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Towards a policy roadmap on eInclusion and eAccessibility in public services- Consolidated results of stakeholder and expert workshops

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Short description:

The project is a co-ordination action with the objective of contributing to the development of “evidence-based” eInclusion and eAccessibility policies at EU and Member State levels. This report presents a summary of the presentations, discussions and outcomes of the two expert workshops being held within the framework of workpackage 4.

The thematic focus of the first WP4 workshop was on the potential contribution of FP7 research to a well functioning European Policy and Research Area on eInclusion. The results are presented along the workshop agenda and key points are presented in a concluding section.

The thematic focus of the second WP4 workshop was on consolidating experiences gained so far in the field of eInclusion monitoring and on contributing to the development of a coherent approach for eInclusion monitoring at a European scale. The results are presented along the line of the workshop agenda.
Contents

1 INTERNATIONAL WORKSHOP “THE POTENTIAL CONTRIBUTION OF FP7 RESEARCH TO A WELL FUNCTIONING EUROPEAN POLICY AND RESEARCH AREA ON EINCLUSION” ................................................................. 8
  1.1 ABOUT THE WORKSHOP ........................................................................................................... 8
  1.2 WORKSHOP FORMAT................................................................................................................ 8
  1.3 SUMMARY OF THE PRESENTATIONS IN THE THEMATIC SESSION ON TECHNOLOGY TRENDS ...... 9
  1.4 SUMMARY OF DISCUSSION....................................................................................................... 16

2 INTERNATIONAL WORKSHOP “TOWARDS A EUROPEAN APPROACH FOR MONITORING EINCLUSION” .................................................................................................................................................. 22
  2.1 ABOUT THE WORKSHOP ........................................................................................................... 22
  2.2 WORKSHOP FORMAT................................................................................................................ 22
  2.3 THE EUROPEAN POLICY CONTEXT FOR MONITORING OF EINCLUSION ........................................... 23
  2.4 LESSONS TO BE LEARNED FROM INNOVATIVE EU-LEVEL APPROACHES ........................................ 26
  2.5 LESSONS TO BE LEARNED FROM NATIONAL AND REGIONAL APPROACHES ..................................... 31
  2.6 ROUNDTABLE ............................................................................................................................ 33
  2.7 KEY POINTS................................................................................................................................... 33

ANNEX 1- WORKSHOP AGENDAS ........................................................................................................ 37

ANNEX 2- WORKSHOP PRESENTATIONS ............................................................................................. 44
Acknowledgements

This report presents the outcomes of an international workshop on “The potential contribution of FP7 research to a well functioning European Policy and Research Area on eInclusion” held on 31 May 2006 in a first part and the outcomes of an international workshop on “Towards a European Approach for Monitoring eInclusion” on 21 June 2006 in a second part. Both workshops were held in Brussels.

Both workshops were organised by the eInclusion@EU project with the support of the European Commission, DG information Society and Media. The second workshop received additional support from the Committee of The Regions.

Disclaimer

The report on the workshops has been prepared by the eInclusion@EU project. It gives a summary of the presentations and discussions but does not present formally the views of the European Commission or any of the contributors. The speakers’ presentations are available on the web and in annex 2 of this document and may be consulted for further details:


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Executive Summary

The deliverable is divided into two separate parts: The first part presents a summary of the presentations, discussions and outcomes of the first workshop of workpackage four of the eInclusion project held in Brussels on 31 May 2006. The workshop focused on the potential contribution of F/7 research to a well functioning European policy and research area on eInclusion and was organised by the eInclusion@EU project with support from the European Commission. The workshop was attended by 60 participants from various arenas such as academic research, industry, user lobbying and policy.

The second part of this report presents a summary of the presentations, discussions and outcomes of the second workshop of workpackage four of the eInclusion@EU project. This workshop was organised by the eInclusion@EU project on 21 June in Brussels and was held together with the Committee of the Regions and was supported by the European Commission. The workshop brought together 70 experts from different stakeholder groupings and engaged them in an evidence-based dialogue on requirements for a coherent approach towards monitoring eInclusion-related developments at EU-level.
1 International Workshop “The potential contribution of FP7 research to a well functioning European Policy and Research Area on eInclusion”

1.1 About the workshop

The workshop focused on identifying how ICT-related research and technology developments can contribute to the achievement of eInclusion-related policy goals. One of the main aims of the workshop was to facilitate a better understanding of the social and equality-related dimensions and impacts of ICTs in order to enable a focusing of EU-level RTD and policy programmes respectively. The event took place at a time where the Commission was in the progress of preparing the next Framework Programme and a particular focus was therefore on debating issues to be considered by future research.

The workshop was attended by 60 participants from various arenas such as academic research, industry, user lobbying and policy.

The policy background

The eInclusion theme is increasingly receiving attention in the policy arena and to some extent various aspects of eInclusion have already been addressed by previous research. However, ICT-related technological change is progressing apace, and it seems clear that new technological developments intersect in many ways with the various dimensions of eInclusion. In this sense, eInclusion related research clearly has the character of addressing a “moving target” rather than of a “definite approach”. For instance, technological innovation keeps raising new challenges in relation to availability, accessibility and usability of ICT based products and services for certain population groups. As new technologies - and societal practices relating to them - tend to emerge continuously, corresponding “new” issues can be expected to emerge on the eInclusion agenda.

So far at the EU level this perspective has been applied mainly in relation to technology developments of particular relevance for older people and people with disabilities. This is an area that needs continued and reinforced attention as there remain many challenges and barriers for these groups and continual technology developments need to be monitored and addressed. In addition, however, it now seems useful to extend the scope of this approach to cover a wider socio-technical remit, including for instance the wider issues of user-centred technologies and technology development processes, innovation in socially useful technologies, and targeted attention to other groups at risk of digital and/or social exclusion. Against this background this one day event aimed at identifying needs for further research in these areas.

1.2 Workshop format

In the morning session, presentations focused on outlining trends in selected technology domains with potential relevance for the eInclusion debate. In the afternoon, workshop participants were invited to discuss opportunities and threats emerging from technological change in relation to three core elements of eInclusion policy: Digital exclusion, independent living and eServices for social inclusion. The generic workshop design adopted for this purpose is summarised by Exhibit 1 below.
Exhibit 1: A three-staged workshop design

The plenary session afterwards was designed to identify issues that need to be further addressed by future research in order to shape developments in the desired direction. Thereby, the full spectrum of research has been considered including basic research, applied RTD, socio-economic research and policy-related research.

1.3 Summary of the presentations in the thematic session on technology trends

The deployment of existing ICTs such as computers, the Internet and mobile devices in all aspects of the economy, services and everyday life is progressing apace. At the same time, new technologies continue to emerge. It has become a widely shared view that both developments are expected to create new risks but also to open up new opportunities in relation to eInclusion. It is therefore important that future research helps to shape developments in the ways that are needed to exploit the positive potentials and reduce the likelihood of negative impacts.

Presentations of the thematic session focused on outlining trends in selected technology domains and their potential impacts on eInclusion: Trends in assistive technology, trends in mobile technology, trends in the World Wide Web and trends in ambient intelligence.

1.3.1 Trends in assistive technology and implications for eInclusion

The session began with a presentation given by Mathijs Soede from the Institute for Rehabilitation Research (iRv) presenting current trends and challenges in the area of assistive technology.

The Institute for Rehabilitation Research together with Price Partnership Ltd in the UK conducted a technology trends study in 2000 where technology trends in the EU, Japan and the USA have been observed. According to this study, four main categories of technologies are impacting on developments in the area of assistive technologies as supporting tools for disabled people: the Internet, mobile technologies, convergence of television and computers/Internet and developments in sensor technologies.

With regard to the Internet, successful efforts have been made to make PCs and common Internet content accessible for people with disabilities. The Internet has many opportunities for disabled people and has the potential to enable disabled people to increase their social contacts or to facilitate interaction with governments and communities. Furthermore, it is a
tool for monitoring and control at the home and therefore potentially enables disabled and older people to live independently in their home and to support a better self-management of daily life, e.g. in relation to specific social, medical and mobility needs older people and people with disabilities tend to have.

Developments in the area of mobile devices have also have an impact on assistive technologies. For instance, mobile devices can be seen as a personal device for everybody and have the potential to be helpful in the area of monitoring well-being of disabled and older people. Furthermore, mobile devices are a tool to facilitate tracking and location. However, considerable parts of the population cannot participate in these developments on equal footing because available standard solutions do not accommodate to their specific needs and requirements. One major drawback of this kind of mobile internet access (i.e. using a mobile user agent and not a mobile computer/notebook with a wireless connection) is that the display size of mobile devices is usually rather small and browsing a website that is not specifically designed for this purpose can becomes rather tedious, requiring a lot of scrolling and zooming. A second major drawback is that many mobile devices, especially mobile phones, do not have an interface (i.e. a keyboard) that is suited to internet browsing including scrolling around on a screen, typing in text, using keyboard shortcuts for access-keys etc..

