Assessment of the Senior Market for ICT. Seniorwatch 2006 – Progress and Developments

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Assessment of the Senior Market for ICT

Progress and Developments

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Executive Summary

Usage of mainstream ICT in everyday life

Internet usage by older people has almost doubled, but the 'age divide' has hardly changed...

Internet usage amongst the older age groups has almost doubled over the last five years, reaching two-in-five amongst those aged 55-64, and one-in-five of those aged 65 to 74 - hiding, however, regional divergences with national usage rates between 0.4% (65-74, Romania) and 72% (55-64, Sweden). This increase has resulted from two main factors - the ageing of younger age groups who were already using ICT (counteracted to some extent by some cessation of usage amongst these groups, for example, when retiring) and an increase in (new) uptake amongst the older age groups. However, the younger age groups have seen similar increases in usage so the overall ('first-order') age-divide in Internet usage has hardly changed.

…and there is increasing polarisation of the older age groups between users and non-users....

With regard to ICT, the 50+ age group is more polarised than ever before: 57% have computer access at home, and 43% have not; 47% have internet home access, and 53% have not. Of special concern is that the group of non-users who are also not interested in using ICT at all has hardly decreased since 2001. These so-called "digitally challenged" still account for more than a quarter of the older population.

...with age and other 'divides' also within the older age groups

There are also major age-divides within the population aged 50+, with much higher usage amongst the younger old compared to the older old. Usage patterns amongst the older generation are also quite strongly determined by socio-economic factors, so that the digital divide not only exists between the younger and older cohorts but there are also vast digital divides among the older population. For example, just 16% of people with lower education use computers on a daily basis, while 62% of people with tertiary education do; only 15% of those in the lowest income quartiles have ever used the internet, compared to 75% in the highest quartiles, and the likelihood of being a frequent user is also much higher in the higher income groups. Whether or not one has been in employment is also an important determinant of usage, and higher occupational groups are a lot more likely to be users than lower ones.

Although costs can be an important inhibitor of ICT take up and usage for older people, there appear to be relatively few examples of financial support schemes targeted towards the older age group, per se.

Much smaller and narrowing age-divide for mobile phone usage and other ICT

In contrast to the situation for computers and the Internet, mobile telephony has rapidly spread through all parts of the population even if there is still some degree of age-divide, especially in relation to the older old. The way that older people use their mobiles is now a lot more similar to that of the younger age groups, unlike the situation found in the first Seniorwatch survey in 2001, when the mobile phone was viewed as a security device among the target group. Other ICT, especially everyday consumer electronics, are also widespread among the older population today as well.

The 'first-order' age-divide in Internet usage is likely to remain significant for some time to come

The evidence indicates that the 'first-order' age-divide in Internet usage will remain significant for some time to come. This means that, without interventions to increase uptake, large numbers of older people will not gain the benefits that Internet usage can bring.

Although older users do more things online that they did in 2001...

The data shows that older users use the Internet for a much wider range of things than they did in 2001. Also broadband is much wider spread today while it was practically non-existent among the older population in 2001.

.... 'second order' digital divide in user skills should increasingly be of concern...

However, in parallel to the substantial first-order divide, the evidence also indicates a major second-order digital divide (between users), especially in relation to user skills. Older users tend to have less skills and/or lower confidence in their skills in using ICT. This can hamper older users to use ICT to its full potential.

Disability and other functional impairments linked with lower usage....

Older people with disabilities or other functional impairments are less likely to use ICT and when they do tend to use them less intensively. Socio-economic disadvantages linked with disability or functional impairment are important factors in this. eAccessibility challenges posed by disability or functional decline with ageing also need consideration

...and Accessibility is an important issue for the older age groups

Half of all hearing aid users report that they regularly experience interference when using mobile, cordless and other telephones. This is likely to be a factor influencing the finding that almost one-third report not to use their mobile phone much. More than one-quarter lack any awareness of models that reduce interference problems and where to get them.

The other exemplary group concerns visually impaired users who may face problems in using computing devices in several regards. We find that computer users with severe visual limitations only partly use any assistive technology – with a majority of 73% not using any at all. Again, a number of barriers to the wider utilisation of such technologies do exist, including for instance again lacking knowledge of what would be available on the market and the fact that existing products do not necessarily seem to meet actual user needs.

While people with severe usage problems seem to know too little of assistive devices, a problem people with more slight visual problems see is that they often do not know how to use standard features that could make usage more comfortable, such as zooming features or font sizes.

As regards people with dexterity problems it becomes apparent that ICT drop-outs in the older age range are found to be strongly overrepresented among those with hand impairments.

… mainstream markets do not seem to adequately respond

The finding that hearing aid users are poorly informed seems rather surprising when considering the fact that the telephone handset market can be considered to be a relatively mature one, with a range of accessible solutions that have in principle become available, including models which are hearing aid compatible

Both the examples of visually and hearing impaired users point into the direction of lacking market transparency when it comes to the availability of telephone hand sets that accommodate the specific needs of hearing aid users or the availability of visual assistive technologies, an assessment which also supports the outcomes of the recent MeAC study.

Public funding and supports for assistive technology not sufficiently targeting older people

Although costs and (lack of) funding availability seem to be important inhibitors to the wider use of assistive technology solutions by older computer users, existing public services in this field are in the main targeted towards people with disabilities. In addition, the available evidence indicates wide variability in levels of public support across Europe in terms of the contexts that are covered (employment, education, everyday life), the assistive technologies covered (especially in the extent to which accessible / assistive ICT are covered), the eligibility criteria that are applied, and so on.

Main conclusions for policy

Issues to be tackled by policy, industry and research include:

Reducing the 'first order' age-divide

- Despite slightly increasing adoption rates of online media among older Europeans, the data indicate a persisting and substantial age-related access and usage divide in the virtual space. The gap widens with increasing age, per se, but there are also major divides amongst the older age groups linked to socio-economic status and prevalence of age-related impairments. The persistence of these divides reinforces the need for further efforts to develop both demand side and supply side measures, as has been recognised in the Commission's 2007 Action Plan on Information and Communication Technologies and Ageing. The findings of this study provide pointers to some key priority issues and types of approach that seem to merit particular attention.

Reaching the 'digitally challenged'

- In relation to the demand side, a key finding is that attention needs to be given to the development of measures that indeed reach those who are least likely to become engaged in ICT, the so called "digitally challenged" who's share has remained more or less stable since the first SeniorWatch survey in 2002. Measures that may have worked well in reaching the "technologically open minded" during the early days of Internet uptake in many Member States (e.g. public access points, awareness raising campaigns) seem to have remained largely ineffective in relation to the former group.

Preventing 'drop-out'

- Focused attention needs to be given not only to those who have never been online but also to those who have stopped engaging in online activities. It seems that a considerable number of older people who have once used ICT (for example at work) have since stopped using them. Special attention may need to be given to transitional stages, such as retirement, where efforts could be made by the various stakeholders (public policy, employers, active retirement organisations, ICT industry) to encourage and support maintenance of ICT usage. In this regard, our data indicate for instance that the share of "drop outs" is particularly high among those who have no home access (32%) while "drop out" rates among older users living in broadband households (4%) is considerably lower (arguably both might be cause or effect). Also, prevalence of functional restrictions (in particular dexterity problems) and – perhaps not surprisingly against this background – older age seem to have a comparatively strong impact on "drop out" rates.

Better industry response

- As regards the supply side, our data confirm that there is still a lack of adequate market response to the ICT-related needs of the ageing population – in 2007 an even larger share of older people felt that their design-related needs were not being adequately considered by industry when compared with the 2002 survey. This outcome reinforces the need for dedicated efforts directed towards stimulating mainstream ICT industry to recognise and better address the economic opportunities potentially provided by the global trend towards population ageing.

eAccessibility – more solutions are needed and more take-up of existing solutions

- As shown, for example, in the access barriers faced by hearing aid users and those who rely upon assistive technology when using a computer, e-accessibility and design-for-all issues need to receive reinforced attention in relation both to better mainstreaming of solutions that are in principle available today and developing new solutions as technology further progresses.
- On the demand side, the data show that there is a lack of transparency for consumers and users in relation eAccessibility solutions (in terms of both dedicated assistive technology and accessibility features embedded within mainstream products) – many users are not aware of existing solutions or do not know where to find them. In addition, the issue of affordability poses barriers that need to be tackled. Today's national assistive technology schemes seem generally to be less well geared towards older users as opposed to those who are formally recognised as 'disabled' and a widening of the focus of these schemes would be very beneficial for older users. Consideration also needs to be given to addressing affordability of online access in the framework of Universal Service regulation and by means of other measures targeting older people in particular as they have for instance emerged in some Member Sates (e.g. micro loans for purchasing equipment, direct or indirect subsidies of online costs, tax incentives and the like).

Reducing the 'second-order' age divide

- The data also show an emerging "second order age-divide" (i.e. usage disparities between older and younger users and between older users from different social backgrounds). Older users tend to feel less confident with ICT and are less able to fully exploit the potential for their own purposes (e.g. in terms of using internet-based health services, government/public administration services, life-long learning services, digital broadcasting services and the like). According to our analysis, particularly the less educated sections of the elderly population and those who have functional impairments seem to be less au fait with the actual usage of online media, although they may have access in principle. Again, consideration needs to be given to interventional measures addressing both the supply side (e.g. provision of plug-and-play solutions that are intuitively usable by a diverse range of users) and the demand side (e.g. capacity building specifically geared towards the needs and circumstances of relevant sub-categories of older users and non-users). Strong national disparities observed with respect to skills levels processed by older user seem to indicate that such measure can work well, at least in principle.

Better measurement and monitoring

- The development of a more differentiated measurement and monitoring approach would merit attention with a view to facilitating a better response to the current situation by policy and by market actors. Clearly, the persisting access divide and 'second order' divides in the virtual space are connected with patterns of socio-economic stratification and the prevalence of functional restrictions among older people. Against this background, consideration should be given to developing and implementing a more differentiated monitoring approach that would enable gathering of robust data on relevant subsections of the overall 50+ population (e.g. low education, different types of functional restriction) and in relation to an increasing variety of ICT, through the development of suitable sampling approaches and indicators respectively.
- Specific attention should be given to the monitoring of user needs of older people with functional restrictions, their awareness barriers and accomplishments. The current study had a broad scope and thus addressed these issues mainly in an exploratory manner and only in relation to selected e-accessibility / design-for-all challenges. A follow-up dedicated exercise to develop and implement a more comprehensive set of indicators to benchmark and monitor eAccessibility issues amongst older people would be very valuable.

ICT and work

For many, ICT use at work remains main avenue towards home usage

ICT use at work is the prime opportunity for many to get involved with ICT at all. Consequently it is a strong predictor of being an ICT user after retirement. Those who used ICT at work are three times more likely to use ICT after retirement. On the other hand, those who never worked are very unlikely to use ICT at all.

Increasing ICT usage among older workers...

Among older people who are still working in gainful employment (or self-employment), almost two-thirds (63%) use computers and one-half (47%) use the internet at work at least occasionally. Comparing this with former workers shows the tremendous increase in ICT use at the workplace, also of older workers, that has taken place. Compared to today's 63%, among those who retired / were last employed before 1991, only 12% used computers at the workplace, and for instance those before 2001 but after 1997 already had a 40% share of computer users.

…but blue collar workers and low skilled keep lagging behind

Today ICT use is, not unexpectedly, more common among white collar older workers than among blue collar workers. More than 80% of non-manual and managerial older workers use computers at work, and more than two thirds the internet. Among older blue collar workers the share of computer users ranges between 20% for the least skilled and 40% for other blue collar workers.

...contributing to the overall digital divide

The strong effect of occupational proximity to ICT on later usage in a private context, plus the fact that people who have never worked (who are almost exclusively women) are the least likely to be computer users today, considerably reinforce the digital divide.

