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REPORT

Matching Up to the Information Society

An Evaluation of the EU, the EU Accession Countries, Switzerland and the United States

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Prepared for the European Commission

RAND EUROPE

SIBIS

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1 EXECUTIVE SUMMARY

The ongoing pace of change towards a knowledge oriented society has been recognised by the European Commission as a challenge and an opportunity to prepare Europe for a future we want: socially inclusive, economically competitive, and culturally diverse, based on sustained and sustainable growth. In order to achieve progress in a way that is of benefit for all European Union (EU) citizens, all EU Member States and the EU Accession Countries have adopted the ambitious e-Europe initiative.

Rather than assuming a central coordinating role, the European Union embraced the so-called "Open Method of Coordination." This entails measuring progress and identifying good practice in all participating countries. Of equal importance is the presentation of the results on a European level so that participating countries can learn from the practice of other countries, and adapt their speed and approach of progress as they require.

Socio-economic research, as sponsored by the Information Society Technologies (IST) programme under the European Union's 5th Framework Programme of Research and Technology Development, has helped to create this understanding and identify good practice. SIBIS' contribution is important in this.

The overall goal of SIBIS is to develop and pilot indicators for monitoring progress towards the Information Society (IS), taking account of the "e-Europe action lines." On this basis, SIBIS focuses on basic access and usage elements like Internet readiness, the digital divide, and information security. It not only considers factors that determine access and usage, such as the perceptions of possible barriers, digital literacy, learning, and training issues, but it also benchmarks on-line applications like e-commerce, e-work, e-science, e-government, and e-health.

A core set of SIBIS indicators was tested and applied in benchmarking surveys in all 15 Member States, in the United States (US), Switzerland, and the following EU Accession Countries (i.e. the New Accession States - NAS): Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia, and Slovakia. The surveys collected robust and representative data for benchmarking purposes that enabled comparisons to be made across the EU Member States and, for the first time, between the EU and the US on exactly the same set of indicators at the same point in time.

The results of the benchmarking surveys have been presented in a series of reports on nine aspects of the Information Society in the EU member states, and a series of country reports on the ten NAS, covering the seven most relevant of the nine aspects of the Information Society.

This report focuses primarily on presenting the main results from the SIBIS benchmarking surveys. The survey fieldwork was carried out in April – May 2002 and January 2003. Annex 1 of this report presents details of the samples and other methodological aspects of the surveys. The questionnaires themselves can be found on the SIBIS website: http://www.sibis-eu.org/statistics/questionnaires.htm.

BASIC ACCESS AND USAGE

Internet Readiness

Within Europe and the US, the development of the Internet is a well-known phenomenon. According to the surveys, 54% of the EU population, and around 77% of the US population, have used the Internet either as a regular user (respondents who used the

Internet in the four weeks prior to the survey), or an occasional user (respondents who used the Internet in the 12 months prior to the survey). In contrast, 73% of the NAS population have never used the Internet, and 11% have never heard of the Internet.

In Europe, most users access the Internet principally from home. However, there is a fast emerging pattern of "bimodal usage", especially in more sophisticated markets: in the US as in Nordic countries, the UK, and the Netherlands there is a large proportion of 'bimodal users' who access the Internet from both at-home, and at-work locations.

Based on experiences of the US and Nordic markets, it has been noted that once a majority of a total population has Internet access there is a migration of users with high tenure (period since first use of the Internet) to faster Internet connections. They seek a better on-line experience such as quicker downloads and "always on" connections.

Mobile telephony is an important, exceptionally fast-growing sector. Although mobile penetration is currently quite high in most western countries, differences occur in usage patterns between countries, as do divergences in the use of data mobile services for communication. SIBIS results show a mobile phone penetration rate that is generally high, almost 70%, across the 15 European Union countries (EU15), whereas in the US, mobile intensity reaches only 56%, and in the 10 Accession countries (NAS10), it is only 34%.

Digital Divides

A digital divide exists between citizens of the EU Member States and those of the Accession Countries. The extent of the digital divide in a given country can be estimated by looking at the PC and Internet participation of groups considered at risk of being excluded. At-risk groups may include the elderly and those with a relatively low level of education, among others. The digital divide index (DIDIX) combines the divides by gender, age, education, and income in relation to computer use, Internet use, and Internet access at home. The DIDIX in the EU Member States compared to the NAS highlights age, income, and education as important factors in determining access to the Internet and PCs. The largest difference in access is between those who have a relatively low level of education and the rest of the population.

Amongst the NAS, Estonia and the Czech Republic show highest values and are not far from the EU15 average. The continued persistence of relatively large digital divides in countries usually considered as 'late adaptors' is apparent. Countries with an observable aggravation of divides rank lower with regard to the ICT uptake.

Information Security

Security concerns have a strong impact on on-line shopping behaviour in Europe as well as in the US. In the EU, for instance, almost 30% of Internet users stated that they would often be stopped from buying on-line because of their concerns. However, it is apparent that divergences exist among countries. Whereas some countries, which could be defined as "front-runners" (e.g. the US and Northern Europe), are affected only in a limited way by their security concerns and have accepted e-commerce as a relatively common practice, the "laggards" (e.g. Mediterranean countries and NAS) show lower than average e-commerce usage and strong impact of security concerns.