With regard to convergence of television and computers and the Internet respectively, there are many potentials and opportunities one can observe in order to support people with disabilities. In television, as in many other areas likewise, digital technology has triggered a new generation of information processing and broadcasting. Basically, digital TV is a more efficient way to broadcast content than analogue TV, as it allows to carry a higher amount of information in the same amount of bandwidth. The new possibilities (and challenges) of digital TV can be grouped according to its two main characteristics: 1. Digital TV as an advanced form of television as it was in the past: a one-way medium used to send content (information, entertainment) to a recipient. In the digital age, this content is more diverse, has a higher audio-visual quality and can be accessed easier than before. 2. Digital TV as an interactive medium, closer to a computer with an internet connection than to a classical TV set. Content can be transmitted both ways, to and from the viewer, who changes from a mere consumer to a user e.g. of services like e-commerce (buying products as seen in a commercial) or even e-government. The prospects of the second characteristic seem to be the more promising ones, and this not only because of the new channel to digital information and interaction it opens. Digital TV also opens up a way to bring the Information Society to people with a low or even non-existent computer affinity, who prefer the TV over the PC as their information and entertainment source. Nevertheless, the first characteristic of digital TV as a one-way medium should not be overlooked. Especially from an eInclusion point-of-view, its basic function as a deliverer of information and entertainment to virtually all households in the EU, regardless of age, health status or social status, highlights TV’s importance as an instrument of mediated social inclusion. This function must not become lost in the switch-over from analogue to digital.

Although maybe not obvious at a first glance, e-accessibility (or measures to avoid e-exclusion) is also an issue for digital TV. A part of these accessibility questions are handed down from analogue to digital TV with only minor changes. These relate, for instance, to closed captioning or sign-language translation of TV programmes for people with a hearing impairment, to audio descriptions for people with visual impairments, and also to the ease- or complexity-of-use of TV sets or remote controls. Other challenges are new and relate to the new, two-way quality of digital TV. These include, among others, limitations in the visual presentation of text and graphic due to the specific characteristics of a TV screen, implementation of screen-reader functionalities, variable font-sizes, comprehensibility of content, usefulness of input device (i.e. remote control) and other issues, some of them well-known from accessible web design and development.
Also developments in the area of sensor technology have a potential impact on assistive technologies. For example, developments in the area of safety and security (wearable airbags against falling) or track and trace functions.

More general trends in technologies changing the assistive technology market have also been presented: Robotics are expected to develop rather fast. Many industrial processes now use robots, which are however usually fixed in location or bound to tracks or wires. With few exceptions, such fixed-location robots are not expected to of great value in domestic or care provision environments. The promise of robotics research resides in independently mobile "service" robots that navigate their way in the environment, transport and manipulate objects and even interact with people as much as a personal assistant, nurse or doctor would. Basic navigation functionality required for the typical service robot is now nearing maturity. Such navigation - based on sensors, switches and in some cases image recognition - is now allowing a range of prototype service robots to emerge. Early prototypes are targeted at the more mundane jobs in home and hospital settings, e.g. cleaning, or transport: carrying objects from drugs to food. Products under development in this class include wheelchairs that can sense obstacles and avoid them, and potentially move around under remote control. Furthermore, developments in the area of intelligent sensors and towards miniaturization will probably have an impact on assistive technologies. However, it was pointed out that marketable products are rare and that market penetration is still in its infancy.

In a next step, a range of applications in the area of short and acute care have been presented concluding that technologies are developing fast in this area. Today, several advanced applications such as mobile electronic patient dossiers, tele-surgery or foetal monitoring at home are developing apace. With regard to applications for chronic illness or handicaps the primary function of appropriate ICT applications is to lessen the impairment and/or to provide support for (daily) living. Here, it was pointed out that privacy is a major concern and a need for transparency is often claimed. Applications presented are for example dialysis at home, glucose measurements via GSM, respiration support, smart home applications, patient lifts, ambient intelligence, voice remote controls or haptic walkers. However, in summary, in the care sector many solutions are already available but access and real widespread usage still hampers significantly.

In the concluding part of the presentation five areas of need where new technologies have potentials to support people with disabilities where presented:

- A secure environment ensured by ICT applications such as alarm systems, sensors and monitoring devices: As outlined by the presenter there is a common public interest to be observed for this but of course these applications are in particular important for those who are/feel most vulnerable.

- Personal safety: Here, social alarm systems with enhanced functions such as early prediction of falls, prediction of epileptic seizures and prediction of general health state problems are main application areas.

- Guidance through “Chaos”: Here, preparation and travel support using dynamic information are relevant application areas for frequent travellers, older people, blind and visually impaired people or hearing impaired people. Support can for example be provided through track and trace or by giving the user feedback on how far he is in his action plan.

- Wellness: The focus here is on measuring and identifying moods and motivation patterns since exercise and learning for rehabilitation tasks often lacks the motivation.
• Solving loneliness: The main objective of caring by giving attention and communication is the prevention of major changes in mood and the prevention of depression.

1.3.2 Trends in mobile technology and implications for eInclusion

Sergio Guillén from the Polytechnic University in Valencia then provided an overview on trends and challenges in the area of mobile technologies and the implications for eInclusion.

The first part of the presentation was a short overview on technologies and services that are relevant for eInclusion. It was argued that wireless and mobile communications were seen as one of the core technologies for the development and maturity of eInclusion services. Issues to be addressed in this regard are convergence of services, networking, interoperability, seamless roaming, scalability, security and trustworthiness and service enablers.

Different communications/computer networks were presented:

**Exhibit 2: Communications Networks**

- **WAN (Wide Area Network):** Mobile TV + Interactive TV will open new opportunities for the delivery of personalised services.
- **MAN (Metropolitan Area Network):** MANs are large computer networks usually spanning a city. They typically use wireless infrastructure or optical fiber connections to link their sites. In this area, some cost-effective solutions are emerging.
- **LAN (Local Area Networks):** A local area network (LAN) is a computer network covering a local area, like a home, office, or group of buildings. For example WiFi hot spots were developed to be used for mobile computing devices, such as laptops, in LANs, but are now increasingly used for more services, including Internet and VoIP phone access, gaming, and basic connectivity of consumer electronics such as televisions and DVD players, or digital cameras. A WiFi delivers broadband data service in limited areas only and users must come to the service areas. For services outside those areas cellular data services are required.
- **PAN (Personal Area Network):** A personal area network (PAN) is a computer network used for communication among computer devices (including telephones and personal digital assistants) close to one person. The devices may or may not belong to the person in question. The reach of a PAN is typically a few meters. PANs can be used for communication among the personal devices themselves (intrapersonal communication), or for connecting to a higher level network and the Internet. It was argued that PAN and BAN network technologies need much more research in order to provide practical, reliable and affordable solutions in the area of e-Inclusion. Mature technologies are for example the Bluetooth technology whereas technologies such as ZigBee, UWB (Ultra-Wideband) and RFID (Radio Frequency Identification)
are only emerging recently. It was pointed out that further research is needed in the area of wireless sensor networks, distributed sensor architecture and enabling AmI.

Potentials provided by mobile technologies in relation to eInclusion concerns a range of aspects. For instance sensing, communication, storage and computation capabilities can be linked together within objects of the daily life. Users will be able to roam through different environments which will be able to grow and to adapt the evolving needs of the users. This will enable new services tailored to the particular needs of individuals. For instance people with disabilities can be better supported while being on the move through personalised communication and location-based support services. Also, mobile technology enables connectivity of objects and devices within intelligent environments that flexible cater for the needs of people with functional and other restrictions.

However, a range of challenges were outlined for wireless and mobile communications to sustain e-Inclusion services delivery. This concerns for instance seamless interoperability of BAN-PAN-LAN networks. Here, Furthermore, the need for new reference architecture for AmI context was pointed out as a further challenge in this context. Here, main challenges were seen in identifying the fundamental functional components for reactive Ambient Intelligence Environments, defining the basic communication and cooperation patterns between these components and providing exemplary middleware technology as well as functional components that will form a basic tool-set for fast prototyping purposes of Ambient Intelligence scenarios. This Ambient Intelligence Reference Model could provide application developers with detailed instructions, which operates as a blue-print, for further Ambient Intelligence applications.

Another challenge seen by the presenter are further developments in the area of wireless sensor networks. Wireless interconnected sensors and actuators, which are embedded in all kind of products (textiles, goods, furniture) enable data collection and control across distributed systems. Seamless roaming enabling true mobility was another challenge raised during the presentation. According to the presenter, connectivity accelerates the process of globalisation and community interaction, which will facilitate innovative services and applications. This is linked to another challenge raised during the presentation: Ubiquitous and always-on connectivity. This would enable continuity of care and anywhere and anytime resulting in a situation where users will not longer need to make distinction between fixed and mobile, being at home or outdoors and the like.

Secure communications were seen as another challenge in the area of wireless and mobile communications to sustain e-Inclusion services delivery. Security and privacy enhancing features built across the whole infrastructure, anonymisation of personal data and secure protocols were highlighted in this regard.

1.3.3 Trends in the World Wide Web and implications for eInclusion

Arno Labonte and Andreas Graf Spee from Framfab then presented an overview on actual trends in the World Wide Web and implications for eInclusion respectively. The first part of the presentation was dedicated to the web usage (patterns) today. The Internet has today turned from an information based channel to fully fledged sales and service channel and internal communication in big organisations today primarily relies on online technology. With regard to user centred developments information architecture based on user needs was seen as the key. Different concepts of navigation were introduced such as categorized navigation, meta-navigation, testimonials, online-tools or search.