ICT also have a key role to play in employment policy for older workers

Employment policy in Europe now gives a high importance to increasing employment rates of older workers and encouraging older workers to remain longer in the workforce. Older workers' ICT skills will play a key role in reaching these goals.

eAccessibility is an important dimension of this…

eAccessibility is also an important issue for employment policy for older workers. Increased eAccessibility in the workplace will contribute to meeting the needs of an ageing workforce as well as in helping to achieve the increases in employment rates that have been targeted in policy.

...but focus to date has been more on disability than the needs of n ageing workforce...

Funding in the area of accessible ICT and Assistive Technologies in the workplace has usually been in relation to disability rather than age. Most countries have some level of public funding and/or provision of assistive technologies in the workplace, but the quality of such services seems to vary widely. Anti-discrimination legislation also imposes obligations on employers to meet needs of workers with disabilities, on a case-by-case basis on request. Overall, these approaches do not yet seem to be well targeted towards the older worker population, per se.

...and mainstreaming of eAccessibility in workplace ICT needs to be encouraged.

More proactive efforts by the ICT industry and by employers to ensure that the mainstream ICT used in the workplace are accessible are also of great importance. The European public procurement directives encourage inclusion of accessibility in procurements by public agencies. In addition, a proposal for horizontal legislation on eAccessibility is now being considered at European level.

ICT to support new working arrangements

New working arrangements supported by ICT, such as teleworking, offer the potential to support the work-life and work-family balance needs of older workers, including those who combine employment with informal caring responsibilities. However, although some initiatives have focused on funding and supporting people with disabilities in this area, there has yet to be much attention given to older workers in this regard.

Strategic conclusions

The issue of ICT and ageing in relation to work and employment needs reinforced attention from two points of view - the workplace as a key point of access to ICT and development of ICT skills; the opportunities and barriers that ICT developments in the workplace present for older workers and for the achievement of the EU's employment rate targets for older workers

<u>The role of the workplace in the age-divide</u>

- The survey data confirm the key importance of the workplace in relation to the observed age-related digital divides in Europe. There are two aspects to this. First, those older people who are in work or who have been in work in the relatively recent past are a lot more likely to use ICT than are those who have not. Second, the socioeconomic stratification in relation to ICT access and usage that can be observed for the population as a whole can also be observed within the workforce. Those in lower / manual occupations are a lot less likely to have access to ICT in the workplace and to develop ICT competencies there. Public policy therefore needs to adopt a dual approach, involving initiatives to encourage wider access to ICT and ICT skills across the workforce (there are interesting examples of this approach by some employers already) and focused efforts to reach those now outside the workforce who have not had an opportunity to acquire ICT skills whilst at work. In addition, as mentioned earlier, the transition from work to retirement can be a critical point in determining whether older people maintain their ICT usage or become 'drop-outs'. This needs to be given appropriate attention in policy as well.

<u>eAccessibility needs of older workers</u>

- Although not all occupational groups are yet being reached, the Seniorwatch and other data do show that ICT usage in the workplace by older workers continues to grow. This brings to the fore the work-related eAccessibility needs that increase with ageing and this is an important issue for attention in public policy and by the other relevant sectors. To date, however, it seems that eAccessibility for older workers has yet to receive much in the way of focused attention either in public policy or in the activities of employers or the ICT industry. The main focus to date has tended to be on people with disabilities and there is a need to extend this with more targeted attention to the needs of older workers, some of whom will be defined has having a disability but many of whom will not.

<u>Work-life balance</u>

- Finally, despite the fact that work-life balance issues are increasingly important for older workers, especially issues relate to combining work and care, it seems that little attention has been given to exploiting the possibilities offered by ICT to enable more flexible and new forms of working arrangement, such as teleworking. Again, the main focus of efforts in this regard to date has tended to address people with disabilities and there is a need to extend this to include the wider group of older workers who may stand to benefit.

ICT for independent living and care

Considerable demand potential

Data on chronic diseases and care needs confirm the high demand potential stated in the first Seniorwatch survey and by other sources. The 2007 survey has found that nearly all households in all the age groups observed are affected by care needs in one form or another. This may be either in form of a need for medical care due to chronic diseases, or as being in need of support of daily living activities, or as being a family carer.

… remains largely unmet

When it comes to actually receiving care, the situation has improved compared with 2001. While the number of people needing support with activities of daily living is slightly lower for the 2007 sample of countries, the share of people receiving care has increased from 5.4 to 6.7%. Also the gap for the over 80 year olds has narrowed (20% receiving care compared to 15 in 2001, while in need of care rate remained about constant at 29%).

Health related and care supporting ICT are found to be used to a varying extent. Five in a hundred older people have a social alarm at home, with the share of users being much higher only for the over 80 year olds. We only find a slight increase across age groups compared to 2001. A good quarter of today's users already use social alarms that are not homebound but can be used outside the home.

Interest in advanced services is high but actual usage is low. Most users of social alarms would greet the supply of a more advanced social alarm service. They would imagine alarms to be highly beneficial if they provided security or additional health features.

We also find very low internet usage for interaction with care personnel.

… but Internet becomes key source of information for those actively searching for health related information …

A majority of the ICT using respondents uses the internet to inform themselves about health matters, whether to obtain information on a specific health matter, disease or medication or to get information on healthy lifestyles, or to follow up on a diagnosis or treatment by a doctor.

It is established knowledge that certain chronic diseases are more likely to affect under-privileged socio-economic groups. These groups are statistically the same groups which are also negatively affected by the digital divide in the older age group. It is thus safe to assume that the socially selective access to health information and other ICT services which support the self-management of chronic diseases/due to the digital divide) are likely to reinforce a socio-economic health divide.

Given the functional restrictions and/or special usability needs it is further necessary to stress the relevance of accessibility and design for all themes as can be inferred from the picture of the older ICT users in the mainstream ICT chapter.

Older people continue to play a major role as carers

Older people continue to play a major role as carer. The longevity of the parents has the consequence that a significant share of the older population are care givers, many even into their eighties. This is also made possible by the fact that the majority of older people still lives in proximity to their children.

… and show similar ICT use patterns as the average

Family carers are almost as likely to be ICT users as the average: 40% of them are computer users (34 %internet), and 25% on a daily basis (20% internet). Almost half have internet access, which is broadband for a majority.

Again, this also means that more than half do not have access to web based information about social and medical care. The digital divide is so carried forward into the care supply.

A range of existing ICT solutions are still waiting for their wider deployment …

Technologies and application concepts that have been around for many years have yet to become mainstreamed within the home care and independent living sector

A final section has looked at technological developments - both already in use and technologies under development, many of which appear to be of great promise but still at an experimental stage. All this makes it difficult to provide a full picture.

… and even more appear on the horizon

Promising topics with strong relevance for the independent living domain include bio-medical clothes, point-of-care systems, personal health assistants and health advocate avatars, effective management of chronic diseases, ambient intelligence, integration of in-house communication with consumer electronics, and robotics.

Efforts to support initial market development are not yet widely used, although there are good examples

A number of lines of intervention to support initial market development have been identified, including pump-prime funding for service providers, preparation supports for service providers, funding for innovation by relevant ICT and/or care sector of industries, public-private collaboration in research / RTD funding, and innovative public procurement. In general, it seems that efforts in these areas are still relatively under-developed. However, various examples from the more forerunner countries have been identified that can provide pointers to good practice for others

Funding / reimbursement mechanisms are critical...

...and pose a variety of potential barriers

As regards ongoing funding mechanisms once ICT-based care and independent living services become mainstream, it seems that the approaches adopted vary with the more general characteristics of the social, healthcare and housing systems in the different countries. Key issues determining funding include whether or not the item or service is included for reimbursement under insurance-based systems. In taxation-based systems, funding support for end-users may depend on income level, assessed level of need or a combination of both. Demarcation boundaries between social, health and housing systems may pose barriers to funding in many national systems because telecare often spans all three. Other barriers arise because some systems focus funding on already identified needs and not on preventative interventions where telecare can often play a key role.

Strategic conclusions

Issues to be tackled by policy, industry and research include:

- As in the case of the 2002 survey, the current data set confirms a considerable demand for care and support among the 50+ population, particularly among the older age bands. Also, the gap between the section of the 50+ population being in need of support and the share actually receiving some sort of support has remained considerable. This suggests that efforts directed towards tackling the 'care gap' need to receive reinforced attention.

More exploitation of ICT to reduce the 'care gap'

- The evidence suggests that the extent of exploitation of ICT in the provision of care for older people has not much improved since 2002. Actual usage levels of basic ICT-enabled home care services have remained more or less stable, overall at a rather low level of utilisation. This outcome indicates the need for reinforced efforts directed towards improving take up of solutions that already exist today.

Better supply channels and more affordability

- Lack of clear supply channels seems to be one important barrier - nearly one in three say that they would not know where to get a basic social alarm services. Cost considerations seem to play a role for many as well - about one in six say that they could not afford such a service. Both these aspects need attention in policy and by providers of care services.

Untapped demand for enhanced ICT-based services

- Among those who have gained experience with basic social alarm services, the majority state an interest in more advanced solutions. This indicates that there is much room for the development of solutions that are capable of meeting a wider spectrum of user needs and/or of meeting currently addressed needs in a more adequate manner. This aspect merits further attention both by the care industry (e.g. when it comes to the incorporation of ICT in existing service delivery processes with a view to prevention) and by the ICT industry (e.g. when it comes to harnessing emerging technologies for the development of new solutions).

Varying responses across the Member States

- Overall, our analysis suggests that the emergence of a well-functioning market place for ICT in the support of independent living and care has been slower than might have been expected. In view of the particular characteristics of the domain (e.g. strong influence of public provision and/or reimbursement of services, disconnection of investment and benefits), this situation seems to have triggered a range of comparatively recent interventional approaches directed towards market development in the field (e.g. pump-prime funding of service providers, funding of innovation, public-private partnership in RTD funding). However, there seems to be a concentration of activities in some countries, with little happening in others. In addition, there seems to be only limited exchange of good practice experiences up to now.

- Whilst respect for subsidiarity must be maintained and national-level activity has a central role and legitimacy in many aspects of market development in this domain, there is also an important role for EU level action, for instance when it comes to the identification of generic market barriers (e.g. through a systematic examination of national approaches) and the development of common strategies directed towards further market maturing (e.g. by means of bringing together relevant stake holder groupings and stimulating/enabling knowledge sharing and bench learning). Studies and dissemination activities would be useful in these regards.

More attention to informal carers

- Informal carers continue to play an important role in meeting needs of older Europeans who require care. When it comes to the utilisation of ICT they show the same access and usage patterns when compared with the overall 50+ population and are affected in the same ways by the digital divides. Special attention should thus be paid to this group in efforts to counteract both access and usage divides, with a view to awareness raising about the potential of ICT in relation to care and building the ICT-related capacities of carers.

RTD

- A wide range of technologies emerging on the horizon hold potential to benefit older people in need of support and those who provide care to them, including formal and informal carers. A focused effort should be made to establish the independent living and care domain as an important field of technological innovation (e.g. in basic research, applied research, technology watch and technology transfer).

Innovative public procurement and public-private-partnerships

- When it comes to applied RTD in particular, the nature of the domain suggests a need for shared risk-taking (given the 'chicken-and-egg' characteristics of the demand-supply interaction). Innovative approaches are needed that enable close cooperation between the demand and supply sides, including mutual learning between ICT procurers, users and suppliers, joint implementation of large-scale clinical and other trials, ensuring standardisation and interoperability, and so on.

Contents

Exhibits

1 Introduction

The SeniorWatch 2007 study aims at following up developments in the ICT markets for older people, as they can be observed since 2002 when the first SeniorWatch study was conducted. In conceptual regard, the analysis relates to three different ICT utilisation contexts that have particular relevance to the aging population as follows:

- Usage of ICT in everyday life that are becoming increasingly important when it comes to participating in social and economic processes. This aspect had been extensively addressed by the first SeniorWatch study which provided strong evidence for the existence of a considerable access and usage gap as well as multi-layer causations.
- Application of ICT with a view to enhancing quality of life and the provision of health and social care to older people. Again, this area was already addressed by the first SeniorWatch study which yielded strong evidence for the existing of a yet largely unmet demand in this area.
- Utilisation of ICT with a view to enable an older workforce to better cope with working life. This is an area that had not been investigated in great detail by the 1rst SeniorWatch study, but some other research suggests that opportunities do exists in this regard.

