatisfied (6) DK
Module C: Educational attainment and lifelong learning		GPS
Transition C IF IN4=1 or IN13=1 or IN7=1	Now I would like to ask you a few questions about training and learning.	
C2 IF IN6=2,3	Did you participate in some kind of work-related training activities that were provided either by your company or by an other organisation, in the last four weeks?	(1) yes (2) no (3) DK
C9b IF IN7=1 or IN6=1	Did you participate in some kind of training activities with the aim of preparing you for a future job, in the last four weeks?	(1) yes (2) no (3) DK
C14a IF IN4=1	Apart from the training that may have been provided by others, did you engage in some kind of self directed learning related to your work, in the last four weeks?	(1) yes (2) no (3) DK
C14b IF IN7=1 or IN6=1	Apart from the training that may have been provided by others, did you engage in some kind of self directed learning which was aimed at preparing you for a future job, in the last four weeks?	(1) yes (2) no (3) DK
C18 IF A1=1 and (C2=1 or C9b=1 or C14a=1 or C14b=1)	Did you use, in the course of your training and learning in the last four weeks, electronic learning materials such as learning programmes on CD-ROM, in company -internal computer systems or on the Internet?	(1) yes (2) no (3) DK
C19 IF C18=1	What did you use? Did you use (a) CD-ROMs or other so-called offline media such as diskettes, audio or video tapes etc.? (b) online learning materials provided on the internal computer system of your organisation or through the Internet	FOR EACH (1) yes (2) no (3) DK
C20 IF IN2=2 and A1=1	Did you use, in the course of your studies in the last four weeks, electronic learning material such as learning programmes on CD-ROM, on the internal computer system of your school/university or through the Internet?	(1) yes (2) no (3) DK

No <i>Branching</i>	Question	Answer categories
C21 <i>IF C20=1</i>	What did you use? Did you use (a) CD-ROMs or other so-called offline media such as diskettes, audio or video tapes etc.? (b) online learning material provided on the internal computer system of your school/university or through the Internet?	FOR EACH (1) yes (2) no (3) DK
Module Z: Standard demography		GPS
	Finally we would like to ask you a few more questions for statistical purposes:	
Z17 <i>ALL</i>	How many people live in your household, yourself included?	_ _ [DK]
Z18a <i>IF Z17>1</i>	How old is the youngest?	_ _ [DK]
Z18b <i>IF Z17>1</i>	How many are 15 years and older?	_ _ [DK] <i>[PROGRAMMER: Build in check with Z17 and Z18a]</i>
Z14 <i>ALL</i>	Do you have any long-standing illness, disability or infirmity that limits your activities in any way? By long-standing I mean anything that has troubled you over a period of time or that is likely to affect you for a period of time.	(1) yes (2) no (3) DK
Z19 <i>ALL</i>	We also need some information about the income of this household to be able to analyse this survey. What is your household's monthly net income (after tax)? Please count the total wages and salaries per month of all members of this household; all pensions and social security benefits; child allowances and any other income like rents etc. <i>[ADD IF NECESSARY: Of course, your answer (as all other answers in this interview) will be treated confidentially and referring back to you or your household will be impossible.]</i> Is it less or more than <income 1>, <income 2> or <income 3>.	(1) less than <income 1> (2) <income 1> to less than <income 2> (3) <income 2> to less than <income 3>. (4) <income 3> or more (5) DK (6) Refusal
Z20 <i>ALL</i>	Looking back over the last three years, has your household income increased, decreased, or remained roughly the same?	(1) increased (2) decreased (3) remained roughly the same (4) DK (5) Refusal
Z21 <i>ALL</i>	Gender <i>[INTERVIEWER: Ask only if in doubt]</i>	(1) male (2) female
Data provided by survey organisation		Categories
P0	Survey Number	101438
P1	Country Code	_ _
P2	Interview Number	_ _ _ _
P3	Date of Interview:	Day _ _ , Month _ _

No <i>Branching</i>	Question	Answer categories
P4	Time of the beginning of the interview (USE 24 HOUR CLOCK):	Hour _ _ , Minute _ _
P5	Number of minutes the interview lasted	_ _ _
P6	Size of locality	_ _
P7	Region	_ _
P8a	Postal Code / Area code must be convertible into NUTS 2 regions	_ _ _ _ _ _ _ _ _
P8b	NUTS 2 regions	_ _ _ _ _ _ _ _ _
P9	Interviewer Number	_ _ _ _ _ _
P10	Weighting Factor	_ . _ _ _ _ _ _
P11	Language of interview (Luxembourg, Belgium, Finland, Switzerland)	_