In a subsequent part of the presentation Web 2.0 applications were presented. „Web 2.0“ has become a collective term, or even a buzzword, for a growing number of recent developments in the World Wide Web. The common denominator of all these developments is that they are web services that make websites appear more like a desktop application and
that they are usually geared towards facilitating the cooperation of people and/or the sharing of information. Far away from being a concisely defined term, “Web 2.0" encompasses a large number of services, tools or gadgets used in web design and web development with the overall aim of making the web more interactive, and more easy and productive to use, such as blogs, wikis, podcasts, content/social tagging etc.

The main part of the presentation focused on developments which have presented in the first part of the presentation pose on eInclusion. Risks and opportunities that were seen in this regard are summarised in Exhibit 3 below.

**Exhibit 3: Trends in the WWW and implications for eInclusion**

<table>
<thead>
<tr>
<th>Trend</th>
<th>Opportunities</th>
<th>Risks</th>
</tr>
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| Fully fledged service channel/       | Access to services independent from place and time (rural and remote areas) | 1) exclusion due to special needs and requirements  
2) exclusion due to lack of education and skills |
| “online only”                        |                                                                              |                                                                                                                                                                                                        |
| Use of web technology in             | Access to services independent from place and time (rural and remote areas) | 1) exclusion due to special needs and requirements  
2) exclusion due to lack of education and skills |
| internal communication               |                                                                              |                                                                                                                                                                                                        |
| Web 2.0 (community aspect)           | 1) encourages participation  
2) minorities can easily access publicity |                                                                                                                                                                                                        |
| Web 2.0 (technology aspect)          | Flexible for alternative presentation | 1) Fewer standardisation leads to possible accessibility problems  
2) Can current screen readers or Braille displays make sense of automatically refreshing websites full of JavaScript?  
3) How to include users using old browsers like Netscape 4 and its minor version-successors or Internet Explorer 4? |
| User experience                      | Approach is open to special needs | As long as there is a lack of business relevance minorities are not considered appropriately.                                                                                                           |

**1.3.4 Trends in Ambient Intelligence and implications for eInclusion**

**María Terese Arredondo** from the Polytechnic University in Madrid held the last presentation of the morning session and focused on the topic of implementing Ambient Intelligence (AmI) for eInclusion. The presentation was based on research results undertaken by the Life Supporting Technologies (LifeSTech) group.

One of the core elements of the AmI concept is to take in account the embeddedness of ICTs. The AmI concept includes a living (and working) environment where humans interact in a natural and non-invasive manner with computational service and is traced by concepts of “ubiquitous computing”, and involves results from many established areas of research, such as pervasive communications, multimodal user interfaces, artificial vision and domotics. According to the proposed revision of the AmI principles AmI is the vision of physical environments in which technology becomes embedded in the natural environment, psychologically “invisible”, continuously present where and when needed, activated by means of simple interactions and in line with our senses, adaptive to users and context needs, proactive and always under control.
The AmI concept holds considerable potentials in relation to eInclusion. This concerns for example semantic web enabled services, supporting and promoting the mobility of people with functional restrictions, enabling the provision of personalised, self-configurable, intuitive and context-related applications and services and facilitating knowledge and content organisation and processing. Moreover, in connection with micro and nano sensors the AmI concept offers opportunities for unobtrusive, real-time monitoring, detection and prediction of human physiological state in relation to wakefulness, fatigue and stress. Some of the most outstanding results achieved so far concern wearable sensors, embedded sensors, semantic web enabled services, networked home system, wide range of micro and nano sensor technologies, functional clothes and integrated electronics, new paradigms and architectures. However, a big deal of work is still necessary to make AmI be operational in a sustainable scale for e-Inclusion: There is for example a lack of standards, or interoperability between physical spaces, really intelligent applications, natural user interfaces for people, tools to build applications over an AmI infrastructure and business Models for AmI applications and services. According to LifeSTech, a revision of the basic principles that sustain AmI we will be helpful to set the conditions for further research needed for the realisation of the concept in the field of e-Inclusion: “Ambient Assisted Living”.

The term Ambient Assisted Living has come to use in relation to the application of the AmI paradigm with the objective of promoting the independent life of older people, people with disabilities and their relatives. Here, the vision is that users live within ‘intelligent spaces’, many of which are enabled with AAL technology. These AAL Spaces render personalised services to each individual user. Users live in these spaces since its life conditions and quality, have been enhanced, making the whole system sustainable in the long term.

In order make such ‘AAL spaces’ a reality further technology development is required in relation to:

- Intelligent and adaptable user profiling,
- User motivation and adaptable support, and
- User’s behaviour learning and prediction.

AAL services enable users to live autonomously in the daily life activities, to enhancing their feeling of self confidence, safety and protection with the feeling of being part of the society and with a minimum intrusion to their privacy. Examples for AAL services supporting the need of belonging and experience exchange are virtual meetings with friends or family relatives or online engagement in community work. Daily life activities can be supported by AAL services such as actuators (blind window actuator or curtain actuator) or sensors (e.g. presence and weight sensors, water temperature sensors, room temperature sensors). AAL
services can also support safety at home by implementing actuators such as water supply or gas supply actuators and sensors such as temperature sensors in the kitchen, gas sensors or even wearable sensors. Supporting life outside the home is another area where AAL services can be helpful to navigate more independently. Here, outdoor weather sensors or smart information bubbles at bus or train stations are examples worth mentioning.

In summary, it was pointed out that once implemented, AAL have the potential to permit to extend the time people can live in a decent way in their preferred place by increasing their autonomy and self confidence, discharge of monotonously everyday activities, monitor and care for the elderly or ill person and enhance the security and save resources.

However, in order to harness emerging AmI technologies for eInclusion and social inclusion of vulnerable people, there are several non technological issues that need to be properly addressed. Here it was suggested to further research the main socio-economic impacts of wider deployment of AmI enabled eInclusion services. Further research would also need to investigate legal and ethical issues related to identity, privacy and security. Another important point raised was the implementation of real size AAL enabled living scenarios for evaluation purposes.

1.4 Summary of discussion

Building on the outcomes of the session on future technology trends and their impacts on eInclusion, the workshop aimed at facilitating a debate among the workshop participants. To this end, the audience was split up into three parallel working groups. A first working group has focused on “digital exclusion” of disadvantaged groups from the common tools and services of the Information Society. A second working groups addressed the question how ICTs can be harnessed to support “independent living” of people who depend on the support of others (e.g. people with disabilities and older citizens), both inside and outside the immediate home environment. A third working group focused on “eServices for social inclusion”, i.e. the utilisation of ICTs as a tool for better integrating socially disadvantaged population groups into social and economic processes. Towards the end of the day, all participants re-joined the plenary where the outcomes of the working groups were discussed.

From this process a range of key points emerged as follows.

Addressing existing and emerging eAccessibility challenges

There has been considerable progress in making certain technologies and services accessible to the “non-average” user when compared with the state of affairs observable 20 years ago. For instance, personal computing systems have become more accessible through screen readers, large font, speech output and so on. However, many disabled or elderly people still have difficulties in using mainstream products or mainstream products in combination with assistive devices and much still needs to be done if the availability of both accessible mainstream ICTs and specifically designed assistive technology tools are to be maximised.

It was for example highlighted that there is still a lack of compatibility of devices and products with assistive services. Since people are using the products and services and the software, applications and contents, all these building blocks have to be accessible. Here, the introduction of a reliable certification and standardisation scheme and consideration of incompatibility when certifying accessibility of products and services has been suggested by workshop participants. In general, standardisation has been identified as an area where European level action would be particularly appropriate and effective.

In addition, it was suggested to investigate if existing accessibility guidelines such as the WAI guidelines could be extended towards newly emerging technologies and devices (e.g. Web
2.0, mobile gadgets) and to investigate where new accessibility guidelines and tools need to be developed. For instance, emerging dynamic formats of web content pose new threats to eAccessibility. Specific research topics identified included automatic accessibility options, inclusion of semantics in information provided to make content accessible or easy-to-use tools for subtitling.

The importance of establishing standards for emerging applications and products in the mobile arena was also emphasised. Here, it was stressed that mobile devices are more and more playing a key role in the daily activities of many people and offer enormous potential for improving the quality of life. However, concerns have been expressed about the fact that these new products and services and their content will be fully accessible for all people. Convergence of technologies and further developments in the mobile arena lead to new levels of flexibility on the one hand but may increase complexity confronted by the users and may lower the usability and ease of use on the other hand. Another point that was raised in this regard concerned the fact that the increasing prevalence of services that provide content on mobile devices increases the necessity to simplify the processes of searching for content using these mobile devices. This particularly affects people with disabilities since the human interfaces of mobile devices - small screens and limited keypads - make it difficult to use these devices.

Another key point that emerged from the discussions concerned the inclusion of eAccessibility requirements as a horizontal issue for FP7 projects.

Harnessing online technologies to address social at-risk groups

It was felt that new technologies have great potential for social integration of disadvantaged population groups. Here, it was for example pointed out that the provision of services through multiple channels could serve as a solution to some of the problems that are currently faced by disadvantaged population groups in accessing social services. The more inclusive provision of services through successfully exploiting new and innovative channels such as mobile telephones, digital interactive television was regarded as a mean to potentially facilitate a better outreach of social services. Web 2.0 was seen to offer opportunities for people at risk of exclusion. The common denominator of Web 2.0 developments is that they produce websites that resemble desktop applications, and that they are usually geared towards facilitating the cooperation of people and/or the sharing of information. Thus, Web 2.0 technologies could facilitate new online communities, thereby empowering disadvantaged population groups and reducing social exclusion.