The methodological approach adopted for the purposes of this study includes four core strands of empirical work:

- A review and analysis of analysis of statistical data available from existing sources such as for instance Eurostat's ICT household surveys and the US survey of PEW internet.
- A representative survey of the 50+ population in five selected EU countries 2007 with a view to updating data available from the 1st SeniorWatch survey conducted in 2002 and collating data on further indicators.
- A review and analysis of existing evidence on the 'funding' dimension in market development concerning the three ICT application contexts mentioned above.
- A review and examination of existing evidence on technological trends with the man focus on the independent living theme.

The remainder of this report presents the outcomes revealed by the empirical and analytical work conducted along the line of this approach.

This starts with a presentation of the evolution of the age divide in the virtual space, as it had been stated by the 1st SeniorWatch study some six years ago (section 2.1). This is followed by a deeper exploration of market dimensions and issues in relation to ICT usage in everyday life (section 2.2) and enabling/inhibiting factors that are relevant in this regard (section 2.3). This includes the analysis of socio-economic as well as physical/accessibility related factors.

Next, an analysis of trends and drivers in the ICT-for-work market is presented (section 3.1). This is followed by an analysis of current usage of ICT at work bay and for older people (section 3.2), as well as of related impacts (section 3.3). Finally, an analysis of current funding and other schemes directed towards ICT for work and employment is presented (section 3.4).

An analysis of needs and potential demand for ICT in the care and independent living domain is presented in section 4.1. Following to this, a supply side analysis in relation to existing funding schemes is presented in section 4.2. with focus on the supply side as well, an analysis of technological developments that will influence what technical solutions will be available in the short- and medium-term perspective is presented in section 4.3.

2 Usage of mainstream ICT in everyday life

The first theme to be considered in this report is the so-called 'age-divide' in usage of ICT, referring to the much lower levels of usage of the older age groups in comparison to the population as a whole. As ICT become more pervasive in all aspects of life and more and more important for full participation in social and economic life, the age-divide has come to occupy an important place on the policy agenda. In this regard, ambitious targets have been set under the i2010 initiative to reduce the age-divide in Europe. This section examines developments in the overall size and shape of the age-divide in Europe, first looking at what can be gleaned from EU-wide data from Eurostat and then presenting data from the SW2 survey that helps to provide further insights into the processes and mechanism underlying the trends in this area.

2.1 Trends in the 'age-divide'

That there is an age divide phenomenon when it comes to the uptake of ICT is mostly undisputed. Regardless of the ICT product, one finds that the early adopters are rather well educated, affluent, urban, often male and – on average – *younger* users. As the product cycle matures, this imbalance levels out to some extent, depending on the nature of the product and the social processes of uptake.

With regard to computers, internet and mobile telephony, we see age divides of different shape in all European countries today.

2.1.1 Some narrowing of the age-divide, but not enough

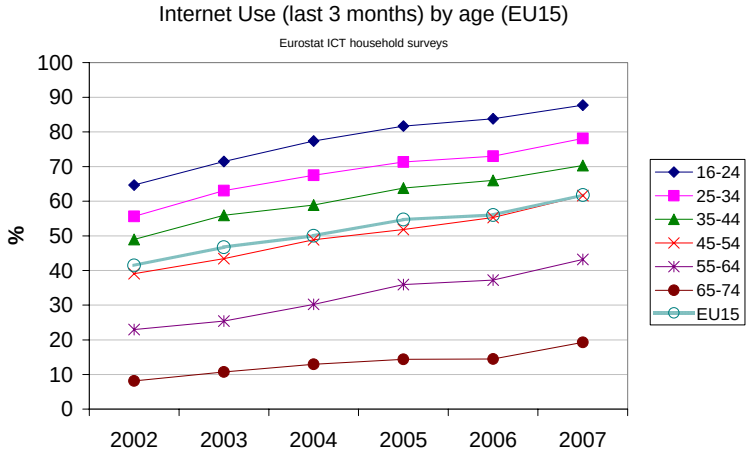
How has the age divide evolved? Looking at Eurostat's age classification scheme, one could say that the share of internet users among the European (EU15[1]) older people (65-74) has more than doubled, while it only increased by half for the whole population – or one could say that the older population added a meagre 11%-points, compared to a 20 %-points gain for all age brackets. Both are true: the oldest bracket was starting from 8% in 2002 and the share increased to 19% in 2007, while the total population figure evolved from 41% to 62 %.

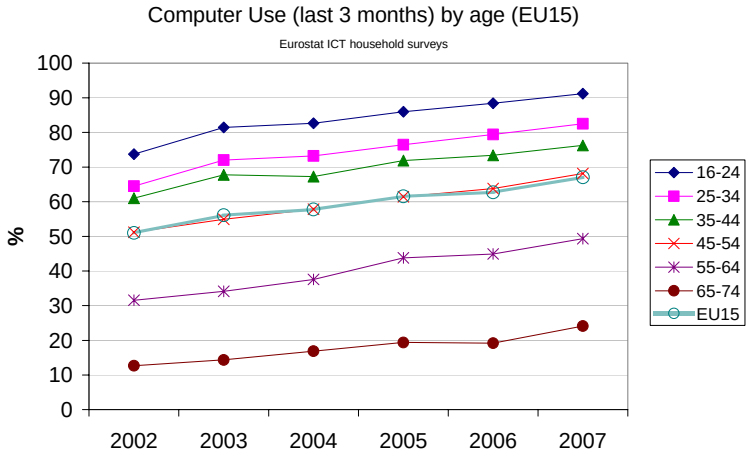
This is just to illustrate that there are no simple yes-or-no answers to the question of whether any digital divide has been actually closing or widening recently[2]

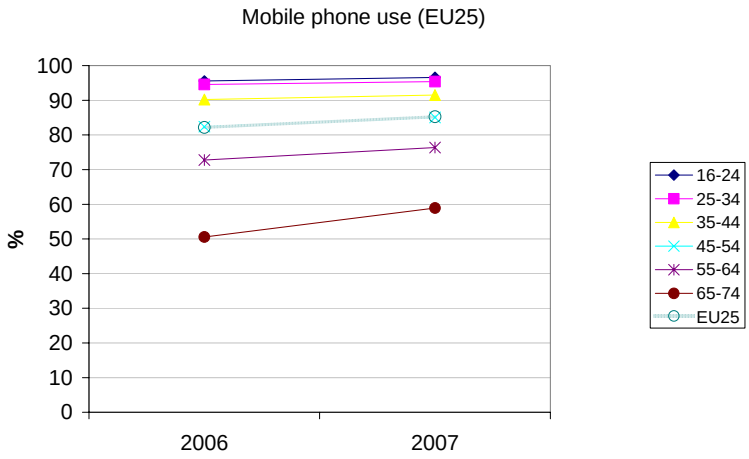
[1] We refer to EU15 because this breakdown data is available since 2002. EU25 and EU27 data has been available only since 2006 and trends are hence better visible using the EU15 breakdown.

[2] Cf. e.g. Martin, S (2003). Is the Digital Divide Really Closing? A Critique of Inequality Measurement in: A Nation Online. IT&Society 1, Issue 4, 1-13. See also: Hüsing, T / Selhofer, H (2004). DIDIX: A Digital Divide Index for Measuring Inequality in IT Diffusion. In IT&Society 1, Issue 7, 21-38. See also: Hüsing, T; W.B. Korte, A. Kersting: Benchmarking in a Policy Perspective – eInclusion: http://www.empirica.biz/empirica/publikationen/documents/No06-2007_BenchPol_eInclusion.pdf

Exhibit 2-1: Age related trends in Internet, computer and mobile phone usage (2007)







Source: Eurostat data base retrieval (data from ICT household surveys)

Looking at the developments above, it becomes apparent that concerning internet and computer use the age brackets "move" more or less in parallel, with the four youngest age brackets following one another at a distance of about five to ten percentage points between

two subsequent age decades. The two older brackets follow only after a wider gap of nearly 20 %-points.

The oldest age decade has even been decoupled to some extent, with the gap (in terms of percentage point difference) becoming wider instead of narrower in the last three years. At the same time the relative gap[3] (usage 65-74 / usage population) which is another appropriate disparity metric shows a slight decrease in the divide with the value increasing from 0.20 (2002) to 0.31 (2007).

All in all, it should be diagnosed that we see a stable / only slightly decreasing digital (age) divide for internet and computer use.

With regard to mobile phone use, Eurostat data has only been available since 2006. The picture is very different here: All age groups except the oldest are concentrated near the saturation level already, and so display only little dynamics. The older age group has been adding about eight %-points, but is also still lagging behind considerably, with a mobile phone penetration rate of 59% among the 65-74 group, compared to 76% in the 55-64 bracket and 84% overall.

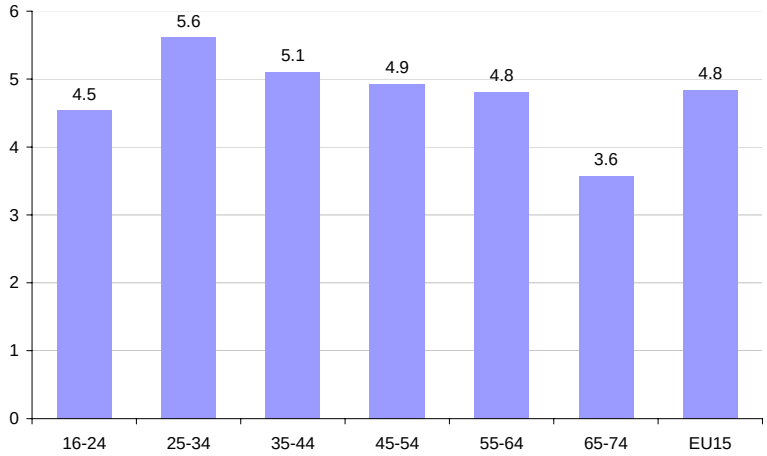
Can we discern likely future developments?

We argue that there are two countervailing trends that make foreseeing future market penetration rates in the individual age groups difficult. Looking at the development by age group as in **Exhibit 2-1** above, one is tempted to extrapolate the individual graphs and assess likely future age distributions of ICT users, and hence the shape of any potential future digital (age) divide. However, one has to bear in mind that the statistical age bracket break-downs are not birth cohorts and every year, approximately one tenth of an age bracket "moves" to a "higher" age bracket while one tenth approximately substitutes for this from a "lower" age bracket. Allowing for the higher likelihood of younger people to be ICT users, this composition effect entails some of the upward movement of the age lines. A counter movement could be resulting from a substantial likelihood to be stopping using ICT when getting older.

There is no direct data about ceasing ICT use in the Eurostat ICT household survey data base. However, one could balance the statistics about current users (such as those who have used Internet in the last three months) and former users (i.e. those who have once used the internet, but not within in the last three months).