9.3 Questionnaire for the Decision Maker Survey (DMS)

Structure of the questionnaire:

- Introduction and Screener Section

Module A: Basic characteristics

- Type of organisation
- Number of staff (employees)
- Turnover

Module B: Module B: Basic ICTs take-up and intensity of use (e-Business)

- e-Mail
- Internet
- Intranet
- EDI
- Video-conferencing
- Call-centre
- Staff access to ICTs

Module C: e-Commerce

- Website/ Internet presence
- Online sales
- Barriers to e-commerce (selling)
- Benefits from / Outcomes of e-commerce
- Online procurement
- Barriers to online procurement
- Benefits from/ Outcomes of online procurement
- Online supply chain integration
- e-Marketplaces

Module D: e-Business security

- Security breaches
- Information security strategy
- Barriers to security
- Security provisions

Module F: e-Government

- Use of e-Government services
- Barriers to e-Government

Module G: Website accessibility

- Design for all" / "universal design" principle awareness

Module E: R&D

- R&D staff
- Computer staff in R&D unit(s)
- IT staff providing computer services to R&D
- Outsourced computer services for R&D
- Vacancies in IT for R&D

No <i>Branching</i>	Question	Answer categories
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Introduction and Screener Section	DMS
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	Database/address information:	Categories
A11 ALL	<u>Main business activity</u> PROGRAMMER: Copy from database	NACE code (2-digit level) __ __ 1 Mining, Energy (includes NACE 10 - 14/ 40, 41) 2 Manufacturing (includes NACE 15 - 37) 3 Construction (includes NACE 45) 4 Distribution (includes NACE 50, 51, 52) 5 Hotels, Restaurants (includes NACE 55) 6 Transport, Communication (includes NACE 60, 61,62, 63, 64) 7 Banking, Insurance (includes NACE 65, 66, 67) 8 Business Services (includes NACE 70, 71, 72, 73, 74 [except: 74.13]) 9 Public Administration (includes NACE 75 [except 75.2]) 10 Education (includes NACE 80) 11 Health and Social Work (includes NACE 85) 12 Other personal or social services (includes NACE 90, 91, 92, 93)

No <i>Branching</i>	Question	Answer categories
A12 ALL	<p><u>Establishment size (if available)</u> PROGRAMMER: Copy from database</p>	<p>According to database a) OPEN (if available) _ _ _ _ _ _ _ _ 6- <i>digit numerical</i> [1] not available from database <u>and</u> b) in categories, i.e. (1) 0 - 9 (2) 10 - 49 (3) 50 - 199 (4) 200 - 499 (5) 500+ (6) not available from database</p>
S1 (INTRO) ALL	<p><u>At reception/switchboard:</u> Good morning/good afternoon. My name is I am calling for ... [name of institute]. We are presently conducting a scientific survey in several European countries. The topic is the use of information and communications technologies. I would like to talk to the person who is responsible for DP/IT decisions at your location. INT.: NOTE: THIS SHOULD BE THE HEAD OF THE DP/IT DPT. OR A SENIOR PERSON IN THE DP/IT DPT. IN SMALLER FIRMS IT CAN ALSO BE THE MANAGING DIRECTOR, THE GENERAL MANAGER OR THE OWNER. INT.: ADD, IF NECESSARY: Your participation is very important to us, because your firm has been selected through a statistical procedure that will result in a typical selection of firms in [COUNTRY] INT.: ADD, IF NECESSARY: The interview will last approx. 15 minutes</p>	<p>(1) put through to target person • CONTINUE (2) target person currently unavailable • MAKE APPOINTMENT FOR CALLBACK (3) no such person • TERMINATE (4) refusal to participate • END</p>