A need for experimentation with diverse ICTs within the social arena was emphasised by workshop participants. Related to this was the suggestion to implement less formal means to study new technology ideas on a smaller scale. Furthermore, the implementation of pilot projects to develop ICT enabled service concepts that meet the requirements and needs of target groups has been stressed.

Leveraging the creative potential of the social sector

Participants affirmed that, at least in general, technological innovations provided opportunities for the social sector. However, it was stressed that, in the social arena, levels of awareness of technology as an enabler of innovative service provision and levels of ICT-related expertise have so far tended to be rather low. Against this background, the workshop was regarded as an important step towards initiating a dialogue between representatives from different arenas. Thus, awareness rising on the potential generally provided by technology in the social arena was called for to leverage the creative potential of professionals working with disadvantaged groups for developing new ICT-based solutions.
It was stressed that an ever-widening range of ICTs and media applications is becoming available, and that this may open up new opportunities for social actors to better target their clienteles. Experiences from Belgium suggest for instance that disadvantaged young adults might be addressed more effectively by means of mobile telephony or podcasting rather than by classical communication channels. Much more experimentation with diverse ICTs such as interactive television, various kinds of mobile technologies, and web-based applications was called for to fathom what technologies could be fruitfully applied for what purposes and under what circumstances.

In relation to the latter, it was highlighted that entirely new service concepts may need to be developed to better exploit the inherent properties of ICTs for social purposes, rather than merely delivering traditional services via new media channels. Evidence available from the UK suggests for instance that it may well be possible to bring social services into the home of disadvantaged people, e.g. by means of digital TV, but that these services may not necessarily be regarded as useful by those ultimately targeted merely because they can be accessed remotely. Therefore, pilot projects were called for, to develop ICT-enabled service concepts that not only meet the requirements of social service providers but the needs and aspirations of those ultimately to be targeted as well. To this end, available approaches directed towards participatory technology development and design should be applied and further developed where required.

In this context, it was emphasised that those who are unable or unwilling to use ICTs should not per se become disadvantaged through wider utilisation of ICTs. Both, ICT users and non-users should be addressed through appropriate multi-channelling strategies. Access to social services and support schemes, e.g. employment schemes, should be available at the same level of quality to all who need them, irrespective of the ICTs available to the individual citizen.

As a horizontal task, continuous monitoring of technological developments and technological change from a social angle was called for.

**Addressing second order divides in the virtual space**

A further aspect highlighted during the debate concerns social and economic disadvantages that might stem from the lack of ability to make purposeful use of ICTs. This aspect seems to become ever more relevant because of increasing pervasiveness of ICTs in all aspects of life. The latter does not only concern increasing online delivery of traditional commercial and public services, but increasing social uses of ICTs as well, particularly in countries with high levels of internet penetration. For instance, web technologies are increasingly utilised for self-organised activities and networking. Technical developments such as Web 2.0 and Folksonomies seem to facilitate such developments. On the other hand, there are considerable parts of the population that do not even possess basic reading and writing skills. New concepts and paradigms were called for that enable a better understanding of the types of skills and literacy that would be needed to optimally exploit the social potentials provided by ICTs, particularly the internet. Apart from this, research efforts directed towards better exploiting the inherent properties of ICTs to increase levels of basic literacy among disadvantaged population groups were called for.

**Enhancing standards in the independent living domain**

A number of examples touched on the barriers to independent living caused by a lack of technological standardisation. For example, different elements of home care service environments such as sensors from different manufacturers were often not compatible.
Standardisation was also a particular issue in the discussions on AmI technologies. In order to achieve standardisation, workshop participants regarded exploratory research as necessary to determine what users might want and what might be of particular help for them. At the same time, participants acknowledged a lack of existing practical experience with developed AmI technologies. Thus, the wisdom of letting prospective users determine the direction of AmI in the absence of actual experience was questioned. Nevertheless, there was a view of the need to "begin somewhere" in this developing field, standardisation being a good place to start. In general, standardisation was identified as an area where European level action would be particularly appropriate and welcome.

Investigating factors that hamper technology transfer from the research arena into relevant markets

An important part of the discussion focused on the fact that in the care sector many solutions are already available today, at least in principle, but that wider deployment does not seem to occur. Many useful solutions have been researched and extensively piloted but there is still a considerable lack of market penetration and marketable products are still missing.

Participants stressed that research on service delivery chains and stakeholder attitudes could be a useful step to examine why innovations are or not being taken up. In addition, socio-economic research enabling policy and public/private market actors to better understand market dynamics and potentials was seen as crucial.

More generally, it was felt that findings from application-related technology research would need to be disseminated to a broader audience than it is currently the case. More effective awareness raising efforts would be required, particularly tailored to relevant stakeholders. The dissemination issue would also need to be tied to 'marketing' in terms of increasing awareness of what is available and even changing perceptions of the relevance of technology.

Shaping of inclusive innovation processes

In general, it was felt that processes of technological and socio-technical innovation would deserve a lot more attention, including design and development processes and the social shaping of the technology. Until now, many ICT products continue to be designed for the more techno-affine generation and early technology adopters, whereas disadvantaged population groups have been often disregarded in design processes.

Workshop participants felt that research should focus on the development of effective methods for user involvement into technological innovation processes. This was felt to be of particular importance since eInclusion was seen as much as a process as an outcome. Therefore, users should be actively included in all aspects and levels of technological innovation processes, and it was suggested to develop innovative approaches of user participation. Within RTD projects dedicated resources would need to be allocated to this task.

There seems to be much room for improving current practice in this regard. In this context, effective socio-technical and multi-disciplinary research methods were called for. The promotion of socio-technical design in ICT development could for example be a good starting point as it is concerned with advocacy of the direct participation of end-users in the design process. Compared to traditional design methods, socio-technical design encompasses methods of networking users, developers, ICTs at hand and the environments in which the system will be uses. The development of respective guidelines for user involvement mechanisms could be an important outcome.
In this context it was also stressed that there may be a need to put more effort into investigating user needs and requirements in order to avoid over-development of certain technologies regarding features and specifications has been emphasised.

**Addressing security, privacy and ethical issues**

According to workshop participants, further research is in particular needed to investigate social, economic, legal, technological and ethical issues in relation to identity, privacy and security of ICTs in general and AmI technologies in particular. It was suggested to promote socio-economic research to enable a better understanding of micro-ethical (e.g. potential threats to privacy and dignity of the dependent individual) and macro-ethical impacts (e.g. possibility of widening income-related divides in access to quality of care and quality of life).

When it comes to the creation of a living environment where humans interact in a natural and non-invasive manner it was felt that the issue of transparency would deserve particular attention. Users would probably need to understand how their data are being used and handled. Furthermore, the need for trust in technology, and related issues of risk and safety, were identified as key issues for older people.

Security issues were also regarded as an important research topic. More precisely, this should include research into how to design self-configuring security systems that avoid the need for users to set up secure configurations themselves, or into the development of easy-to-use security solutions to help vulnerable people (for example older people) protect themselves.

**Summary: Key Messages for Policy**

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<th>Addressing existing and emerging eAccessibility issues</th>
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<tr>
<td>• Promote research efforts to address lack of compatibility of mainstream ICT with AT.</td>
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<td>• Introduce reliable certification and standardisation schemes and consider incompatibility when certifying accessibility of products and services.</td>
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<td>• Investigate if existing guidelines such as the WAI guidelines can be extended towards newly emerging technologies/applications and what new guidelines and tools need to be developed</td>
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<td>• Address accessibility in the mobile arena.</td>
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<td>• Include eAccessibility as a horizontal issue in the 7th Framework Programme.</td>
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<th>Leveraging the creative potential of the social sector</th>
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<td>• Facilitate experimentation with new technologies in the social arena.</td>
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<td>• Enable less formal means of experimentation to enable social actors to participate in RTD.</td>
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<tr>
<td>• Facilitate the development of new service concepts in the social arena that better exploit the inherent properties of ICTs.</td>
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<tr>
<td>• Increase the level of awareness on the potentials generally provided by ICTs among actors in the social arena.</td>
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<tr>
<td>• Facilitate building of ICT related knowledge and expertise in the social arena.</td>
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<tr>
<td>• Continuously monitor technological developments from a social angle.</td>
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<th>Addressing second order divides in the virtual space</th>
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<tr>
<td>• Develop new concepts and paradigms that enable a better understanding of skills and competencies required to make purposeful use of emerging online trends such as Web 2.0 and “Folksonomies”.</td>
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Enhancing standards in the independent living domain
- Address the lack of interoperability of independent living technologies by means of standardisation.
- Address the lack of standards in the emerging AmI domain.

Addressing factors that hamper technology transfer from the research arena into relevant markets
- Investigate service delivery chains and stakeholder attitudes to better understand market barriers of useful technologies.
- Investigate socio-economic issues to enable policy and market actors to better understand market dynamics and potentials.
- Develop means to more effectively channel RTD results to relevant stakeholders.
- Reinforce more general awareness rising on useful RTF outcomes.