[3] The DIDIX is based on the relative gap. See: Hüsing, T; W.B. Korte, A. Kersting: Benchmarking in a Policy Perspective – eInclusion: http://www.empirica.biz/empirica/publikationen/documents/No06-2007_BenchPol_eInclusion.pdf

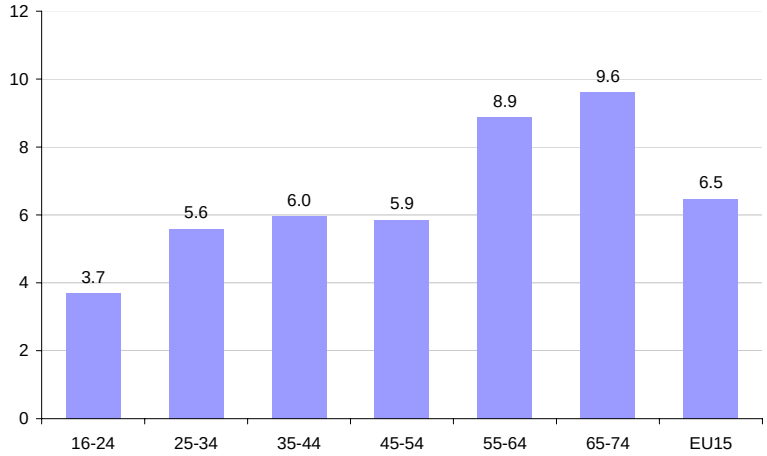
Exhibit 2-2: Churn in internet use: percentage difference between "having ever used the internet" and "having used the internet in the last three months" (2007)



Source: Eurostat data base retrieval (data from ICT household surveys). Base: population (users and non-users)

(This approach neglects, however, the fact that this may identify some "former users" who have never really started to be users, but just once tried using it.) This in mind, we find that there are overall about five percent of "ex-users" of the internet (percentage base total population, users and non-users), with the figure varying between 5.6% among 16-24 year olds and 3.6% among 64-75 year olds. The decrease over age is partly due to a level effect (the share of former users is hence higher in older age in relation to actual users), but shows that churn is not particularly an older age phenomenon. When put in relation to users, ex-users make up a considerable 16% of ever-users among the 64-75 year olds, while for all age groups this share averages at 7%.

Exhibit 2-3: Churn in computer use: percentage difference between "having ever used a computer" and "having used a computer in the last three months" (2007)



Source: Eurostat data base retrieval (data from ICT household surveys). Base: population (users and non-users)

There is a stronger churn for computer use, with almost 10% of all 65-74 year olds being eligible to be classified as ex-computer users (which equal 29% of all who have ever used computers).

The bottom line is that the age divide is influenced by both cohort effects and by older age usage churn. The cohort effects draw the age curves upwards, and the usage churn downwards.

Churn analysis in chapter 2.3.2 (for details see there) based not on Eurostat but on Seniorwatch data suggests that factors that make cease of use likely are especially not having internet access at home, being over 80 years old, having a hand impairment and being on low income.

What does this tell us about the future age divide? Again looking at the ten-year age bracket graphs above, one is tempted to extrapolate the single lines so that they will continue the upwards movement at current pace, and very probably this is a likely development. However, it is impossible to exactly forecast the most likely development.

In any case one needs to bear that this is an age based rather than a cohort view into the data. With the two effects described, and the extrapolation of the graphs in **Exhibit 2-1**, the age divide is likely to stay with us for the decades to come. Therefore, it is justified to assume that the **old age groups will remain at a rather low level of uptake. It is almost certain that the age divide will remain significant for the foreseeable future.** This is even more so the case with higher order divides as described in the following.

2.1.2 Second order divides: skills, use, benefits

The discussion about the digital divide has lately turned its emphasis from mere attention towards access possibilities and dichotomous usage statistics towards the so- called second and third order divides in user skills, quality of use and benefits derived from ICT. Molnar[4] has developed a model of successive stages of the digital divide. Molnar's model is to some extent corresponding to the OECD model, which originally has been developed in terms of e-commerce take-up, which adapted to the individual level says that three dimension of take-up be measured in different steps: readiness (including access), use (intensity) of ICT and impact (such as derived benefits and participation).

He differentiates between three phases of uptake that he attributes to different types of divides. In the initial phase, an access divide termed "early digital divide" exists between those early adopters and the rest of the population. The divide hence "describes the difference between those with and without access". In the take-off phase, Molnar sees a usage divide named "primary digital divide" which "describes the differences between users and non-users". Finally, as the S-curve approaches saturation, the "secondary" digital divide is seen as stemming from the quality of use. It now "describes the difference between users and users".

In terms of measurement, Molnar therefore claims: "The persistence or the recurrence of the digital divide of course will only become transparent if we provide in each stage the variables that bring about the divides revealed by the different sociological researches."

Finally, widespread access will not make the digital divide disappear, but change it in its nature. A "secondary digital divide" stems from differences in the quality of use of Internet

[4] Molnár S. (2003): The explanation frame of the digital divide

services. In this phase, the divide is following the levels of skills and empowerment of users. Skills represent the abilities to use internet services: navigation skills and problem solving skills. Empowerment refers to the effectiveness of use with regard to social relationships and social capital. In this phase, the divide will exist along the variables:

- education
- income
- gender
- age
- period of use.

Applying the Molnar view of "difference between users and users" to skills, the Eurostat data confirm that there are significant skills differences to be found between the generations. Among computer users, the share of highly skilled computer users[5] is 40% in the 16-24 year group, compared to 11 % among the oldest age group. Similarly high and medium internet skills combined account for 65% of youngest users, but only 16% of oldest users.

[5] The approach in the ICT household surveys is using questions about real behaviour. The 2005 and 2006 modules measure e-skills via lists of computer related and internet related activities (six each) that respondents may or may not have already carried out. As skills level in the European population including a wide age bracket, all sorts of employment situation and educational level, the spectrum of skills covered needs "'low entry' questions, at least as a starting point. Computer related activities surveyed are
"Which of the following computer related activities have you already carried out?"
a) Copying or moving a file or folder
b) Using copy and paste tools to duplicate or move information within a document
c) Using basic arithmetic formulas in a spreadsheet
d) Compressing files
e) Connecting and installing new devices, e.g. a printer or a modem
f) Writing a computer program using a specialised programming language
Internet related activities are:
"Which of the following Internet related activities have you already carried out?"
a) Using a search engine to find information
b) Sending e-mails with attached files (documents, pictures, etc.)
c) Posting messages to chat rooms, newsgroups or an online discussion forum
d) Using the Internet to make telephone calls
e) Using peer-to-peer file sharing for exchanging movies, music, etc.
f) Creating a web page

Exhibit 2-4: Computer /internet skills among the EU25 population (2006)

	Percentage of computer users who have							
	No computer skills	Low computer skills	Medium computer skills	High computer skills	No internet skills	Low internet skills	Medium internet skills	High internet skills
16-24	4.5	14.3	40.0	40.4	2.9	31.2	47.0	18.4
25-34	8.3	15.8	35.5	39.2	3.0	45.7	37.7	13.0
35-44	10.8	19.0	35.8	32.0	3.4	58.8	29.7	7.1
45-54	13.4	22.1	35.8	25.3	5.1	64.2	24.9	4.4
55-64	18.6	24.9	32.1	20.4	7.5	67.7	20.5	2.6
65-74	25.9	29.5	26.5	11.0	12.4	67.7	14.5	1.6
EU25	11.1	19.1	35.7	31.7	4.2	51.9	33.0	9.8

Source: Eurostat data base retrieval (data from ICT household surveys). Base: computer users / internet users. Skills index is based respondents having carried out a number out of six items of computer/internet practice. Labelling: High: 5,6 items carried out; Medium: 4,3, Low: 1,2; 0: no. Why percentages do not add to 100% could not to be validated.

As regards the purpose of internet use, not for all kinds of usage there is an age divide. Quite expectedly, younger users use the internet more often for educational purposes, and older users use it more often to search for health information. e-government is used most by the middle ages.

Exhibit 2-5: Internet uses among the EU25 population by age (2007)

	Percentage of internet users who have used Internet, in the last 3 months,		
	for seeking health information on injury, disease or nutrition	for interaction with public authorities	for training and education (2006)
16-24	29.8	38.1	42.6
25-34	44.5	58.0	31.4
35-44	46.8	58.1	28.4
45-54	45.9	58.1	27.8
55-64	44.6	56.1	22.1
65-74	44.0	47.9	18.9
EU25	42.1	53.1	35.5

Source: Eurostat data base retrieval (data from ICT household surveys). Base: computer users / internet users.

The following figures from Eurostat show comparable Internet use figures by application and by age group. All in all, the 55+ age group is less active in each category but (amongst those who were Internet users) clearly using the Internet almost as often as Internet users in the younger age groups for e-mail, online banking, seeking health information, seeking information on travel/tickets and booking for events. E-mail is a universally popular use of the Internet across all generations online.

Compared to the newer figures, E-mail has won 13%-points, news 19%-points since 2002, and health information (measured quite differently and therefore to be interpreted with a grain of salt) 26%-points.

Exhibit 2-6: Purposes of Internet use, as percentage of all Internet users, in 2004 and 2006

	All ages	16-24 years	25-34 years	35-44 years	45-54 years	55-74 years
2004 (EU25)						
E-mail	81	80	84	81	78	81
Financial services	36	20	44	42	38	38
Playing/downloading games/music	35	61	36	26	21	18
Finding out about goods and services	76	65	83	82	77	73
Reading/downloading online newspapers	35	38	41	32	32	27
2006 (EU27)						
E-mail	81	80	84	82	79	79
Financial services	40	23	47	47	43	41
Playing/downloading games/music	34	58	38	28	20	15
Finding out about goods and services	79	70	84	83	80	76
Reading/downloading online newspapers	35	32	41	35	33	31

Source: Eurostat 2006 (online database) Base: Individuals who used Internet in the last 3 months

2.1.3 Cohort factors in Seniorwatch data underlying the trends

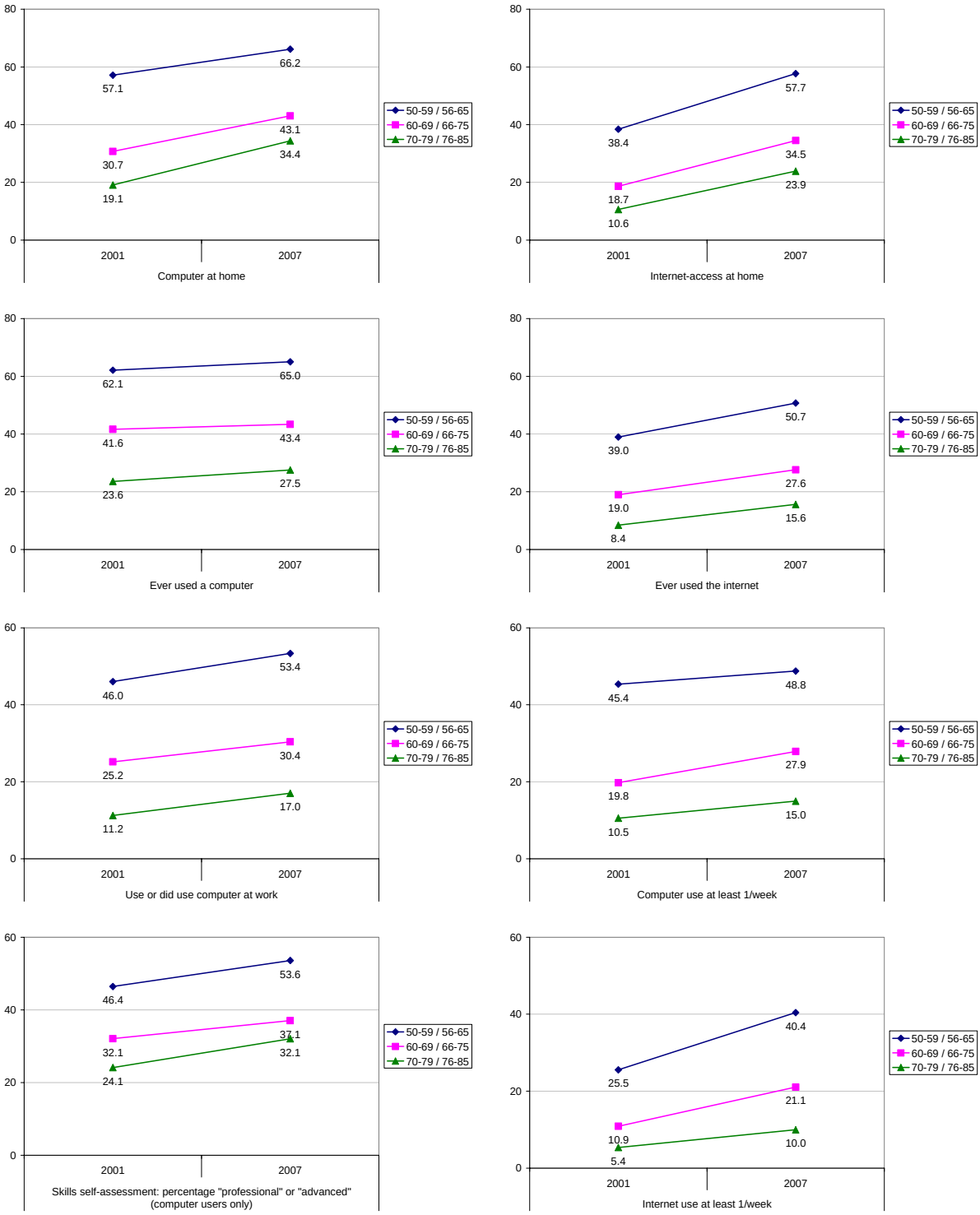
Between the 2001 and 2007 Seniorwatch surveys, a period of six years has passed. In analysing both surveys according to cohort results, it was chosen to use an age partition of 50-59, 60-69, 70-79 and 80+ years. However, a comparison of the, say, 60-69 years bracket in 2001 and the same age bracket in 2007 is of course representing different cohorts (years of birth).