No <i>Branching</i>	Question	Answer categories
S2 (INTRO) ALL	<p><u>At target person:</u> Good morning/good afternoon. My name is ... I am calling for ... [name of institute].</p> <p>We are presently conducting a scientific survey in several European countries. The topic is the use of information and communications technologies. We are talking to people who are responsible for DP/IT decisions at their respective locations.</p> <p>Can I just check: Would you be the right person to talk to at your location and can we do the interview now?</p> <p>INT.: ADD, IF NECESSARY: Your participation is very important to us, because your firm has been selected through a statistical procedure that will result in a typical selection of firms in [COUNTRY]</p> <p>INT.: ADD, IF NECESSARY: The interview will last approx. 15 minutes</p>	<p>(1) yes, interview now • CONTINUE</p> <p>(2) yes but no time at the moment • MAKE APPOINTMENT FOR CALLBACK</p> <p>(3) no, other person responsible <u>at this location</u> • ASK TO BE PUT THROUGH TO THAT PERSON, RESPECTIVELY ASK FOR CONTACT DETAILS. AT NEW TARGET PERSON START AGAIN WITH QUESTION S2</p> <p>(4) no, other person responsible <u>at another location</u> • TERMINATE</p> <p>(5) refusal to participate • TERMINATE</p>
A13 ALL	<p><u>Function of target person</u></p> <p>What is your position in your establishment? What of the following is the most appropriate?</p> <p>INT.: READ OUT. SINGLE ANSWER.</p>	<p>(1) Owner/Proprietor</p> <p>(2) Managing Director/Board Member</p> <p>(3) Head of Establishment/Site</p> <p>(4) Head of IT/DP</p> <p><u>(5) Other senior member of IT/DP Department</u></p> <p>(6) Other • TERMINATE</p>
Module A: Basic characteristics		DMS
Transition A ALL	<p>Let us start with some general questions about your establishment.</p>	
A2 ALL	<p>Does your organisation have only one establishment, or has it more than one establishment?</p> <p>By establishment we mean a single identifiable unit at a particular address.</p> <p>[TRANSLATOR: Be very careful to identify a correct translation for "establishment"]</p>	<p>(1) only one establishment</p> <p>(2) more than one establishment</p> <p>(3) DK</p>
A4 IF A2=2	<p>How many employees does your organisation have in total in [country], including yourself?</p> <p>INT.: IF "DK" SAY: If you do not know it exactly, can you give me an estimate?</p>	<p> _ _ _ _ _ _ _ 6-</p> <p><i>digit numerical</i></p> <p>[DK]</p>

No <i>Branching</i>	Question	Answer categories
A5 ALL	<p>And how many employees work for your organisation AT THIS ESTABLISHMENT, including yourself?</p> <p>INT.: IF "DK" SAY: If you do not know it exactly, can you give me an estimate?</p> <p>PROGR.: CHECK: IF A2=(2), Answer in A5 MUST be < Answer in A4! IF NOT RE-ASK A4 / A5</p>	<p>□□□□□□ 6-digit numerical</p> <p>[DK] • TERMINATE INTERVIEW</p>
	<p>PROGR.: CHECK QUOTA (according to answer in A5)</p> <p><u>1 up to 9 employees • QUOTA</u> <u>2 10 - 49 employees • QUOTA</u> <u>3 50 - 199 employees • QUOTA</u> <u>4 200 - 499 employees • QUOTA</u> <u>5 500+employees • QUOTA</u></p> <p>IF "DK" TO QUESTIONS A5</p>	
A3 IF A2=2	<p>Is your establishment ...?</p> <p>INT.: READ OUT ALL ANSWER CATEGORIES. SINGLE ANSWER.</p>	<p>(1) the headquarters of an internationally operating organisation</p> <p>(2) the headquarters of an organisation that only operates in this country</p> <p>(3) a division or branch operation of an internationally operating organisation</p> <p>(4) a division or branch operation of an organisation that only operates in this country</p> <p>(5) other [INT.: DO NOT READ]</p> <p>(6) DK</p>