Shaping inclusive innovation processes
- Develop effective methods and tools to involve users in technological innovation processes.
- Promote socio-technical design.

Addressing security, privacy and ethical issues
- Promote socio-economic research on security, privacy and ethical issues that concern vulnerable groups in particular.
- Pay attention to informational transparency in the context of AmI related research.
2 International Workshop “Towards a European Approach for Monitoring eInclusion”

2.1 About the workshop

The second workshop for workpackage 4 focused on monitoring eInclusion and was held on 21 June 2006 at the premises of the Committee of the Regions in Brussels. This workshop brought together more than 70 experts from different stakeholder groupings and engaged them in an evidence-based dialogue on requirements for a coherent approach towards monitoring eInclusion-related developments at EU-level.

The policy background

Today, growing parts of the population live and work in digitally ‘networked’ environments and engage in new forms of ICT-mediated communication, collaboration, production and consumption. Doing things with the help of ICT is no longer limited to specialists, and many day to day activities are undergoing quite fundamental changes. At the onset of this trend the European Union embarked on the so-called “Lisbon Strategy”, with the goal of becoming “the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.” The relatively new field of eInclusion policy is fundamentally concerned with ensuring that development towards the Lisbon objectives really achieves a knowledge-based society which is cohesive and socially sustainable. More specifically, it is concerned with ensuring that everyone is included in and gains from developments enabled by ICT. However, the field of ICTs is very dynamic regarding the technological advancements, the adoption of new technologies and impacts for individuals respectively.

eInclusion benchmarking and monitoring approaches at the EU level are up to now mainly concerned with access to the Internet and with the roll- out of online public services, and a recently published benchmarking report highlights the need for an extended benchmarking framework to be implemented in the context of the newly launched i2010 initiative. Some analysts from the scientific arena argue that- as the Information Society further develops- it is no longer sufficient to merely measure who is online and who is not. Beyond mere ICT access, actual usage as well as social and economic impacts of ICT usage and non-usage need to be monitored as well.

Against this background it was seen as an important need to consolidate experiences gained so far in the field of eInclusion monitoring and to develop a common view on requirements for further improvements in this field. The goal of this workshop was to contribute to the development of a coherent approach towards eInclusion monitoring on a European scale. With this in mind, a set of speakers and participants were identified that would collectively represent the variety of stakeholders that have key roles to play.

2.2 Workshop format

In order to address the various dimensions of the topic, the workshop was organised into four main themes:

- The European policy context for monitoring eInclusion
- Lessons to be learned from innovative EU-level approaches
- Lessons to be learned from national and regional approaches
• What are the requirements for a coherent EU-level monitoring approach?

At the beginning of the day, the eInclusion@EU project set the scene by outlining the rational for putting a particular focus on the theme of eInclusion monitoring. An overview was given over current activities in this field as they can be observed in Europe. In the following, the first thematic session provided the audience with an overview on the current European policy context for eInclusion monitoring. It provided an insight into official EU statistics available from Eurostat in relation with relevance to the eInclusion theme. This was followed by an overview of benchmarking activities to be pursued within the framework of the European Commission’s i2010 initiative.

The subsequent session provided an inside into relevant empirical work conducted with the support of the European Commission. On the one hand, this included ongoing studies directed towards monitoring developments in relation to eInclusion, eAccessibility and user-orientation of current online services. On the other hand, relevant work was presented that had been conducted some time ago in the framework of more general Information Society benchmarking, e.g. under the heading of the digital divide.

This was followed by the presentation of a number of eInclusion monitoring approaches pursued at the national and regional levels. Presenters from Germany, Belgium, Slovenia and France gave an inside into relevant monitoring and benchmarking activities carried out in their countries. Based on a critical stock-taking in relation to achievements in relation to eInclusion monitoring, a representative of the Association of European Regions for the Information Society (eris@) presented a prospective view on the way forward.

The various thematic sessions were followed by a roundtable discussion aiming at digesting the views that had been exchanged throughout the day.

The remainder of chapter 2 presents a summary of the presentations, discussions and conclusions on each of these themes, followed by an outline of overall workshop conclusions.

2.3 The European Policy Context for Monitoring of eInclusion

When it comes to actual policy implementation in the field of eInclusion, it is quite challenging to take stock and assess the degree of appropriateness and effectiveness of activities that can be observed across the European Union. As revealed by recent research, eInclusion related policy interventions are pursued by diverse actors and on various policy levels, including the EU, Member States, regions, local communities, NGOs and the social partners. Overall, they address a broad range of objectives through a wide array of approaches. Up to now, there has however been fairly limited attention to monitoring and evaluation, especially at regional or local level. On the EU-level, benchmarking activities that have been pursued throughout the various stages of the eEurope initiative would seem of potential interest for eInclusion.

Furthermore, the targets recently set by the Riga declaration furthermore call on a comprehensive and regular monitoring in order to assess whether these targets have been reached or not: The Riga targets with regard to eInclusion are:

• halve the gap in internet usage by 2010 for groups at risk of exclusion
• reduce digital literacy/skills gaps for groups at risk of exclusion by half in 2010,
• increase broadband coverage in Europe to at least 90% by 2010
• ensure that all public websites are accessible by 2010,
• by 2007, make recommendations on accessibility standards and common approaches in public procurement

• by 2007 assess the necessity for legislative measures in the field of e-Accessibility.

However, up to now a coherent and comprehensive European level approach to monitor eInclusion developments is missing.

The focus of the first session was on giving an insight into the recent policy developments in relation to monitoring of eInclusion at the European level. The session began with a presentation given by Maria Del Mar Negreiro from the European Commission, DG Information Society and Media.

The European Commission’s i2010 strategy has put a clear emphasis on eInclusion as a core target for policy-making in the area of the information society: making sure that ICT benefit all citizens; making public services better, more cost effective and more accessible; and improving quality of life. ICTs are becoming more widely used and are benefiting more people. But today over half of the EU population either does not reap these benefits in full or is effectively cut off from them. Reinforcing social, economic and territorial cohesion by making ICT products and services more accessible, including in regions lagging behind, is an economic, social, ethical and political imperative. In i2010, strong emphasis is given to full participation and to providing people with basic digital competence.

As already stated above, the Commission recognises that issues such as technological convergence, research and innovation on ICT eInclusion related issues will require an extended benchmarking framework. The Commission and the Member States are preparing a new benchmarking framework to meet these requirements. Until now, the most important benchmarking activities on a European level are benchmarking activities that have been pursued throughout the various stages of the eEurope and the recent i2010 initiatives.

The i2010 benchmarking has been introduced in order to monitor the achievements of the i2010 priorities and is structured along the three i2010 priorities, as they are 1) completing the Single European Information Space, 2) Strengthening R&D in ICT and the take-up of e-business and 3) achieving an inclusive European Information Society. Benchmarking indicators are selected through discussions with the Member States and Eurostat and mainly stemming from the Eurostat Community surveys on ICT use in households and by enterprises. Apart from some indicators covered within the first pillar such as broadband coverage, the third pillar is clearly of most importance with regard to eInclusion benchmarking and monitoring. The areas covered with regard to eInclusion are Internet access and disparities in usage, e-Accessibility, digital literacy and online public services.

Internet access and usage disparities are covering socio economic factors in the Community survey on households as well as territorial divides. In addition to that, usage and to some extend, non-usage, are covered by including indicators on reasons for not having Internet or a broadband connection at home. Furthermore, different places of having an Internet connection such as home, work, school, PIAPs are monitored and can be broken down by different socio-economic variables.

The area of e-Accessibility is mainly focusing on web accessibility and accessibility requirements in public procurement. This will be supplemented by a forthcoming study on measuring progress of eAccessibility by providing a set of indicators on eAccessibility measurement.

Digital Literacy questions are assessing the level of computer and Internet skills of different population groups and assessing the ways of acquiring these skills. These indicators and

also indicators on barriers to improve digital literacy levels, user satisfaction with their skill’s level and the Internet as a source for learning and training will also be covered by a special module in the Eurostat 2007 household survey.

The online public services area is mainly covering eGovernment related issues and is assessing three different dimensions: The supply side by measuring the availability of and sophistication with online public services. The supply side is mainly covered by the web-based survey of e-Government services whereas the demand side has mainly been covered by a special Eurostat module in 2006. The demand side is related to percentage of individuals using the Internet for interacting with public authorities broken down by purposes such as obtaining information, obtaining forms or returning filled forms. The third dimension has until now not yet been implemented but the development of a framework is currently in progress and pilot test are planned for 2006/07. Impact measurement will then include back office restructuring progresses as results of online provision of services of public interest and impacts of online service provision and usage on different user groups.

As stated by Maria del Mar Negreiro, the third pillar of i2010 benchmarking is until now including four of the five target areas which have been set out in the recent Riga declaration: Geographical divide, e-Government, digital literacy and eAccessibility. What is currently missing are information and measurement approaches on cultural diversity and ageing. With regard to demographic changes and an ageing society, the development of a methodology to include and measure those societal changes is of indispensable importance.