In order to find out exactly how the cohorts analysed for the first time in 2001 (in the countries comparable) have developed, an age distribution of 56-65, 66-75, and 76-85 (the group of 86+ in 2007 is too small to be analysed separately) of the 2007 is used and compared with the original age brackets in 2001. Given that both samples are supposed to be representative profiles of the analysed countries, the comparison is justified. The comparison may however be hampered by the very probably non-negligible mortality in the older age brackets and by life cycle related sample effects.

Theoretically one may expect two opposing trends: as the spread of ICT continues more people take up ICT, while on the other hand older people tend to be using ICT less. With regard to the second trend it is however not clear if churn of usage has a substantial share in this fact. It may be that older people are only slower in taking up a technology but stay with it once they have taken it up or it may be that many older people who have been users cease to use ICT.

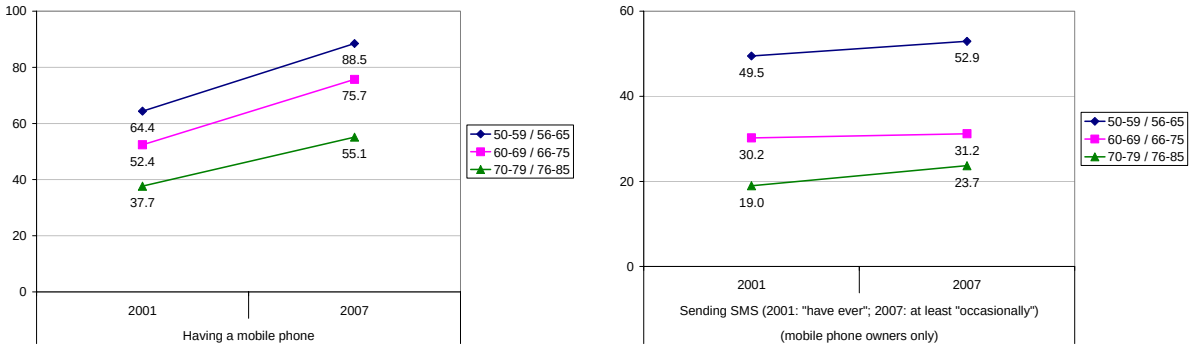
In all cohorts there has been an increase in ICT usage. While this is not a proof that usage cessation does not happen in big numbers, if usage churn was a significant factor then the number of new users must have significantly exceeded this.

Exhibit 2-7: Cohort developments of ICT use – comparison of Seniorwatch 1 and 2 cohorts



See notes on next page.

Exhibit continued: Cohort developments of ICT use – comparison of Seniorwatch 1 and 2 cohorts



Source: Seniorwatch 2002 and 2007 surveys. From the two surveys, only respondent data of the shared countries DE, FR, IT, UK is compared here. No between-country weighting. Note that the two Seniorwatch surveys are cross-sectional and not panel-based. Life-cycle effects and mortality may affect cohort sample composition.

To exemplify what can be learnt from the cohort we want to turn to the variable internet use. What becomes apparent is that while the age group data in the younger classes make a leap forwards in terms of usage, the same is true for the cohorts. Half of today's 50-59 year olds use the internet at least once per week, while 40 percent of 2001's 50-59 year olds do today compared to 25% in 2001.

Unfortunately, no churn data can detail how many of 2001's users are user today. In general, ex-users of 2007 will be analysed in 2.3.2, but this can not be related back to the 2001 data.

All in all, within the individual age cohorts, uptake has been about doubling the percentage of the year 2001 (two older cohorts) or has increased by about 60%, respectively (the younger cohort).

Exhibit 2-8: Cohort (red) and age (green) developments of internet use (1/week)

	2001	2007	2007
50-59	25.5		49.6
56-65		40.4	
60-69	10.9		31.4
66-75		21.1	
70-79	5.4		12.7
76-85		10.0	
80+	4.1		5.9
		N/A	
Total	14.1		31.4

Source: Seniorwatch 2002 and 2007 surveys - as above-

Excursus: What do computer, internet and mobile phone proliferation patterns tell us about future technologies?

One question frequently asked is to eventually assess or anticipate the kind of uptake that relatively new or even future technologies will face among older people. For technologies and services which were not available in 2001, at the time of the first survey, It is thought that these developments might be anticipated for technologies surveyed today and analogies drawn from the past patterns observed then. The question hence is: what can computer, internet and mobile phone proliferation patterns observed in the past tell us about future technologies?

Of the three, affordable home computers have arguably been around for the longest time, from at least the late eighties on. There has been a rather slow take up in the first years, however, with about twenty percent of the EU15 50+ population using computers in 1997 according to a Eurobarometer study[6]. In 2001, Seniorwatch found already 27% of regular (weekly) users, and today we find computers regularly used by 44% of the older population. The steeper increase in recent years can quite possibly be attributed to the internet as one killer application of home computers among the older population.

For today, 44% of computer users include those 37% regular internet users. There share among computer users used to be significantly lower: 17% were at least once a month using the internet in 2001. In 1997, in fact, a share of only about 3.5% internet users among Europe's (EU15) older population was recorded.

For mobile phones, substantial market penetration was beginning to emerge only in the beginning nineties with the 2G GSM phone. Today, we find 80% of older population having a mobile phone, compared to 48% in 2001. For the 1997 Eurobarometer, no age grouped data have been retrieved, but population totals for all age groups for home use ranged between 9% in Portugal and 56% in Sweden.

(Nota bene: the 1997 Eurobarometer also asked people who were not using mobile phones whether they were interested. It is quite instructive to look at the population percentages at that time of those (base: all ages) who do not use and are not interested in mobile phones at all. Actually, these shares were at about 67% in Germany, 55% in the UK, 71% in the Netherlands, or 34% in Finland, to name a few examples.)

Comparing these three technologies it becomes apparent that every technology follows its own trajectory of proliferation which were not to be predicted at the time of their invention or market entrance. Trying to draw analogies is therefore almost certainly doomed to failure.

[6] Eurobarometer 47.0. The exact question wording was: Do you your self use at home, or not, in your leisure time ....a Computer or PC

2.2 Deeper exploration of market dimensions and issues

Compared to the situation in 2001[7], the volume of the ICT market made up by older people has changed considerably. In 2001, a relatively small fraction of older age ICT vanguard users found themselves facing a huge majority of non-users. Today, the using of at least one or another form of ICT has entered the everyday lives of many older people and the group of non-users has shrunk significantly. Nevertheless, regarding many technologies, non-users are still accounting for the majority, albeit not as huge as in 2001, of people in the 50+ age bracket.

2.2.1 Usage of different ICT in Europe

Computers

In 2001, the Seniorwatch surveys found that 36% of the then EU15 citizens age 50+ had access to a computer at home, and 22% had home internet access. Today, the Seniorwatch survey in five countries finds a tremendous increase to 57% having at home computer access and 47% to the internet. Most have a desktop computer (49%) but a considerable share has (also) a laptop computer (22%).

The SeniorWatch 1 study revealed that in 2001 a considerable proportion of the 50+ population in the then 15 EU Member States had already gained hands-on experience with a PC. Some 40% had ever used a computer once in their life. However, this included only 20% of those who were in their 70s and a mere 10% of those aged 80 and above. This has now climbed up to 53% who have ever used a computer, and each generation now about reaches the figures that the 10-year younger generation then had, six years ago: 19% of the 80-plusers, 32% for seventies bracket, 54% in the sixties bracket and 74 for the 50-59 year olds.

Roughly more than one third (36%) had access to a computer at home in 2001, and 8% said that they were likely to purchase a computer during the next one or two years. The latter figure did not include those who already owned a PC and planned a renewal of their equipment. Today 57% are living in a computer household, and another 6% plan the purchase.

[7] For this and all the following comparisons, it is to be taken into account that data for 2001 is based on EU15 data. Because weighted according to population size, the four "old" EU15 countries covered in 2001 already together accounted for about 67% of the EU-15 total in 2001 (and for 80% of the 2007 "EU5" total). Therefore, although to be taken with a grain of salt, comparison is to be justified.

Exhibit 2-9: Computer access and usage among the EU 50+ population in the EU15 (2001) and EU5 (2007) by age (row %)

	Age	PC at home	Likely to have a PC at home within next two years	Ever used PC / other Computer	Regular computer user (> one day/week)	Use of computer at (former) work-place
2001 EU15	50-59	56.8	10.8	59.1	46.3	43.3
	60-69	31.6	9.3	38.7	22.0	23.8
	70-79	19.0	5.0	22.0	11.0	10.5
	80+	16.0	2.8	12.1	6.2	2.6
	total	36.1	8.2	39.6	26.6	25.7
2007 EU5	50-59	78.5	6.8	73.5	60.7	50.1
	60-69	53.5	6.1	53.9	36.9	41.8
	70-79	38.7	6.0	31.5	17.4	21.4
	80+	24.3	5.8	19.1	7.1	7.5
	total	56.6	6.3	52.7	38.8	37.1

Source: SeniorWatch 2002a: 52, and SWA 2007 surveys

Exhibit 2-10: Percent of population having a PC or laptop computer

	Germany	France	Italy	Poland	UK	EU5
PC	45.8	48.7	49.0	46.7	56.6	49.4
Laptop computer	17.6	20.8	28.0	16.7	25.4	21.7

Source: Seniorwatch 2007 surveys F61: And do you have any of the following at home: … Base all.

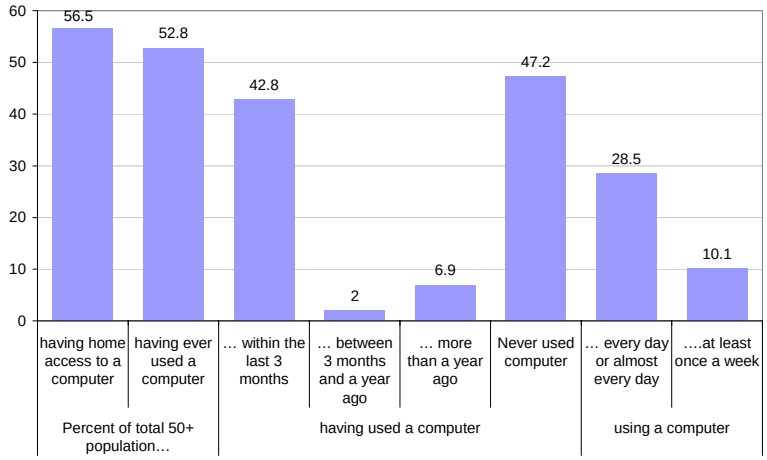
Seniorwatch 1 asserted that the availability of a computer at home does not necessarily mean that this technology is actually being used. A certain proportion of older adults were classified as “lapsed users”, since they had previously used a computer at earlier times in their life but were no longer doing so on a regular basis. According to the SeniorWatch 2001 study, about one quarter of those who had used a computer once in their life time did not do so anymore at the time of the survey (i.e. within three months prior to the survey), and another 12% reported to use a computer less often than once a week[8].