In the NAS both e-commerce usage and the effects of security concerns on e-commerce are limited; this could be related to the fact that the share of regular Internet users (and thus e-buyers) is lower than in the EU. If we benchmark individual NAS against the NAS average rather than against the EU average, it appears that, in this case too, the split

between “front-runners” and “laggards” is marked: in some countries, such as Estonia, on-line shopping usage is becoming comparable to what is found in some of the EU Member States; others still have a long way to go (Romania, Latvia, Lithuania).

Countries who lead the way in practicing e-commerce, such as the US, are also the most aware of security features of websites. Countries lagging behind in e-commerce usage (such as most NAS), typically also show low awareness and importance of websites’ security features.

The most widespread information security breaches are computer virus infections. Almost all organisations have been affected by computer viruses in the 12 months prior to the survey. By comparison, the numbers of businesses affected by other security breaches, such as unauthorised access to their networks or identity theft, are fairly low.

FACTORS DETERMINING ACCESS AND USAGE

Perceptions of Possible Barriers

Citizens are strongly concerned both about privacy/confidentiality and data security, with a slightly higher concern about privacy. Generally, among the NAS, concerns about privacy and confidentiality, as well as data security, tend to be lower than within the EU. However, looking at Member States of the EU and at Accession Countries individually, both groups exhibit a great deal of variation. For example, Poland and Latvia are countries where both concerns register higher than in the EU. Similarly, in the Netherlands, France, Austria, and Sweden concerns about privacy and confidentiality are lower than in the Accession Countries as a whole.

Most non-regular Internet users in Europe believe that advanced computing skills are required for using the Internet. However, while in the EU15 less than 60% feel the skill gap as a barrier to Internet usage, this figure is 68% on average in the NAS10, reaching peaks of over 80% in Latvia, Lithuania, the Czech Republic, and Slovakia. In contrast, psychosocial barriers to Internet usage are stronger in more advanced information societies (e.g. Sweden), suggesting limitations to the current growth in Internet penetration levels.

Digital Literacy, Learning, and Training

A significant share of the labour force is participating in work-related lifelong learning. While not giving any information on the type, intensity, and field of these activities, SIBIS results show that a high percentage of workers are in the process of preparing for the adaptation of skills to the fast-changing requirements that are a key feature of the Information Society. At the same time, e-learning can play a decisive role in delivering learning systems which meet the demands of today's workers - and the unemployed. The share of the labour force that uses e-learning is 15% on average in the EU, and 5% in the NAS, both of which is much lower than the 23% reached in the US.

The level of digital literacy (DL), measured by four types of skills in using the Internet (communicating digitally, obtaining and installing digital tools, questioning the source and reliability of information from the Internet, and searching for the required information using search engines) varies strongly within the EU, with the NAS in general as the ones showing the lowest level of DL among the total population. Estonia and Slovenia show a slightly higher level of DL than the Mediterranean countries of the EU and Portugal.

ON-LINE APPLICATIONS

e-commerce

On average, 20% of the EU's population purchases products online. By comparison, only about 5% of the population in the Accession Countries does so. On-line buyers tend to display a more interactive use of the PC than non-on-line buyers, suggesting that the more sophisticated Internet users purchase on-line.

Almost a quarter of Europe's businesses sell online, whether that is through a website or an e-marketplace, and twice as many make on-line purchases. On-line selling activity varies across the three market domains and across the countries analysed. Business-to-Business (B2B) and Business to Consumer (B2C) correlate closely in terms of on-line sales, whereas Business to Government (B2G) is lagging behind. On average, the volume of sales generated via e-commerce are small and tend to form a small portion of total sales turnover.

European businesses vary widely in their levels of engagement with e-commerce. In the seven countries covered in the SIBIS establishment survey, only a very small minority of establishments remain completely off-line, although a further one in five companies only use basic e-mail. For one third of businesses in the countries surveyed, e-commerce engagement involves back-office transactions through closed network business integration (based on the use of extranets or Electronic Data Interchange). More than two in five businesses engage in some level of front-office e-commerce, with this being restricted to web marketing for one in five businesses, and web sales for one in twelve. Just under one in seven businesses engage in both front-office and back-office e-commerce.

e-work

Despite people's strong interest towards telework, home-based telework is not common: just over 7% of workers from the EU, 3% from the NAS and 17% from the US actually telework from home. However, it must be stressed that telework consists of a variety of types apart from home-based telework, including mobile work, centre-based telework, and self-employed teleworkers in a Small-Office-Home-Office (SOHO). Hence, figures are higher when other forms of telework are also taken into account.

Averages, both for the EU and for the NAS, conceal significant differences among different countries. In the EU, home-based telework is common in northern Europe (15-20%), but the Mediterranean area, together with Portugal, barely reaches 5% of intensity. Similarly, although telework is infrequent in the NAS, there are significant disparities between those countries that show a relatively high intensity of home-based telework (8% in Estonia and Lithuania, which are above the EU average), and the others (less than 5%).