With regard to eInclusion measurement, different approaches are object to discussion within the framework of developing the 2008 eInclusion strategy: One of these approaches is the development of an eInclusion benchmarking framework following a three-stage ladder model, i.e. access-usage-impact and the second approach relies upon developing a comprehensive indicator to quantify and qualify those who are left behind information society developments. However, the methodology needs still to be developed. Remaining gaps in recent eInclusion benchmarking on a European level and within the framework of i2010 benchmarking activities have been summarised by the presenter as follows:

- Indicators which require a more qualitative approach: motivational, attitudinal aspects. Those aspects have recently been examined by the eUser project, which has developed a three stage approach to assess the characteristics of non-users and online services users, the so-called ACM model, which integrates access, competence and motivation as preconditions for public service usage.

- Indicators in specific areas such as ageing society, cultural diversity and impacts assessment (i.e. satisfaction, quality of use).

- Indicators in specific (population) group categories such as disabled people, migrants and regional coverage.

As pointed out in the second presentation of the first session by Hartmut Buchow from Euotstat, the official European statistics on eInclusion are mainly stemming from the Community Survey on ICT usage in households and by individuals. The survey is carried out in all Member States on an annual basis and provides data broken down by age group, gender, educational attainment etc, which is then collected, harmonised and published by Eurostat. The survey includes information on access and connectivity to ICTs (e.g. Internet access at home or broadband at home) and on computer and Internet use (e.g. frequency, location of use, Internet skills). In order to better assess the diversity of the digital divide in the future, additional breakdowns are planned. For example, the feasibility of more detailed regional breakdowns is currently being analysed and it is planned to expand the number of countries collection information on household income. Furthermore, a detailed module on digital literacy and e-skills is planned to be included in the 2007 survey.
2.4 Lessons to be learned from innovative EU-level approaches

Although until now regular in-depth monitoring approaches and measures are missing at the European level, a range of promising projects have been conducted within the framework of research programmes funded by the European Commission. These projects are related to eInclusion measurement in a somewhat more extensive manner than the more limited set of indicators that have been developed within the framework of the European Commission’s benchmarking activities. These include for example eUser, MeAC and a study on the status of eInclusion measurement, analysis and approaches for improvement. The second workshop session provided an insight into this relevant empirical work conducted with the support of the European Commission. On the one hand, these included ongoing studies directed towards monitoring developments in relation to eInclusion, eAccessibility and user-orientation of current online services. On the other hand, relevant work was presented that has been conducted some time ago in the framework of more general Information Society benchmarking, e.g. under the heading of the digital divide.

Joe Cullen from Tavistock Institute presented first experiences and results from an ongoing study on monitoring eInclusion on a European scale. Features of trans-national eInclusion policy demonstrate three clear stages in policy evolution from an infrastructure focus through skills focus to a current focus on services and participation. Six current policy foci have been identified which are: access, accessibility, service development, individual capacity-building, human and social capital and citizen participation.

A project analysis of eInclusion policy and practice at the local level reveals the existence of examples of ‘grass roots’ initiatives with some of them being initiated by major third sector organisations such as the Digital Learning Ring in the United Kingdom and others being part of major general social movements such as a growing demand for a voice for older citizens. The description of different approaches being pursued at national, regional and local level leads to the formulation of challenges for monitoring and measuring eInclusion at all levels. However, this is not an easy task since measurement and monitoring of eInclusion is a complex issue, and has to be considered as a moving target which is closely linked to the continuing process of technological innovation. Furthermore, eInclusion related policy interventions are pursued by very diverse actors and on various policy levels, including the EU, Member States, regions, local communities and the social partners. Moreover, one has to consider new identities arising such as increasing participation of citizens in knowledge creation (the Wikipedia approach is a good example for this).

In his concluding remarks the presenter highlighted a need for new forms of indicators and benchmarking in the area of eInclusion. For instance, a need for a broader benchmarking framework and more sophisticated indicators was emphasised. Furthermore, an in-depth analysis of contextual behaviours and the consideration of motivational indicators was highlighted. In methodological regards, multi-perspective, multi-source and multi-methodological approaches were seen as important to consider.

As pointed out by Kevin Cullen from the Work Research Centre in Ireland, a high level of complexity is dedicated to the measurement and benchmark of eAccessibility. This leads to requirements of eAccessibility indicators being a real challenge: They must address issues that are important for disabled persons, they need to be measurable and to have a clear policy relevance. An additional level of complexity is added by the wide range of ICT products and services of potential relevance and the wide range of disabilities and associated requirements that these raise (Exhibit 5). In fact, the complexity is much larger than this when the various functions and features of the different products are also taken into account.

Exhibit 5: Sectors, value chains and ICT products and services
The MeAc study aims at contributing to eAccessibility measurement at an European level by assessing to what extent ICT products and services available in Europe take into account eAccessibility requirements and Design for All principles, to what extent the opportunities offered by assistive technologies are being capitalised on and to assess the impact on costs of accessible and assistive ICT products and services. The project therefore identifies throughout the EU and elsewhere legislative and other policy measures and actions by industry and other actor groupings that already have or potentially can have a significant positive impact on eAccessibility and that support the Community eAccessibility strategy. Furthermore, the status of eAccessibility across Europe will be measured at two points of time. Therefore, the project will develop indicators for three different layers:

- **Policy indicators:** These indicators will be directed towards monitoring relevant core policies at the level of the individual Member States (e.g. extent to which attention is given to eAccessibility in the national transposition of relevant Directives) and from a pan-European perspective as well (e.g. degree of harmonisation how eAccessibility aspects are addressed in relation to a particular directive across all Member States).

- **Readiness indicators:** A second set of indicators will be directed towards monitoring the extent to which the relevant stakeholders are prepared to take effective actions in relation to eAccessibility. For instance, ICT industry needs to be ready for developing and making available accessible products and services to both individual end users and intermediaries such as employers, services providers and procurers who play a key role in the wider deployment of accessible ICT solutions. Whether or not these are ready to make the required contributions here, depends on various factors, for instance whether or not they consider people with disabilities as a strategic target groups for their business/service, whether or not they are aware of the eAccessibility requirement these have in relation to ICT and whether or not they have sufficient knowledge and resources to adequately respond to these requirements.

- **Implementation indicators:** Another set of indicators will be directed towards monitoring the level of actual implementation of eAccessibility as it is understood in the framework of this study. These indicators are to reflect to what extent people with impairments are disabled in participating in common ICT uses due to inaccessibility of
the given ICT environment in terms of products and services that are available to them.

Karsten Gareis from empirica then presented results stemming from the eUser project. The project has developed the so-called ACM-model. The ACM (Access-Competence-Motivation) as defined in the eUser project describes the citizens’ proximity to become eGovernment users and is composed of three different dimensions (Exhibit 6): The access dimension is defined as physical access to the Internet or at a suitable other location and is the most basic precondition for eGovernment usage. Digital skills, ICT usage experience or alternatively ready access to help from friend/family or others are comprised by the competence dimension. The third dimension refers to the willingness to use online channels to engage with government or a relative preference compared to other delivery channels respectively and is called the motivation dimension.

Exhibit 6: The ACM model as used in the eUser project

Source: based on Viherä & Numela 2001

For each of the three dimensions of the ACM Model, thresholds are defined for classifying users with regard to whether the condition is fulfilled or not fulfilled. This results into 8 different combinations of access, competence and motivation, from “all conditions met” (type A) to “none of the conditions met” (type H). This was illustrated using the example of lifelong learning/eLearning. Here, the access dimension relates to physical access to online infrastructure at home or any other place found suitable whereas the competence dimension corresponds to the ability to learn (self-efficacy) and digital skills (eLiteracy). The motivation dimension then is operationalised by the willingness to engage in learning.

The ACM-model allows policy-makers to identify the possible quantitative impact which changes in either access, competences or motivation are likely to have on overall uptake of eGovernment usage. It can be applied for continuous monitoring of user orientation, i.e. tracking user orientation over time (adaptation to emerging technologies and adaptation to changing definitions of eInclusion) and tracking user orientation across countries. The advantage over other presentation methods of survey data lies in the ACM Model’s ability to show how incidences of lack of access, competence or motivation are interrelated, and as such require focussed policy attention in order to achieve the strongest impact with given resources.

Relying upon research in the field of user satisfaction with online services some generic requirements for inclusive online services can however be identified. These can be summarised as follows:

- Visability refers to the degree to which the service is known to its potential users, i.e. the level of awareness about the service in the target population.
• Usefulness refers to the practical utility of the service from the viewpoint of the individual (actual or potential) end user. Utility might be derived from the relevance of the service to meet particular needs of the user (i.e. in the case of many health services) and the suitability for personal circumstances. It also comprises the variety of tangible aspects, such as time savings, cost savings and so on resulting from the service itself (rather than the way it is delivered – see service quality below). Finally, it can also incorporate less tangible aspects, such as personal intrinsic gratification that can be derived from the fun of, for example, participating in an attractive learning experience/training course. Other social aspects such as prestige and social desirability etc. may also play a role.

• Accessibility refers to the degree at which the mediating technologies employed enable the end user to access the service in question. Further to the concept of eAccessibility it can be understood as a function of a number of- not necessarily disability related- aspects including e.g. findability (the ease with which the service can be located), affordability (the degree to which the end users can afford the costs for accessing and using the service in question), time independence (the extend to which the service is accessible at any time when demand occurs) or platform independence (the extend to which the service is accessible through various alternative hardware/software systems).