These figures then suggested that there was a significant proportion of older adults who rarely apply their computer skills or have even completely “given up” using this technology. This finding was also supported by evidence available from qualitative research suggesting that individuals who had used a computer at work may not necessarily see it as having a role in their life when they retire[9].

[8] SENIORWATCH (2002): Older People and the Information Society. Deliverable 5.1.

[9] SELWYN, N. (2004): The information aged: A qualitative study of older adults' use of information and communications technology. Journal of Aging Studies Vol 18:4, p.369-384.

Exhibit 2-11: Percent of persons having access or using computers (2007)



Percent of total 50+ populations…	Germany	France	Italy	Poland	UK	EU5
having home access to a computer	52.0	53.9	56.4	56.7	63.8	56.5
having ever used a computer	52.6	58.9	37.2	47.9	67.2	52.8
having used a computer						
… within the last 3 months	41.6	46.9	29.6	39.9	56.0	42.8
… between 3 months and a year ago	1.8	2.9	1.6	1.6	2.4	2.0
… more than a year ago10	8.8	8.1	4.6	5.8	7.2	6.9
Never used computer	47.4	41.1	62.8	52.1	32.8	47.2
using a computer						
… every day or almost every day	24.0	36.9	18.8	24.8	38.2	28.5
….at least once a week (but not every day)	13.8	7.6	6.4	9.7	13.2	10.1

Source: Seniorwatch 2007 surveys Base: all

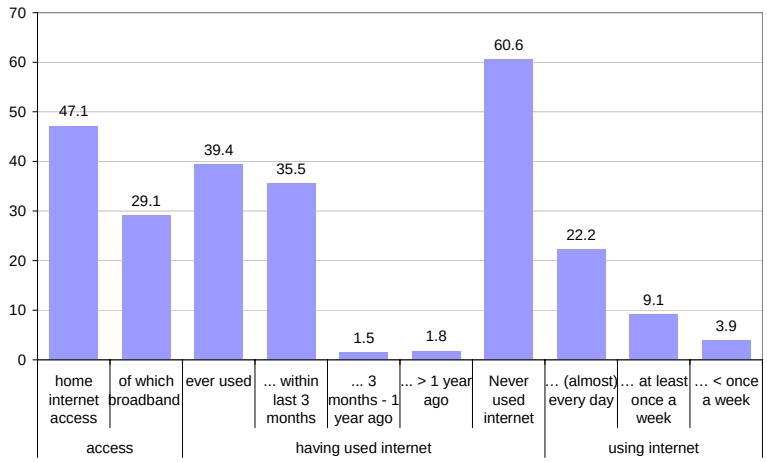
However, today the share of lapsed users has decreased, and it is only 19% (or 10%-points) of those who ever used a computer that did not use one in at least the three months prior to the survey. In total, 53% had ever used a computer, and 43% had done so within three months. Furthermore, those who are computer users today are by the majority also quite frequent users – as said, 81% of those who ever used a computer also used it in the last three months, and of the latter two thirds use it (almost) daily, which equals a third of the total older population.

Internet

The SeniorWatch study found that in 2001 22% of the 50+ population in the EU15 lived in a household with Internet access while 17% were regularly online, which was meant to be at least once a month at that time.

[10] Missing from 100% answered "don't know" or refused.

Exhibit 2-12: Percent of population having access or using internet (2007)



	Germany	France	Italy	Poland	UK	EU5
home internet access	42.0	42.7	47.0	44.1	59.9	47.1
of which narrowband access	11.8	9.8	24.8	25.4	17.8	17.9
of which broadband access	30.0	32.7	22.0	18.8	42.0	29.1
ever used the internet	38.2	43.3	28.0	34.4	53.1	39.4
of which … within the last 3 months	34.0	38.9	23.3	31.8	49.2	35.5
… between 3 months and a year ago	1.4	1.8	1.8	1.2	1.4	1.5
… more than a year ago	2.2	1.9	2.0	0.8	1.8	1.8
… Never used internet	61.8	56.7	72.0	65.6	46.7	60.6
Using internet … every day or almost every day	19.6	28.9	14.2	18.3	30.2	22.2
… use at least once a week	10.2	7.2	5.6	9.9	12.8	9.1
… use less than once a week (but not every day)	4.2	2.2	3.0	3.8	6.2	3.9

Source: Seniorwatch 2007 surveys Base all

Today, 47% have home access, 39% have ever used the internet, and most of them (31% of the 50+ population) use it at least once per week, a good quarter (27%) of older people even daily.

Broadband access is mentioned by 29% of older people, a tremendous increase compared to 2001 (DSL had a mere 1.2%, and cable modem, with 1.4%, had hardly been mentioned more frequently). Today, more older people have broadband than narrowband access[11].

Similar as for computer use, those who have ever used internet are by a very large majority of 90% still users today (i.e., have used internet in the three months prior to the survey). Of today's users, two thirds use the internet on a daily basis, and another quarter at least once a week. That equals 22 percent of total older population being daily users and another 9% at least weekly users.

[11] This finding is based on Seniorwatch survey data. Unfortunately Eurostat does not publish Broadband data that can be broken down by respondent characteristics. Based on houeholds, Eurostat report tremendous increases with now (2007) 43% of all EU25 households having broadband internet compared to14% in 2004. No age related data is available.

Exhibit 2-13: Internet access and usage among the EU 50+ population in the EU15 (2001) and EU5 (2007) by age (row %)

		Access at home	Broadband access	Narrowband access	Ever used the internet	Use within three months	Daily / nearly daily use
2001 EU15	Total	22.4	2.6	19.9	21.9	18.6	8.3
	50-59	37.9	4.0	33.8	38.3	33.7	15.5
	60-69	19.1	2.1	17.0	18.3	14.2	6.1
	70-79	9.8	1.7	8.1	8.1	6.8	2.9
	80 +	7.0	0.3	6.7	6.7	6.3	2.4
2007 EU5	Total	47.1	29.1	18.0	39.4	35.4	22.2
	50-59	68.3	43.5	24.8	61.1	56.5	36.2
	60-69	45.0	27.9	17.1	38.8	34.4	21.9
	70-79	29.2	16.3	12.9	17.7	14.8	8.0
	80 +	14.8	8.5	6.3	10.0	7.3	3.7

Source: Seniorwatch 2001 and 2007 surveys Base all

Put it the other way around, among those who are experienced with the internet by at least once trying it out, there are 56 percent heavy (=daily) users, 22% not-so-heavy (weekly) users and 22 percent seldom or none users.

Purposes of Internet usage

As said above, physical access to the Internet is a necessary requirement, but clearly not a sufficient condition for an older person's full participation in the Information Society. Equally important are the purposes for which the Internet, and other ICT such as mobile end devices, are used, and the personal benefits that are being derived from utilisation of these tools.

Among regular internet users, the most common purposes are information seek about products and services and e-mail. E-mail is used by most to stay in touch with family. Almost half of internet users also use e-mail to share photos, a quarter as a means of communication with associations, clubs and other groups they belong to. Only 4% have e-mailed with their GP or other practitioner.

Almost 80% use the internet as a news media. Two thirds use the internet to inform themselves in health matters, most do so to find information on a specific condition, 30% in order to follow up on and 14% in preparation of a GP visit.

More than half also use it for buying goods and services. Almost half indulge in spending time online without any particular reason, to pass time or "for fun".

Almost a quarter listen to the radio or watch TV online, and 22% make phone calls via internet.

Exhibit 2-14: Purposes of Internet use, as percentage of all Internet users by age (EU5 Seniorwatch 2007)

	Age				
	50-59	60-69	70-79	80 +	Total
Information about goods or services	85.2	86.4	81.8	56.3	84.7
E-mail	75.7	87.6	89.3	71.8	80.7
e-mail: to stay in touch with family	56.5	68.7	79.3	65.4	62.7
e-mail: share your digital photos	44.5	50.1	37.5	13.6	45.0
e-mail: with a hobby group or association	18.4	24.0	32.6	37.4	21.9
e-mail or internet: to communicate about health matters with physician	4.3	3.0	0.4	2.9	3.5
News and current information	80.8	75.1	75.0	46.7	77.9
Health information (any)	67.5	66.7	55.1	26.7	65.3
obtain information on a specific health matter, disease or medication	52.8	52.2	37.2	26.7	50.6
get information on healthy lifestyles, such as fitness, diet or similar	43.2	39.1	33.0	12.5	40.3
to follow up on a diagnosis or treatment recommendation by a doctor	30.2	34.6	23.4	13.3	30.6
to find information about health services, e.g. what services are available, your entitlements for treatment and so on	27.9	19.7	16.0	13.3	23.9
to prepare yourself before visiting a doctor	13.4	17.0	11.6	6.3	14.2
Buying products or services	57.5	51.6	51.1	12.5	54.3
Going online for no particular reason, just for fun or to pass the time	51.1	48.2	39.8	60.0	49.2
Listening to radio or watching TV	25.6	22.3	13.6	18.8	23.3
Instant messages	25.7	20.1	17.0	13.3	22.9
Phone calls via the internet	21.5	24.9	13.5	20.0	21.7
Post digital photos on the internet	19.1	19.8	12.5	7.4	18.4
Downloading music or video files	20.9	17.2	12.5	13.3	18.8
Mailing lists and group e-mails of a hobby group or association	10.8	11.6	17.0	18.1	11.8
Group website or blog of a hobby group or association	8.4	12.8	10.1	2.7	9.8
Job search	16.5	4.4	1.1		10.9
Maintaining a personal website or blog	8.4	7.3	5.7	13.3	7.9

Source: Seniorwatch 2007 surveys Base: Internet users in the last three months

Data on the perceived importance of the various activities can be gathered from the eUser surveys of 2005. There, again, older Internet users do not appear to have radically different interests compared to younger onliners, apart from some exceptions. Regardless of age, the Internet is in the first instance regarded as a means to look up information on certain issues and to communicate with others by e-mail (cf. below). Using the Internet for transaction purposes appears to be somewhat less important for all age groups, with young adults being an exception in this regard. Older users in particular appear to be less interested in downloading music/games and online purchasing.

Exhibit 2-15: Importance of online activities, by age group (average score, 1=not important, 5=very important)

	18 – 24 years	25 – 49 years	50 – 64 years	65+ years	Total
(a) being able to keep in touch with people through e-mail	3.91	3.85	3.71	3.57	3.81
(b) being able to look for information about important or interesting things	4.46	4.45	4.29	4.05	4.39
(c) using it for leisure pursuits, e.g. playing online games or downloading music	3.10	2.48	2.08	2.10	2.47
(d) being able to pay bills or doing your banking online	2.91	3.22	2.88	2.67	3.07
(e) being able to buy goods, book tickets and so on online	3.32	3.35	2.96	2.43	3.20

Data source: eUser 2005, EU6. Base: All who have used the Internet in the last three months for private purposes

Mobile phone and consumer electronics use

When compared with the Internet, the European mobile phone market has matured more quickly in the time since the beginning of the 21st century. While the highest share of mobile phones users can today be found in the age group up to 24 (which was already at 86% in 2002-3)[12], older adults use this technology to a significant extent as well. Today, mobile telephony is the ICT which is most widespread among all age adult groups, and text messaging one of the most popular applications in the digital domain. This makes the mobile phone device of special interest for the development of services that are targeted at the entire population.

In 2001, survey results suggested that many older adults seemed to appreciate their mobile phone in the first instance as a kind of security device rather than as a tool for social communication. According to the 2001 SeniorWatch survey about one half of the mobile phone owners aged 50 and above in the EU15 Member States stated that they had obtained their mobile phone mainly for security reasons while only 27% said that they had obtained it mainly for their own convenience. Only 10% responded that the main reason for obtaining a mobile phone was to communicate with friends and family. On the other hand, nearly 90% had used their mobile phones during the last month[13].

Today, 77% of the observed target group have a mobile phone, (48% in 2001). Little more than half of the mobile phone owners also send text messages at least occasionally, the share being highest in Poland. In 2001 the share of older people who had ever sent or received SMS was at 38% of mobile phone owners only.

[12] SIBIS (2003): Towards the Information Society in Europe and the US. Highlights 2002.