In spite of the interest in telework, an extensive shift of work from the office into the home is yet to be seen. Although companies are often willing to give their staff remote access to their computer network, the acceptability of staff working from home whole days seems to be limited. This trend is complemented by the strong increase in mobile teleworking, which means the use of on-line connections for work purposes during business trips.

e-science

Researchers in some disciplines can be considered as avant-garde ICT users in a work environment. Hence, exploring e-science should give clues about future ICT requirements and trends in other areas of society. Although research systems include academic and

private sector research and development (R&D) establishments in principle, SIBIS considered public science, and defines e-science as its penetration with computers and computer networks.

The types of available computers (stand-alone PC, workstation, mainframe, supercomputer, cluster of PCs) and the age of the computer used are the most important indicators to assess the quality of computer equipment. SIBIS data shows that whereas national differences do not play a significant role here, discipline-related divergences are far more pronounced: astronomers and computer scientists appear the most "e-science ready." Chemists are usually at, or a little bit below, the average of all scientific disciplines in the dataset; economists and psychologists rate the readiness indicators worse than the average scientist.

SIBIS assessed to what extent scientists do in fact use e-science tools for their work, either for data collection, analysis, or diffusion of results. Also in this respect, country differences, even though revealing a patchwork of strengths and weaknesses, are less marked than discipline-related differences: astronomers generally use the Internet most often for collecting and analysing data, and retrieving information; but, they do not rely on personal world-wide web (WWW) pages for publishing professional information. On the other hand, much higher percentages of economists, normally not the avant-garde of e-science, and computer scientists have their own WWW pages.

e-government

EU and NAS citizens show a significant preference for some e-government services, that is the interaction with government via electronic means, while for other services the traditional way is still preferred. Regular Internet users would rather turn to the Internet for communicating with their administrations if it did not involve revealing a great deal of personal information (clearly a declaration to the police entails renouncing one's privacy far more than a library book search or a job search). The amount of personal information required is only one explanatory factor for the preferences of citizens. For instance, familiarity with the on-line service, and experience using the Internet, are also likely to play a role.

Typically in countries where Internet usage is higher, citizens prefer to communicate on-line with their governments. However, the enthusiasm towards e-government does not always ensue from its actual implementation or from citizens' on-line access. Romania shows a very high preference for using online services, well above the average of the Accession Countries and higher than all EU member states. Yet, availability and usage of those services in Romania is limited: Romanians are very willing and enthusiastic about the possibilities the Internet can create for them in the future.

e-health

The SIBIS survey found that although online searching for health-related information is still a minority activity in Europe, both amongst Internet users (36.4%) and amongst the general population (19.8%), it is of sufficient scale to represent a significant issue for public health policy in general, and for patient-doctor interaction in particular. There are significant variations across the EU Member States in the prevalence of health-information searching on the Internet, ranging from between 20% to 50% of Internet users and between 10% and 30% of the population. No EU country reached the levels found in the US, where this form of e-health activity was reported by more than half (58.3%) of Internet users, a figure that translates into more that two in five (44.9%) of the US population overall.

Amongst Internet users, males and younger users were less likely to report online searching for health information, and there were few differences across socio-economic groups. However, differences in Internet usage in the first place reveal that older people, and people in less favourable socio-economic circumstances, are a lot less likely to use the Internet to search for health-related information. This indicates a need for careful monitoring of the extent to which the advent of health-related information services on the Internet may exacerbate existing health "divides" in the population.

About one in six EU users reported having to search web sites in languages other than their mother tongue in order to find suitable health-related information. This was significantly higher than the US (English-speaking) response of one in forty users. Language is therefore an important factor to be considered in e-health policy, thus if linguistically-determined health divides are to be avoided, it will be necessary to ensure that sufficient quality information is available for all language groups.

CONCLUSIONS

SIBIS was conceived with the aim of measuring the developments of the Information Society by combining the three levels of IS development: readiness, intensity, and impact. The results of the SIBIS project point to important aspects of the IS that provide a necessary complement to existing measures of progress in the IS. Up to now, evaluations of the Information Society have focused primarily on the supply side, looking at whether services are available, and how sophisticated they are. SIBIS measures whether the services are used, to what extent, and why or why not. As a result of SIBIS, it is fair to say that we have today a clearer picture of how Europe is progressing towards becoming the most competitive and dynamic economy of the world. For e-commerce and e-government this is certainly true.

SIBIS also reveals regional differences in the advancement of the Information Society. Overall, the US leads the way, with high Internet penetration and experience. Northern Europe, however, often has even higher figures. SIBIS shows that, overall, the Accession countries still have a long way to go to reach current EU levels, although, significant differences were measured between the Accession countries, and, in fact, leading countries there perform better than the lagging countries of the EU.

The purpose of SIBIS was to test and pilot indicators, which should be used in larger, more comprehensive surveys. The results obtained are very promising, though they still present certain limitations. This issue is considered in more detail in other SIBIS products - in particular the *Indicator Handbook* – where the “best” indicators are given – even when these were not the ones actually tested and piloted within SIBIS.