• Service Quality refers to the ability of the service to fulfil the expectations of the end user (i.e. lead to satisfaction with the service). Again, this can be understood as a function of a range of attributes including e.g. usability in terms of “ease of use”, reliability in terms of technical functioning and accuracy of information given, responsiveness in terms of quick response and the possibility to get assistance if a problem or a questions arises, efficiency in terms of simple to use processes, assurance and trust, customisation in terms of easy tailoring to the end users’ preferences and needs.

Finally, an outline for a monitoring system for (online) services was proposed comprising the measurement of the supply side (i.e. nature and quality of online service offers, costs and the availability of alternatives), the user side which is operationalised through dimensions of the ACM model and the different components of the eUser model of user orientation of (online/offline) public services. Outcomes to be monitored are usage of public services, user experiences with public services as well as impacts of online usage of public services.

**Tobias Hüsing** from empirica then presented approaches on exploiting cross national survey data to quantify levels of e-exclusion by developing and applying compound indicators. Compound indicators in general are approaches to strongly simplify a complex picture or situation and are thus capable to serve as an eye-opener which is intuitive and understandable. Compound indicators are a means of informing policy and public as well as a means for monitoring policy. In methodological regards, compound indicators require accompanying multi-variate analysis and validation and full discloser of methodology.

Two examples of compound indicators for eInclusion measurement have been presented: The Digital Divide Index (DIDIX) and the eInclusion Index (eIIx).

The Digital Divide Index (DIDIX) was developed in the FP5 IST project SIBIS and applies diffusion theory to assessing the digital divide. DIDIX has shown that diffusion theory, even if understood as deterministic S-curve movements, will not - as many pundits have argued - let the digital divide vanish or that it is a merely temporary problem. While some have argued that different S-curves applied to different societal groups will in the not so long run approximate at a shared saturation level, it should be obvious that neither the saturation level nor the speed of approximation is inherently determined by application of diffusion theory.
Diffusion theory may well conform to scenarios where either a societal group will never reach the same saturation level as society on average and/or where the velocity of uptake is deemed socio-politically undesired.

DIDIX tried to analyse whether or not the empirically detectable differences in ICT diffusion between societal groups can largely be explained by the overall societal level of ICT penetration. It came to the conclusion that the digital divide may not be diagnosed an only temporary problem in many countries. In many countries the increase in overall ICT deployment involves only a constant or even falling relative participation of disadvantaged population groups. This suggests that in these countries the disadvantaged groups under scrutiny in DIDIX will not even in the longer run reach the adoption level of the population average.

The digital divide expressed in DIDIX is primarily one between disadvantaged groups and an overall population average. DIDIX analyses what is called relative diffusion rates – the relation (ratio) between diffusion in disadvantaged groups and the population total. It looks into the adoption in four socio-economic groups, defined in terms of gender, age, income and education. The choice is driven by data availability. Other crucial data breakdowns were either not available or not comparable. DIDIX refers to these social segments as the "at-risk groups". For these at-risk groups uptake indicators for computers and the internet are compared to the population average as ratios between at-risk group and population.

One of the results was that the overall European Index has not changed much between 1997 and 2002 although an increase is predicted when ICT usage is as dynamically increasing as it did in Europe during that period. Its value, however, stagnated at a level of 53, roughly meaning that the at-risk groups have adopted ICT at 53% of the population average.

While the overall values remained at this level, developments in opposite directions in sub indicators balanced each other out. But even more interesting is the fact that also developments in opposite directions in Member States balanced each other out. The coefficient of variation between Member States increased from 10.3 (1997) to 22.9 (2003). While forerunner countries like the Nordic countries, the United Kingdom and the Netherlands, plus two countries with a notable surge in ICT, Austria and Ireland, have improved their elnclusion in DIDIX terms, the situation in southern countries has considerably aggravated.

Remarkably, in many countries the increase in overall ICT deployment involves only a constant or even falling relative participation of disadvantaged population groups. In some countries disadvantaged groups may not even in the longer run reach the adoption level of the population average. While for instance in Sweden the average participation in disadvantaged groups is 65% of the overall level, this average accounts for only 27% and falling in Portugal.

The second compound indicator being presented was an elnclusion index which is a proposal for an indicator for monitoring Europe’s progress towards elnclusion based on the targets set in the recent Riga declaration. The elnclusion Index eIIX developed by empirica focuses on the quantitative targets set by the EU ministers in Riga and provides a single indicator of Member State progress towards inclusion of all citizens in the Information Society. The compound index proposed as the elnclusion indicator is based on individual citizens’ situations in respect of usable access to Information Society services, i.e. their elnclusion status, and applying the risk-group-based DIDIX to characterise progress made by the EU, by Member States and regions. There are four component variables underlying online citizenship of a region’s population: 1) accessibility of eGovernment to the citizens, 2) their digital literacy, 3) their belongingness to the user community and 4) their access to broadband connections.
2.5 Lessons to be learned from national and regional approaches

Also at the national and regional level innovative eInclusion monitoring approaches are pursued. Presenters from Belgium, France, Germany and Slovenia gave an insight into relevant monitoring and benchmarking activities carried out in their countries.

The session began with a presentation given by Hervé Le Guyader presenting an approach to monitor regional Information Society developments in the Aquitaine region in France. Measuring ICT deployments and empowerment on the regional level is here seen as the necessary precondition for the definition of regional and sub-regional ICT development strategies. Monitoring these developments in the region Aquitaine is now in its fifth year and relies upon 15 indicators covering households, businesses eGovernment, digital TV, tourism, education, health etc. Regular monitoring of certain developments allows to adequately assessing the maturity of the Information Society in several areas. However, as indicated by the presenter, there are still a lot of things to do in order to increase ICT access and usage since Aquitaine citizen’s usage figures are, although above national average, quite below European leading regions. In addition to this, it was pointed out that the methodology of the monitoring approach adopted needs further improving since for example some key indicators such as indicators in eInclusion are simply missing.

In addition to this, Aquitaine is planning to integrate new tools and approaches such as sectoral databases or a GIS platform in order provide decision makers with an Information Society dashboard. A strong focus in the future will also be the assessment of impacts of public policies.

Katharina Ahrens from the Initiative D21 in Germany presented the German (N)ONLINER Atlas as a good approach to monitor usage and non-usage of the Internet. The (N)ONLINER Atlas is the largest and most important tool for regular monitoring of Internet usage and non-usage in various German population groups and regions. It is published annually by the Initiative D21, the largest partnership of politics and business promoting digital integration and development in Germany. The Initiative seeks to enable different target groups to use ICTs, and to strengthen the development of innovative ICTs in Germany. The Atlas is supported by member companies such as the market research group TNS Infratest and by political partners such as the Federal Ministry of Economics and Technology.

The (N)ONLINER was first published in 2001 as the so-called “Verweigerer Atlas (“refusers’ Atlas”). By monitoring internet-usage and non-usage it helps define the target groups that have yet to cross the digital gap. This information helps determine the prospective project work of the Initiative D21 and others.

The (N)ONLINER Atlas survey is conducted from January to April every year by TNS Infratest via 50,000 computer based telephone interviews (CATI). In addition to this standard survey, 1,000 onliners are asked in an online panel about a specific topic or trend in the Internet each year. These results are analysed and published as “Annual Trend Topics”. Trend topics in recent years have covered ‘Future Online Applications and Services’ (2005), ‘Innovation - Mobile Internet’ (2004) and ‘Online Job-Search’ (2003). In addition to the trend topic surveys, a special analysis had been carried out in 2005 ad-dressing Internet usage of the 50plus generation.

One of the core subjects of the (N)ONLINER Atlas is Internet usage broken down by federal state, regions and postcode areas, as well as socio-demographic data like age, gender, income, education and occupation. The results are comprehensively illustrated in various maps and diagrams. Persons who are planning to get online and those who are not aiming to get Internet access at all are included in the Atlas. As well as defining non-user target groups, the geographical structure of Internet access is analysed and presented. Thus, the
Atlas provides a monitoring of the maturity of different kinds of regions within Germany (e.g. urban versus rural regions).

The (N)ONLINER Atlas 2006 has recently been published. It shows that 58% of the German population over 14 years of age are online - two million internet users more than last year. Surprisingly, the age group “50plus” has been mostly responsible for this growth – over one million people aged 50plus joined the net community in the last twelve months. Also, the gaps between male and female users and users in Eastern and Western Germany seem to be narrowing. The Trend Topic 2006 “Security on the Internet” shows a high degree of security awareness among German users.

Vesnar Dolnicar from the University of Ljubljana then presented activities undertaken in Slovenia to measure and monitor the national digital divide.

According to the presenter, the digital divide is typically observed as a comparison of percentages related to the penetration of ICTs among different countries. However, new additional insights are neglected by the usual approaches since they often do not fully utilize the information embodied in the existing data. It was pointed out that absolute and relative distances as well as the measurement of time distances may not be sufficient to measure and monitor the dynamics of the digital divide.

The presentation was concluded with stating that simplified time analysis merely based on absolute or relative differences may offer completely different outcomes compared to the trends based on time distance observations. Correct analysis should therefore explicitly and carefully address the implicit assumptions for the corresponding distribution models. The question whether the digital divide is narrowing or widening requires a sophisticated methodological approach taking into account diffusion patterns of ICT penetration, starting delay of the lagging unit and saturation level of each of the compared units. In order to evaluate and interpret digital divide dynamics in an appropriate manner, one has to incorporate assumptions about past and future scenarios.