[13] SENIORWATCH (2002): Older People and the Information Society. Deliverable 5.1.

Exhibit 2-16: Sending text messages on mobile phone.

Do you send text messages on your mobile phone?	Germany	France	Italy	Poland	UK	EU5
Regularly	10.6	15.8	15.6	22.9	27.2	18.4
Occasionally	35.7	25.1	28.4	47.2	28.9	32.7

Source: Seniorwatch 2007 surveys Base: Mobile Phone owners

Also compared to the 2002/2003 SIBIS survey there has been a steep increase in the usage of SMS among older users. For the EU15 SIBIS gave a SMS usage figure of 34% of the 50-64 age group and 15% for those aged 65 and over. Interestingly, figures for SMS usage were higher in the New Member States, with 62% for the 50-64 age group and 30% for the 65+ group, which confirms the 2007 status as Seniorwatch 2 found in Poland. SIBIS found that all age groups use SMS primarily for communication; while downloading or other pay services via SMS were hardly taken up at all in the older age groups. No current data has been gathered on these issues in 2007.

Apart from computers and the internet, respondents were asked about a couple of consumer electronics in the 2007 survey. 49% own a desktop PC and 22% a laptop computer. Consumer electronics are also quite widely owned today, with two thirds owning a DVD player, 45% a digital camera and 15% an MP3 player, to name some of the devices surveyed.

Exhibit 2-17: Percent of population having a...

	Germany	France	Italy	Poland	UK	
Mobile phone	77.4	70.7	86.2	68.8	83.8	77.4
DVD player	56.4	70.7	58.4	51.2	84.0	64.1
Digital camera	41.2	52.5	39.0	33.4	56.6	44.5
Ever taking digital photos	41.0	53.5	33.8	37.4	49.9	43.1
Video camera	16.0	23.0	22.2	13.5	28.4	20.6
Fax machine	20.0	13.6	13.6	7.2	14.4	13.7
iPod or other MP3 player	9.2	14.0	17.8	16.3	15.2	14.5
Blackberry, Palm or other PDA (personal digital assistant)	6.6	2.2	1.4	2.4	4.4	4.1

Source: Seniorwatch 2007 surveys, F61, F63 Base: all

Digital photography is done by 43% of the older population. Of these, most almost half copy their photos on CD and 40% share them via e-mail. Posting on the internet and sending them via mobile phone are only used by 17% and 16 % respectively

Exhibit 2-18: Sharing and saving digital photos

Do you ever …	Germany	France	Italy	Poland	UK	
Share digital photos through e-mail	39.7	47.2	27.8	34.8	46.0	40.3
Send digital photos by mobile phone	12.2	12.7	18.3	18.7	18.4	15.8
Post digital photos on the internet	8.8	29.1	10.7	18.2	14.4	17.1
Copy digital photos onto CDs	54.1	53.4	33.1	29.9	52.2	46.0

Source: Seniorwatch 2007 surveys, F65 Base: Digital photographers

ICT involvement typology

The first SeniorWatch study[14] calculated a generic typology describing people's engagement with ICT:

- The "experienced frontrunners" include computer users with professional or advanced skills and/or using a computer at least once a week
- The "late beginners" include computer users with less than advanced skills and using a computer less often than once a week
- The "technologically open minded" include non-computer users who are keen on learning about new technology and/or (this definition in 2001 only) who wish to improve their computer skills
- The "digitally challenged" include non-computer users who are not interested in learning about technology and/or who do not wish to improve their computer skills.

According to this typology, the majority of the 50+ population in 2001 tended to be open-minded towards new technologies in a general meaning. Even within the age range between 70 to 79 years more than one half were at least interested in ICT, and among those who were 80 years and older interest was not at a much lower level (49%). At the same time, nearly one third of the EU 50+ population in the EU 15 were not at all interested in ICT, and this concerns not only the older age cohorts. Nearly one fifth of the respondents who are in their 50's belong to the technology "want-nots", and even 30% of those in the age range between 60 and 70 years do so[15].

Comparing the 2001 and 2007 figures it becomes apparent that the share of advanced users has significantly increased, from 27% to 40%, while the number of users with only little skills and infrequent usage was diminished from 13% to 5%. Among non-users, there are as many who are generally open-minded towards ICT (27%) as there are deniers (28%). This relation has been like that in 2001 already, albeit at a higher level of non-users generally.

[14] SENIORWATCH (2002c): Older People and the Information Society. Deliverable 5.3.

[15] op. cit.

Exhibit 2-19: ICT involvement in 2001 and 2007

Name	Description	% 2001 EU15	% 2007 EU5
The experienced frontrunners	Computer users with professional or advanced user skills and/or using computers at least once a week	26.7	39.5
The old age beginners	Computer users with less than advanced computer user skills using computers less often than once a week	13.0	5.4
The technologically open minded	Non-users but keen on learning about technology and / or wishing to improve computer skills	29.1	26.9
The digitally challenged	Non-users not keen on learning about technology and not wishing to improve computer skills	31.3	28.2

Source: SeniorWatch 2002a: 52, and SWA 2007 surveys

Given that the everyday usage of computers was not very widespread in 2001 among the target group of the research, the term "experienced frontrunners" made sense with the given definition then, but may be challenged from today's point of view. For comparison reason we shall nevertheless stick to it.

Exhibit 2-20: ICT involvement in 2001 and 2007 by age

Name	% 2001 – EU15				% 2007 – EU5			
	50-59	60-69	70-79	80 +	50-59	60-69	70-79	80 +
The experienced frontrunners	45.6	22.8	11.3	6.0	61.9	37.4	19.7	6.9
The old age beginners	13.5	15.9	10.7	6.0	6.8	6.3	3.2	2.7
The technologically open minded	22.8	30.5	33.9	36.7	19.9	29.4	35.6	23.3
The digitally challenged	18.1	30.9	44.1	51.2	11.5	27.0	41.4	67.2
	100	100	100	100	100	100	100	100

Source: SeniorWatch 2001 and Seniorwatch 2007 surveys

2.2.2 Available evidence for Japan and the USA

Internet access

With regard to the possibility of using internet at home there is a small difference between the situation in Japan an in the EU. On average, 45% of the generation 50+ have access to the internet at home in Japan, compared to almost 50% of the European population. There are even more households in the EU with people aged 50 to 69 years having an internet access at home.

Exhibit 2-21: Internet access in Japan (households) and EU5 (individuals)

Japan	50-59	60-69	70+	Total Japan
Households that own equipments that are able to use Internet	65.4	45.7	24.3	45.1
Households that don't own equipments that are able to use Internet	33.5	52.8	73.5	53.3

Source: Japanese Survey of Household Economy 2005, Internet

Europe	50-59	60-69	70-79	80+	Total EU
Yes	68.3	45.0	29.1	14.8	47.1
No	31.3	54.8	69.1	83.8	52.2
Don't know	0.3	0.3	1.7	1.4	0.7

Source: Seniorwatch 2007 surveys, F5

Internet usage

In the USA there is an about 12%-points higher share of people aged 50 and older using internet occasionally. There is a remarkable difference of 8-10% in the first three age groups between US-users and European users. Even 26% of the generation 80+ use internet, while only about 10% of the same age in Europe do.

Exhibit 2-22: Internet use in USA and EU5

US	50-59	60-69	70-79	80+	Total USA
Yes	72.2	57.7	27.2	26.6	53.5
No	27.8	41.9	72.2	72.7	46.2
Don't know/Refused		0.4	0.5	0.7	0.3

Source: Pew Internet, data of Feb-Mar 2006. Q6a: Do you use the internet, at least occasionally?

Europe	50-59	60-69	70-79	80 +	Total EU
Within the last three months	56.5	34.4	14.8	7.1	35.4
between 3 months and a year ago	1.8	2.0	1.0		1.5
more than a year ago	1.8	1.6	1.7	2.9	1.8
don't know	0.8	0.4	0.2		0.4
Refused	0.2	0.4			0.2

Source: Seniorwatch 2007 surveys, F11: When did you most recently use the internet, within the last three months, in the last 12 months or more than a year ago? Base: all

Mobile phones and consumer electronics

Exhibit 2-23: Mobile phones and consumer electronics in USA and EU5

	EU5					USA				
	50-59	60-69	70-79	80 +	Total EU5	50-59	60-69	70-79	80 +	Total USA
desktop computer / PC	71.5	46.5	31.0	17.6	49.4	71.8	61.3	34.5	28.2	55.8
laptop computer	35.3	18.4	11.2	4.8	21.7	30.8	21.4	8.2	7.0	20.7
cell phone / mobile phone	90.0	81.6	62.3	49.5	77.4	73.5	69.4	49.8	42.5	63.4
Blackberry, Palm or other PDA	6.6	3.9	1.5	1.0	4.1	9.3	5.1	2.0	2.1	5.8
iPod or other MP3 player	27.8	11.1	3.4	1.9	14.5	12.0	8.2	2.0	1.8	7.7
digital camera	63.3	46.0	25.8	11.0	44.5	55.0	42.1	20.8	20.9	40.4
video camera	28.5	22.5	11.9	4.8	20.7	41.8	32.5	17.6	14.0	30.9

Source: EU Seniorwatch 2007 surveys, F61. USA: Pew Internet, data of Feb-Mar 2006.

With regard to having technical equipment at home, similar results are found for USA and Europe. However, quite a higher number of people aged 50 and older in the EU (80%) have a mobile phone, which is almost 16% more than in the USA. The generation 70+ seems to be more technically open-minded in the USA than in the EU concerning to computers.

Japan only has data on Internet enabled ICT and consumer electronics. Therefore, the data are not directly comparable. In the Japanese 50+ generation, 39% have an internet enabled personal computer at home.

Exhibit 2-24: Japan: Ownership of equipments that are able to use Internet

	50-59	60-69	70 +	Total Japan
Personal Computer/Word processor	58.1	39.4	19.9	39.1
Cell phone/PHS	47.6	29.2	13.7	30.2
PDA	2.2	1.6	0.8	1.5
TV game	7.3	3.0	1.3	3.9
TV	9.6	8.1	5.6	7.8
Phone/Fax	12.1	10.6	6.3	9.7
Others	0.3	0.1	0.1	0.2

Source: Japanese Survey of Household Economy 2005

2.3 Enablers and inhibiting factors

There is a variety of factors affecting access and usage of ICT among older people, reflecting both the usual "digital divide" fault lines of socio-economic stratification such as education and income and some factors that are more closely linked to older age groups, per se, such as functional changes associated with ageing, attitudes and history of exposure to technology. The role of these inhibiting factors tends to remain largely stable over time.

2.3.1 Socio-economic factors

Socio-economic factors appear to have a strong impact on older European's propensity to get involved in ICT. Those older people who utilise ICT for their purposes tend to be younger but also better educated; they tend to have a rather active life style and are on average better off in economic terms[16]. In other words, whether or not older Europeans engage themselves with ICT cannot merely be regarded as a matter of biological age, but is strongly associated with several dimensions of social stratification.

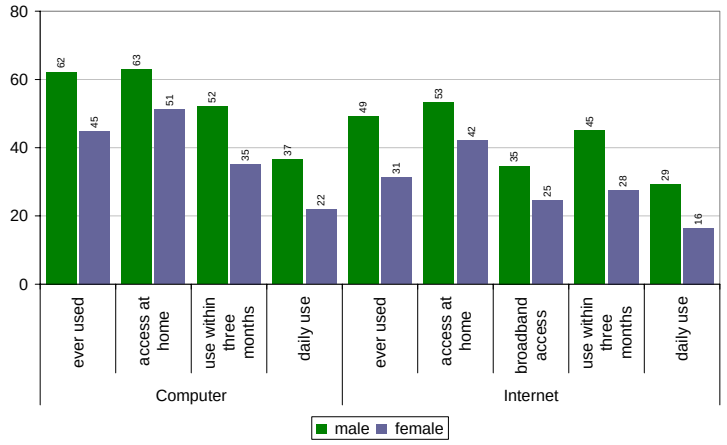
While the gender gap for younger age groups has constantly been decreasing in recent years in Europe, it remains highly visible for older people. 29% of older men are daily internet users, while only 16% of older women are. Another exemplary difference is that 53% of men live in a household with internet access, compared to 42% of women. Gender effects in older age always have to be taken with the note that they are most likely to be confounded with age effects and educational effects. The former is due to the fact that women on average live about 7 years longer, and therefore their share among the very old, who are less likely to be users, is much higher. The latter is due to the fact that years of schooling differ strongly between men and women among the oldest cohorts.