No <i>Branching</i>	Question	Answer categories
A8 ALL EXCEPT IF A11 (NACE Code) = 75, 80, 85	Please indicate your establishment's turnover in the last financial year. INT.: IF "DK", SAY: If you do not know it exactly, can you give me a rough estimate? INT.: PLEASE TRY TO GET AT LEAST AN ESTIMATE. INDICATE IF ANSWER IS GIVEN IN EURO OR IN PREVIOUS NATIONAL CURRENCY (/UK: RESP. OR IN GBP)	(1) Turnover given IN EURO (2) Turnover given IN PREVIOUS NATIONAL CURRENCY (UK: Always use GBP) (3) DK, no answer to turnover Turnover given: _ _ _ _ . _ _ _ _ . _ _ _ _ . _ _ _ _ _ _ _ 12-digit numerical
A9 ALL EXCEPT IF A11 (NACE-Code) = 75, 80, 85	Has the turnover of your establishment increased, decreased or roughly stayed the same when comparing the last financial year with the year before?	(1) increased (2) decreased (3) roughly stayed the same (4) DK
Module B: Basic ICTs take-up and intensity of use (e-Business)		DMS
Transition B ALL	Now we would like to ask you some questions about the use of Information and Communications Technologies in your establishment.	
B1 ALL	Does your establishment use e-mail?	(1) yes (2) no (3) DK
B2 ALL	Does your establishment have access to the World Wide Web, i.e. the Internet?	(1) yes (2) no (3) DK
B3 ALL	Does your establishment have an Intranet, i.e. an internal computer network that uses the Internet protocol?	(1) yes (2) no (3) DK
B5 ALL	Does your establishment use EDI, i.e. electronic data interchange using the EDI standard?	(1) yes (2) no (3) do not know what this is [IF SPONTANEOUSLY SAID] (4) DK
B6 IF B5=1	Is your EDI Internet based?	(1) yes (2) no (3) do not know what this is [IF SPONTANEOUSLY SAID] (4) DK

No <i>Branching</i>	Question	Answer categories
B7 <i>ALL</i>	Does your establishment use video-conferencing in your own facilities?	(1) yes (2) no (3) DK
B8 <i>ALL</i>	Does your establishment use a call center for communication with customers or other external contacts?	(1) yes (2) no (3) DK
B11 <i>IF B1=1</i>	Which applications can be accessed by the majority of your office workers? Can the MAJORITY OF YOUR OFFICE WORKERS ... send e-mails to external addresses?	(1) yes (2) no (3) DK
B12 <i>IF B2=1</i>	(What applications can be accessed by the majority of your office workers?) Can the MAJORITY OF YOUR OFFICE WORKERS ... browse Internet sites?	(1) yes (2) no (3) DK
B13 <i>IF B3=1</i>	(What applications can be accessed by the majority of your office workers?) Can the MAJORITY OF YOUR OFFICE WORKERS ... browse INTRANET sites?	(1) yes (2) no (3) DK
Module C: E-commerce		DMS
Transition C <i>ALL</i>	Now we would like to ask you some questions about E-commerce. Please refer to your establishment when answering.	
C1 <i>ALL</i>	Does your establishment put information on the Internet, for example by means of a website?	(1) yes (2) no (3) DK
C2 <i>IF C1=1 or 3</i>	Do you sell goods or services via the Internet?	(1) yes (2) no (3) DK
C3a <i>IF C1=1 or 3</i>	Do you offer online reservation? By this we mean that your customers can make a reservation for a product or service through the Internet.	(1) yes (2) no (3) DK
C3b <i>IF C2=1</i>	Do you distribute digital products or services online? By this we mean that the product is transferred to the customer online, or the service is provided online.	(1) yes (2) no (3) DK
C4a <i>IF C2=1</i>	Are some of your online sales to businesses?	(1) yes (2) no (3) DK

No <i>Branching</i>	Question	Answer categories
C5a <i>IF C4a=1</i>	How large a share of your total sales to businesses are conducted online? Would you say ... INT.: READ OUT. SINGLE ANSWER	(1) less than 5% (2) 5 up to 25% (3) 26 up to 50% (4) 51 up to 75% (5) more than 75% (6) DK
C4b <i>IF C2=1</i>	Are some of your online sales to consumers?	(1) yes (2) no (3) DK
C5b <i>IF C4b=1</i>	How large a share of your total consumer sales are conducted online? Would you say ... INT.: READ OUT. SINGLE ANSWER	(1) less than 5% (2) 5 up to 25% (3) 26 up to 50% (4) 51 up to 75% (5) more than 75% (6) DK
C4c <i>IF C2=1</i>	Are some of your online sales to the public sector?	(1) yes (2) no (3) DK
C5c <i>IF C4c=1</i>	How large a share of your total sales to the public sector are conducted online? Would you say ... INT.: READ OUT. SINGLE ANSWER	(1) less than 5% (2) 5 up to 25% (3) 26 up to 50% (4) 51 up to 75% (5) more than 75% (6) DK
C6 <i>IF C2=1</i>	Are your online sales MAINLY to a local, national or global market? INT.: SINGLE ANSWER.	(1) local market (2) national market (3) global market (4) DK