The last presentation was given by Luc Simons from the Agence Wallonne des Telecommunications and focused on experiences gained in the Walloon region and the SOURIR network. Sourir “Synergie des Observatories des Usages Régionaux de l’Internet et des Réseaux“ is a synergy of research institutes on regional uses of the Internet and Information Networks. The network’s main objective is to share methodological expertise, questionnaires and indicators, results for comparison purposes and technological monitoring.

Sourir was started informally six years ago, by Aquitaine (AEC), Brittany (M@rsouin) and Wallonia (AWT). The network includes two kinds of participants. Those who have signed a charter (see below) are effective members and are required to be active in the network. There are also ‘partners’ representing other bodies with similar interests, but who do not want to be active members.

Currently the network involves more than ten regions from three countries (Belgium, France and Luxembourg). Sourir has four effective members from Aquitaine (AEC), Brittany (M@rsouin), Wallonia (AWT) and Reunion (POSI). Furthermore, the network is supported by eight partners from Alsace, Ile-de-France, Limousin, Midi-Pyrénées, Nord-Pas de Calais, Pays de la Loire, Poitou-Charentes and Grand-Duchy of Luxembourg.

The Sourir network supports diverse activities: seminars for members; support for electronic access to regional resources; organisation of conferences, workshops and training and publication of regional studies conducted by the members.

The Sourir network is often regarded as “the open source” of benchmarking, and its charter is based upon four main principles:
• Reciprocity. The members share their knowledge and experience, mainly on methodological issues: questionnaires, methods, indicators, etc.

• Quality. One of the purposes of this sharing of experience and knowledge is to improve the methods and processes of ICT surveys methodologies and to share common standards in order to be able to benchmark the results of the studies.

• Loyalty. All the members must have respect for information and sources.

• Free of charge. Participation to the network is free of charge and the contributions are voluntary based.

Sourir intends to develop a common approach and methodology to benchmarking digital exclusion and inclusion at the regional level. The target groups of the regional surveys and studies are mainly individuals, households and small enterprises.

Each region involved in Sourir has conducted an annual study of the penetration and users of the Internet since 2000 on the main topics of phone equipment, computer and Internet equipment and usage.

2.6 Roundtable
A Round Table series of short presentations was held in the fourth session. Participants were asked to address three main questions:

• What do current monitoring activities tell us in relation to eInclusion?
• Do we need additional/new policy approaches, monitoring instruments and indicators?
• How could a comprehensive monitoring of eInclusion be implemented across the EU?

The main points made in the presentations are included in the following chapter.

2.7 Key points
There were lively and wide-ranging discussions amongst participants. This section summarises the key points emerging from the discussion during the thematic sessions and the round table in the afternoon.

Various activities are taking place in European Member States in terms of eInclusion-related policies, multi-stakeholder activities and initiatives but also surveying the situation and developments in relation to the Information Society. However, despite the existence of various developments and surveys aiming at measuring access, usage of, and to a much lower extend, impacts ICTs have in relation to digital and/or social exclusion there is so far no well-organised conceptual and analytical framework available on a European level for mapping the range of issues that need to be measured in the field of eInclusion and the identification of at-risk groups. It is this currently rather difficult to get a comparative EU-wide picture of the current situation in relation to eInclusion and the digital divide since in each country different issues are considered and different methodologies applied. It was thus emphasised that efforts should be promoted to support the development a coherent and comprehensive eInclusion monitoring system at the European level could be helpful to improve the situation. However, there were also fears raised that a monitoring system at European level might not be the adequate level because of significant regional disparities and differences.

As a generic requirement, it was stressed that accurate measurement requires a properly defined theoretical and operational framework. Up to now, the emerging field of eInclusion policy seems not to have reached the stage of a properly defined area of public intervention,
in terms of commonly agreed concepts and targets. It was suggested that a policy framework
to guide further data gathering needed to be further spelled out in this regard, with the Riga
declaration being seen as a starting point.

When it came to specific requirements on future EU-level monitoring of eInclusion, it was
highlighted that attention should not merely be paid to the so called "first order divide"
(user/non-user), but also to "second order divides" (based on categories of users). Available
evidence suggests, for instance, that simplistic assumptions about the impacts of ICTs in
terms of a single, or even small number of, 'digital divides' become misleading when
developments in the 'knowledge-based society' reach wider and more generalised
audiences. Very different styles of Internet use and types of Internet users do exist which
need to be addressed based on a much better understanding of both, styles of use and
different groups of users, than we have today. Different types of users have different types of
usage patterns that should be taken into account. Moreover, it becomes appropriate to think
of ICTs as having wide-ranging but differentiated impacts on participation in economic, social
and cultural processes. However, it was stressed that current monitoring approaches largely
seem to lack indicators directed at monitoring such impacts. According to workshop
participants, this needs to be more carefully addressed, by considering impacts ICTs have in
relation to digital and/or social exclusion, e.g. with regard to life satisfaction and quality of life,
equitable access to goods and services, possibility to participate in common economic and
societal processes, satisfaction with services of public interest such as eGovernment
services and the like.

In relation to monitoring access of certain population groups to ICTs it was emphasised that
one should take into account technological developments and the fact that technological
change keeps raising new challenges in relation to availability, access, accessibility and
usability of ICT based products and services for certain population groups. It was therefore
suggested to promote efforts to deeper analyse access related variables.

With regard to the development of indicators for the measurement of impacts it was
suggested that two different layers need to be addressed: The impacts emerging at individual
and societal level as well as impact assessment of policy measures and activities. With
regard to the latter, for example impacts of structural funds of ICT-related measures were
seen as important issues. In relation to this, it was pointed out that there is currently a
significant lack of longitudinal and follow-up studies.

A more general need for the conceptual broadening of current benchmarking frameworks
was highlighted. This would enable the development of more sophisticated indicators and
information gathering methods, both qualitative and quantitative in nature. Since indicator-
based monitoring relies on various conceptual assumptions and definitions, it seems
important to critically review our understanding of how Information Society developments
actually impact on the citizens and the society as a whole. For instance we do not sufficiently
understand how ICTs are going to change the way knowledge is created, and it seems likely
that more complex forms of inclusion will emerge over time. In relation to this it was also
suggested by some participants to promote efforts with regard to priority setting for
eInclusion monitoring.

A related aspect that received attention during the debate was the question of how to better
exploit existing EU-level data sets for the purposes of eInclusion monitoring. Here, more
complex multivariate statistical analysis was called for. This would however require micro
data, which have up to now not been provided by the Community Survey on ICT Usage in
Households conducted by Eurostat or the National Statistical Institutes. Only one-off studies,
such as Seniorwatch (www.seniorwatch.de/) or SIBIS (www.sibis-eu.org/), have provided this
kind of data. Also, it was stressed that there is a need for reliable and comparable data as
well as a need for the development of complex indexes which could serve as an eye-opener
for complex issues in relation to digital divide developments or risk assessment.
Beyond this, it was claimed that adequate attention should be given to ICT non-users. A considerable share of the European population is likely to remain "off-line" in the foreseeable future, either voluntarily or because their ability to participate in ICT developments is hampered by personal characteristics (e.g. due to disability and/or personal capabilities) and/or life circumstances (e.g. due to their economic situation). At the same time, more and more services are now becoming available by means of ICTs, including both commercially driven and public interest services. It will thus become increasingly important to monitor whether those who cannot or do not want to participate in the online world will continue to have access to "traditional" services that are comparable - in terms of quality, price and outcomes - to those that will increasingly be provided by means of ICTs. Furthermore, it will be more and more important to assess whether difference in usage patterns are the result if personal choice or from context and to which extend difference in usage has socio-economic implications for the citizen and society.

Not only the demand side but also the supply side assessment and monitoring which needs to reach beyond monitoring eAccessibility of public websites was seen as crucial. The eGovernment supply side measurements were given as an example of what could be aimed at.

Furthermore, we still do not know much about how eInclusion issues (and the measures that are suited to addressing these) feed into the wider social inclusion agenda.

**Summary: Key Messages for Policy**

- Promote the development of a properly defined theoretical and operational framework to monitor and benchmark eInclusion.
- Develop, implement and pilot European-wide measuring, monitoring and benchmarking activities to track progress on Information Society/eInclusion related developments.
- Develop a more coherent and complete approach to monitoring and benchmarking.
- Promote the implementation of longitudinal and follow-up studies in relation to digital divides assessments.
- Establish observatories that monitor Information Society developments at national and European level.
- Pay adequate attention to first order and second order digital divides.
- Promote the development of appropriate indicators directed at monitoring impacts at individual and societal level as well as impact assessment of policy measures.
- Better conceptualise and measure different user and non-user groups.
- Give equal attention to the needs of those who are and those who are not online.
- Take into account that technological developments technological change keeps raising new challenges in relation to availability, access, accessibility and usability of ICTs for certain population groups.
- Develop more sophisticated indicators and information gathering methods, both qualitative and quantitative in nature.
- Better exploit existing EU-level data sets for the purposes of eInclusion monitoring and develop more sophisticated analyses of gathered indicator data.
- Develop more complex indexes which could serve as an eye-opener for complex issues in relation to digital divide developments.
- Pay adequate attention to ICT non-users.
- Benchmark the current degree of equivalence in access to services.
- Promote supply side assessment and monitoring.