No <i>Branching</i>	Question	Answer categories
C7 IF C1=2 OR IF C2=2 or 3	I am now going to read you a list of statements about selling online. For each statement, please tell me whether you agree completely, agree somewhat or do not agree from the point of view of your establishment. How about the statement ... [item]. Do you ... INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM. (a) Selling our products and services requires face-to-face interaction with customers (b) The necessary technology is expensive (c) The costs for the promotion of the online offer are high (d) The revenue potential of online sales is low (e) Customers might be concerned about data protection or security issues (f) Adapting corporate culture to e-commerce is difficult (g) The necessary skills are not readily available (h) Handling the delivery process causes problems	FOR EACH: (1) agree completely (2) agree somewhat (3) or do you not agree (4) DK
C8 IF C2=1	You said earlier that you make sales online. According to your experience, what effect has selling online on ... [item]? Would you say the effect is ... INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM. (a) your sales (b) your costs (c) your sales area (d) the quality of your customer service (e) the efficiency of your internal business processes	FOR EACH: (1) very positive (2) rather positive (3) neither positive nor negative (4) rather negative (5) very negative (6) DK
C9 IF B2=1 or 3	Do you use the Internet or other online services to purchase goods or services?	(1) yes (2) no (3) DK
C10 IF C9=1	Roughly what proportion of the maintenance, repair and organisation goods your establishment buys are purchased online, measured in amount spent? Would you say ... INT.: READ OUT. SINGLE ANSWER	(1) less than 5% (2) 5 up to 25% (3) 26 up to 50% (4) 51 up to 75% (5) more than 75% (6) DK

No <i>Branching</i>	Question	Answer categories
<p>C11 <i>IF B2=2</i> <i>OR</i> <i>IF C9=2 or 3</i></p>	<p>I am now going to read you a list of statements about purchasing online. For each statement, please tell me whether you agree completely, agree somewhat or do not agree from the point of view of your establishment.</p> <p>How about the statement ... [item].</p> <p>Do you ...</p> <p>INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM.</p> <p>(a) Purchasing procurement products or services requires face-to-face interaction with suppliers</p> <p>(b) Our suppliers do not sell online</p> <p>(c) The necessary technology is expensive</p> <p>(d) The cost advantage is negligible</p> <p>(e) We are concerned about data protection or security issues</p> <p>(f) The legal protection of online contracts is not sufficient</p> <p>(g) The necessary skills are not readily available</p> <p>(h) Suppliers' technical systems are not compatible with ours</p>	<p>FOR EACH:</p> <p>(1) agree completely</p> <p>(2) agree somewhat</p> <p>(3) or do you not agree</p> <p>(4) DK</p>
<p>C12 <i>IF C9=1</i></p>	<p>You said earlier that you purchase goods or services online. According to your experience, what effect has online procurement on ... [item]?</p> <p>Would you say the effect is ...</p> <p>INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM.</p> <p>(a) your procurement costs</p> <p>(b) stock-keeping of maintenance, repair and organisation goods</p> <p>(c) the number of suppliers</p> <p>(d) your relations to suppliers</p> <p>(e) the efficiency of your internal business processes</p>	<p>FOR EACH:</p> <p>(1) very positive</p> <p>(2) rather positive</p> <p>(3) neither positive nor negative</p> <p>(4) rather negative</p> <p>(5) very negative</p> <p>(6) DK</p>
<p>C13 <i>IF C1=1</i></p>	<p>Does your establishment have an EXTRANET, i.e. a private, secure network running on the Internet protocol and accessible for selected external users?</p>	<p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>
<p>C14 <i>IF C13=1</i></p>	<p>For which of the following purposes do you use your Extranet? Do you use it for ... [item]</p> <p>INT.: ONE ANSWER PER ITEM.</p> <p>(a) communication with customers or clients?</p> <p>(b) communication with suppliers?</p>	<p>FOR EACH:</p> <p>(1) yes</p> <p>(2) no</p> <p>(3) DK</p>

No <i>Branching</i>	Question	Answer categories
C15 <i>IF B2=1</i>	Do you have access to the Extranet of one of your supplier, partner or customer organisations? PROGR.: IF C1=2 or 3, add: By Extranet I mean a private, secure network running on the Internet protocol and accessible for selected external users.	(1) yes (2) no (3) DK
C19 <i>IF B2=1</i>	Does your establishment trade goods or services through an e-marketplace? By e-marketplace I mean a business-to-business Internet trading forum in which multiple buyers and sellers exchange goods and services within an industry group or geographic region.	(1) yes (2) no (3) DK
C20 <i>IF C19=1</i>	On e-marketplaces, different types of business transactions can be accomplished. In which of the following types is your establishment actively involved? INT.: READ OUT AND CODE ALL THAT APPLY	(1) catalogue-based offering of products or services (2) catalogue-based purchasing of products or services (3) auctions -- as a seller (4) auctions -- as a bidder (5) launching calls for tenders (6) answering calls for tenders (7) powerbuying, i.e. joint purchases together with other organisations to save costs (8) none of these (9) DK
Module D: e-Business security		DMS
Transition D <i>IF C1=1</i>	Let us now turn to the topic of information security. Again, please refer to your establishment when answering.	
D1 <i>IF C1=1</i>	Many establishments are affected by security breaches such as identity theft, online fraud, manipulation of software applications, computer viruses or unauthorised entry to internal networks. Have any breaches of your information security occurred in your establishment in the last 12 months?	(1) yes (2) no (3) DK

No <i>Branching</i>	Question	Answer categories
D2a <i>IF D1=1</i>	<p>Progr.: <i>Note for D2a to D2b:</i> <i>For each item in D2a=1, ask <u>directly</u> D2b; then go to next item in D2a!!</i></p> <p>Which of the following types of information security breaches have occurred in your establishment in the last 12 months? Did you experience cases of ... [item]?</p> <p>INT.: READ OUT. ONE ANSWER PER ITEM.</p> <p>(a) Identity theft (b) Online fraud (c) Manipulation of software applications (d) Computer virus infections (e) Unauthorised entry to internal networks</p>	<p>FOR EACH:</p> <p>(1) yes (2) no (3) DK</p>
D2b <i>(For Each Item) IF D2a=1</i>	<p>And how substantial were the consequences of this security breach for your establishment? Would you say they were ...</p> <p>INT.: READ OUT ANSWER CATEGORIES. SINGLE ANSWER (PER ITEM ASKED)</p>	<p>FOR EACH ITEM IF D2a=1</p> <p>(1) very substantial (2) rather substantial (3) not substantial (4) DK</p>
D3 <i>IF D1=1</i>	<p>Where do you believe these breaches mainly came from? Do you think the largest threat to online security came from ...</p> <p>INT.: READ OUT ANSWER CATEGORIES. CODE ALL THAT APPLY</p>	<p>MULTIPLE ANSWERS</p> <p>(1) Customers (2) Suppliers/competitors (3) Former employees (4) Computer hackers (5) Internal users (6) Others, not mentioned yet (7) DK</p>
D4 <i>IF D1=1</i>	<p>How have you learned about these breaches, in most cases? Were you ... [item]</p> <p>INT.: READ OUT, CODE ALL THAT APPLY</p>	<p>MULTIPLE ANSWERS</p> <p>(1) alerted by a customer/supplier (2) alerted by employees or did you notice yourself (3) notified by your own information security system (4) made aware by damage or loss of data (5) alerted by the providers of outsourced security services (6) in another way (DO NOT READ) (7) DK</p>

No <i>Branching</i>	Question	Answer categories
D5 <i>IF C1=1</i>	Does your establishment or your organisation have an information security policy?	(1) yes (2) no (3) DK
D6 <i>IF D5=1</i>	How would you describe it? As formal or informal?	(1) formal (2) informal (3) DK
D7 <i>IF D5=1</i>	Which are your information security priorities? How much priority is given to ... [item] INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM. (a) Blocking of unauthorised access (b) Expanding budget for security measures (c) Defining the security architecture (d) Outsourcing security management	FOR EACH (1) high priority (2) medium priority (3) low priority (4) DK
D8 <i>IF C1=1</i>	How important are the following factors as barriers to effective information security inside your establishment? How about ...[item]: Is this factor as a barrier to effective information security inside your establishment... INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM. (a) High costs for security measures (b) Lack of staff training (c) Lack of staff time (d) Complexity of the technology (e) Lack of employee co-operation	FOR EACH: (1) very important (2) fairly important (3) not important (4) DK
D9 <i>IF C1=1</i>	Which of the following tools do you use for information security in your establishment? Do you make use of ... [item] INT.: ONE ANSWER PER ITEM. (a) Control of access to the computer system (b) Cryptography/ data encryption (c) Vulnerability Assessment Tools (d) Firewalls (e) Security Training and Awareness Rising Activities (f) Intrusion Detection Systems (g) End-user Security Training Classes	FOR EACH: (1) yes (2) no (3) DK
Module F: e-Government		DMS
Transition F <i>IF B2=1</i>	Now let's turn to the topic of using online services for interacting with public administration.	

No <i>Branching</i>	Question	Answer categories
<p>F1 IF B2=1 AND A11 (NACE-Code) <u>NOT</u>=75 (Public Admin)</p>	<p>Progr.: Note for F1 to F2: For each item in F1=2, ask directly F2; then go to next item in F1!!</p> <p>I am going to read you a list of activities for which establishments have to get in touch with public administration.</p> <p>For which of these activities do you already use online media such as EDI or the Internet?</p> <p>What about ...[item]? Do you use online media such as EDI or the Internet for this?</p> <p>INT.: ONE ANSWER PER ITEM.</p> <p>(a) Payment of social contribution for employees (b) Corporation tax declaration (c) VAT declaration (d) Submission of data to statistical offices (e) Obtaining environment-related permits (f) Participation in public invitation to tender</p>	<p>FOR EACH</p> <p>(1) yes (2) no (3) DK</p>
<p>F2 (For Each Item) IF F1=2</p>	<p>Would your establishment prefer to use online media such as EDI or the Internet for this purpose?</p>	<p>FOR EACH ITEM IF F1=2</p> <p>(1) yes (2) no (3) DK</p>
<p>Transition F3 IF B2=2 or 3</p>	<p>Now let's turn to the topic of using online services for interacting with public administration.</p> <p>It is now possible to conduct at least some of the interaction with public administration online, i.e. by using EDI or the Internet.</p>	

No <i>Branching</i>	Question	Answer categories
F3 ALL	<p>Now I will read you a list of statements about using online media for interacting with public administration. Please tell me for each statement whether you agree completely, agree somewhat or do not agree.</p> <p>Public services on the Internet ... [item]. Do you ...</p> <p><i>INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM.</i></p> <p>(a) are not useful enough (b) are faster than the traditional way (c) require that you install special equipment or software (d) reduce the number of mistakes public authorities make (e) do not seem as safe as using the traditional way (f) make it possible to deal with the authorities at more convenient times (g) make it possible to deal with the authorities at more convenient locations, e.g. from the workplace (h) are difficult to use</p>	<p>FOR EACH</p> <p>(1) agree completely (2) agree somewhat (3) or do you not agree (4) DK</p>
Module G: Website accessibility		DMS
Transition G <i>IF C1=1</i>	<p>Now a few questions about the accessibility of your website for people with special needs.</p>	
G1a <i>IF C1=1</i>	<p>What priority has making your website user friendly for ... [item] in your establishment?</p> <p><i>INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM.</i></p> <p>(a) People with visual disabilities or sight difficulties (b) People with reduced or limited dexterities (c) People with limited literacy</p>	<p>FOR EACH:</p> <p>(1) high priority (2) medium priority (3) low priority (4) DK</p>
G1b <i>IF G1a (a) =2,3</i> <i>or</i> <i>IF G1a (b) =2,3</i> <i>or</i> <i>IF G1a (c) =2,3</i>	<p>Bearing the these groups in mind: Would you say that your website could be adapted rather easily, would prove difficult to adapt, or could not at all be adapted to these people's needs?</p> <p><i>INT.: SINGLE ANSWER.</i></p>	<p>(1) could be adapted rather easily (2) would prove difficult to adapt (3) could not at all be adapted (4) DK</p>
G2 <i>IF G1a (a) =1,2</i> <i>or</i> <i>IF G1a (b) =1,2</i> <i>or</i> <i>IF G1a (c) =1,2</i>	<p>Does your establishment or your organisation have formal Guidelines for making your website accessible to people with such special needs? By guidelines I mean rules which have to be followed by your website developers?</p>	<p>(1) yes (2) no (3) DK</p>

No <i>Branching</i>	Question	Answer categories
E2 <i>IF E1b=1</i>	What is the size of the computer staff in your central R&D unit(s)? Please add up part time computer staff to full-time staff. INT.: IF NECESSARY, EXPLAIN: By computer staff we mean all staff that - manages the computers, networks and digital resources, or - manages the Internet access and presentation, or - carries out information searches and computations as their major work tasks, or - provides user training. INT.: IF "DK", PROMPT: If you do not know it exactly, can you give me an estimate?	[OPEN] _ _ _ _ _ _ _ _ 6- <i>digit numerical</i> INT.: IF NONE, CODE "0". [DK] Progr.: Answer to E2 (Computer staff in R&D) must be £ Answer to E1a (Number employed in R&D) IF NOT, re-ask E2
E3 <i>IF E1a > 0</i> <i>and E1a is <u>NOT</u> DK</i>	Do you get IT services for R&D from internal computer staff that are not members of your central R&D unit(s)?	(1) yes (2) no (3) DK
E4 <i>IF E3=1</i>	What is the size of the internal computer staff outside of your R&D unit(s) who provide IT services for R&D projects? Please add up part time computer staff to full-time staff again. INT.: IF "DK", PROMPT: If you do not know it exactly, can you give me an estimate?	[OPEN] _ _ _ _ _ _ _ _ 6- <i>digit numerical</i> INT.: IF NONE, CODE "0". [DK] Progr.: Answer to E4 (Computer staff outside R&D) must be £ Answer to A5 (Total number employed in establishment) IF NOT, re-ask E4
E5 <i>IF E1a > 0</i> <i>and E1a is <u>NOT</u> DK</i>	Do you buy IT services for R&D from external service providers?	(1) yes (2) no (3) DK

No Branching	Question	Answer categories
E6 IF E5=1	What is the number of additional computer staff in your establishment that would be necessary to substitute for the IT services for R&D projects which are currently obtained from external service providers? INT.: IF "DK", PROMPT: If you do not know it exactly, can you give me an estimate?	[OPEN] _ _ _ _ _ _ _ _ 6-digit numerical INT.: IF NONE, CODE "0". [DK]
E7 IF E1a > 0 and E1a is <u>NOT</u> DK	Do your R&D activities suffer from a low supply of qualified computer staff in your establishment?	(1) yes (2) no (3) DK
E8 IF E7=1	Please specify the number of open jobs for computer staff needed to provide IT services for R&D projects in your establishment? INT.: IF "DK", PROMPT: If you do not know it exactly, can you give me an estimate?	[OPEN] _ _ _ _ _ _ _ _ 6-digit numerical [INT.: IF NONE, CODE "0". [DK]
X1 ALL	Finally I would like to ask you for a brief assessment: In the course of the interview we talked, among others, about the areas e-Commerce, i.e. selling and buying online, and e-Government, i.e. interacting online with public administration. That is about areas, which might not necessarily fall into your direct responsibility. Thinking back to the questions about ... [item]: What would you say: How familiar were you with the topics covered in those questions? Would you say... INT.: READ OUT ANSWER CATEGORIES. ONE ANSWER PER ITEM. (a) e-Commerce, i.e. selling and bying online (b) e-Government, i.e. interacting online with public administration	FOR EACH (1) very familiar (2) fairly familiar (3) not very familiar (4) not at all familiar (5) DK/ no answer
X2 ALL	And all in all: How interesting did you find the questionnaire as a whole? Would you say ... INT.: READ OUT ANSWER CATEGORIES. SINGLE ANSWER.	
End Text ALL	These were all my questions. I would like to thank you very much for participating in the interview. Have a nice day/evening!	
	Data to be provided by survey organisation	Categories
P0	Survey Number	1 0 1 4 3 9
P1	Country Code	_ _

No Branching	Question	Answer categories
P2	Interview Number	_ _ _ _
P3	Date of Interview:	Day _ _ , Month _ _
P4	Time of the beginning of the interview (USE 24 HOUR CLOCK):	Hour _ _ , Minute _ _
P5	Number of minutes the interview lasted	_ _ _
P9	Interviewer Number	_ _ _ _ _ _ _ _ _