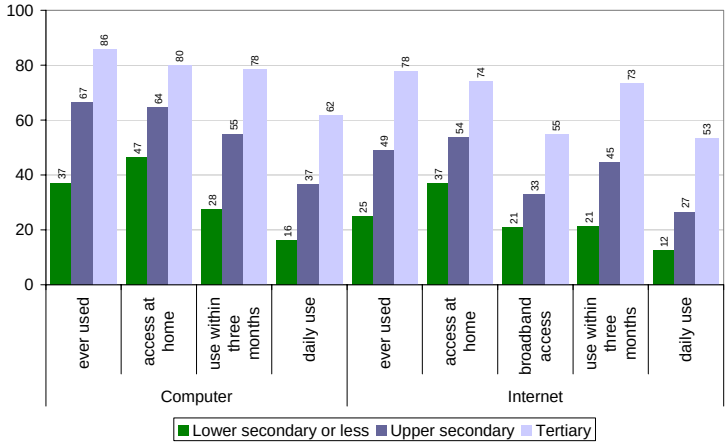
With regard to educational attainment, differences were to be expected, yet the extent of this divide in the older age group is striking. A quarter of those with lower secondary and less schooling have ever used the internet, compared to more than three times that percentage among those with tertiary entertainment. Daily users are 53% of all with tertiary education, but only 13 percent of those with more basic schooling.

The first SeniorWatch study revealed, for instance, that the better educated "older old" are more likely to belong to the group of "experienced frontrunners" than the less educated "younger old" (cf. below). Both factors - age and educational attainment - exhibit an independent influence on the propensity to utilise ICT. Keeping the age factor constant, ICT uptake increases with educational attainment and – vice versa – keeping educational attainment constant ICT use decreases with age. Similar patterns can be observed with respect to other dimensions such as income and life style.

[16] Cf. SENIORWATCH (2002c): Older People and the Information Society. Deliverable 5.3.; but also FOX, S. and PEW INTERNET AND AMERICAN LIFE PROJECT (2004): Older Americans and the internet. Washington D.C.

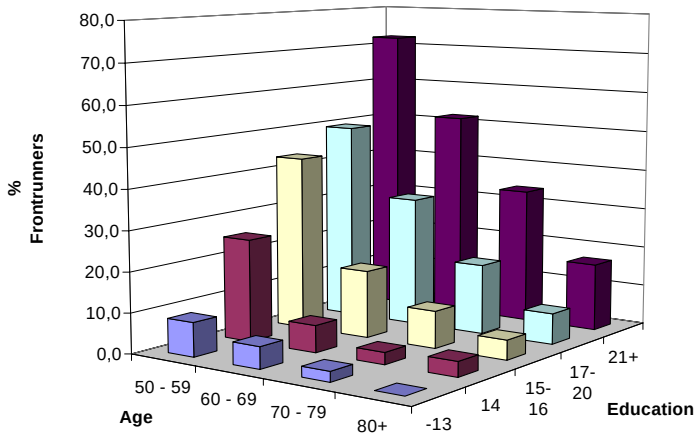
Exhibit 2-25: Uptake of ICT according to gender and educational attainment (in %), 2007





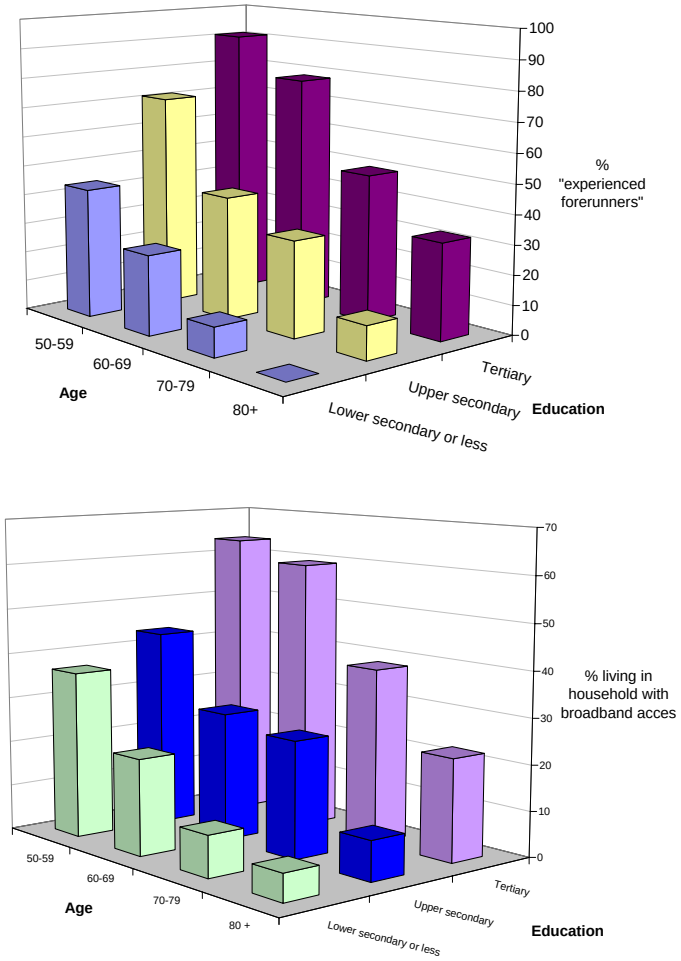
Source: SeniorWatch Surveys2007

Exhibit 2-26: The "experienced ICT frontrunners" according to age and education (in %), 2001



Source: SeniorWatch1 Surveys2001

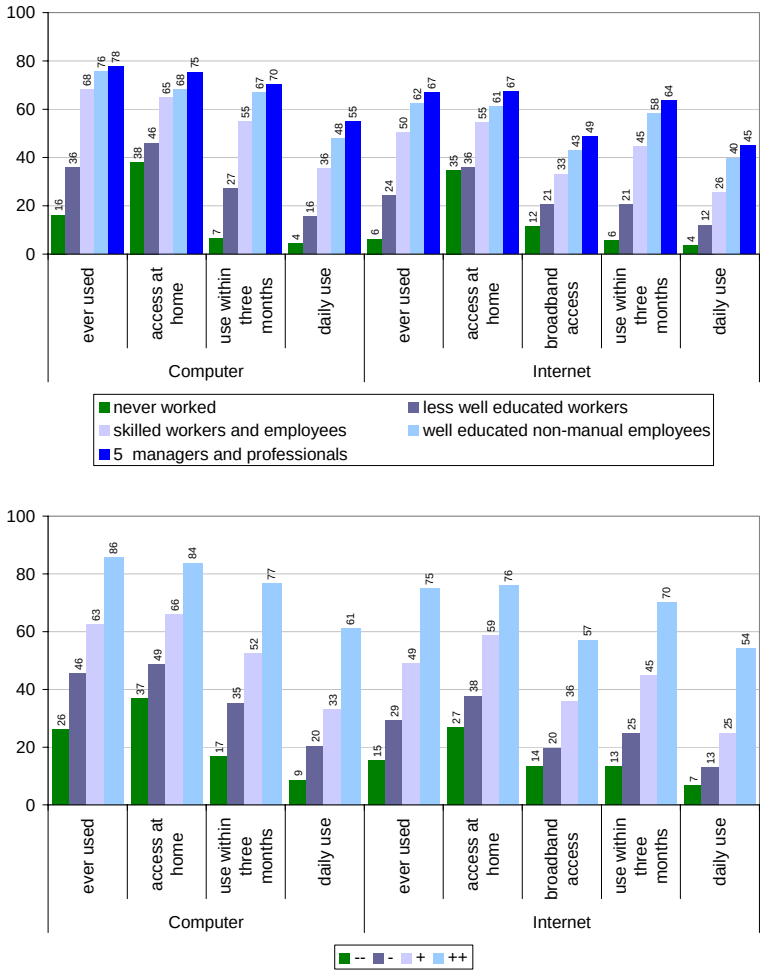
Exhibit 2-27: The share of "experienced ICT frontrunners" and of broadband household dwellers among EU5, 50+ population, age and education groups (in %), 2007



Source: SeniorWatch2 Surveys2007 – Explanation: percentages refer to sample share within each age/education group.

Accordingly, the use of ICT is also strongly correlated with social status, measured here as a combination of occupational status and education. (Former) white collar workers (managerial and well educated non-manual employees) use the internet by a majority of more than 60%, compared to 44% and 22% respectively among the higher and lower skilled blue collar workers.

Exhibit 2-28: Uptake of ICT according to occupation based social status and income (in %), 2007



Source: SeniorWatch Surveys2007

The same diagnosis can be made with respect to income: in the upper quartile, 84% have a computer, and 76% internet access at home, 54% are internet users on a daily basis. In the lower quartile, contrarily, 37% have computer and 27% internet access at home, and 7% only are daily internet users.

Although older adults' propensity to utilise ICT is influenced by the interplay of various socio-economic dimensions, multivariate analyses of the Seniorwatch 1 data had suggested that a person's educational attainment has a particularly strong influence and that income is also a very discriminating factor. In bivariate analysis this finding is supported in the 2007 data. A multivariate analysis will be undertaken further below.

Both dimensions are of course linked to occupational participation and professional characteristics that are likely to facilitate or obstruct access to and/or usage of ICT during working life. Furthermore, educational background and consequently occupational status may affect the development of the personal capabilities that are required when coping with technology-related innovations. This may for instance concern the acquisition of required skills, but also habitual strategies in coping with problems in one's working life.

2.3.2 Disabilities and impairments

Gerontological research has shown that sensory capabilities (e.g. visual, audio, tactile) as well as cognitive ones – particularly in relation to apperception speed – tend to decline with growing age.[17] Also, research has highlighted a link between age and disability in the sense that a large proportion of disabled people are older adults.[18] Against this background, it seems important that the ICT which are today commonly used for social and economic purposes are designed in ways that take into account the changes in vision, hearing, dexterity and cognition that occur with ageing.

However, empirical data on the scale of the actual demand for accessible ICT among older people cannot easily be found. For the first time, the 2001 SeniorWatch survey provided strong empirical evidence that a considerable share of older adults face functional restriction when using ICT, while the severity of the reported restrictions tends to increase with age.[19] Somewhat later in 2003, these findings were supported by research conducted in the US with regard to the aging workforce.[20] According to this research, up to one-in-five of the working age population have such a degree of disability that eAccessibility provisions may be needed for them to effectively use ICT and that, overall, 60%, would be likely to benefit from eAccessibility provisions.[21] This already high level of demand for accessible ICT solutions will increase substantially with the aging of the population. Already, there are more than 33 million Europeans aged 50 years and over with restrictions that are severe enough to pose direct ICT accessibility (eAccessibility) challenges and this is projected to reach 46 million by 2050.[22]

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[17] REISCHIES, F.M. and U. LINDENBERGER (1996): Grenzen und Potentiale kognitiver Leistungsfähigkeit im Alter. In: MAYER, K.U. and P.B. BALTES (eds.): Die Berliner Altersstudie: das höhere Alter in interdisziplinärer Perspektive, pp.351-377. Berlin as well as MARSISKE, M., DELIUS, J., MAAS, I., LINDENBERGER, U., SCHERER, H. and C. TESCH-RÖMER (1996): Sensorische Systeme im Alter. In: MAYER, K.U. and P.B. BALTES (eds.): Die Berliner Altersstudie: das höhere Alter in interdisziplinärer Perspektive, pp.379-403. Berlin.

[18] Roe, P.R.W. (1995): Consumer Overview. In: Roe, P.R.W.: Tele Communications for all, pp. 9-27. Brussels.

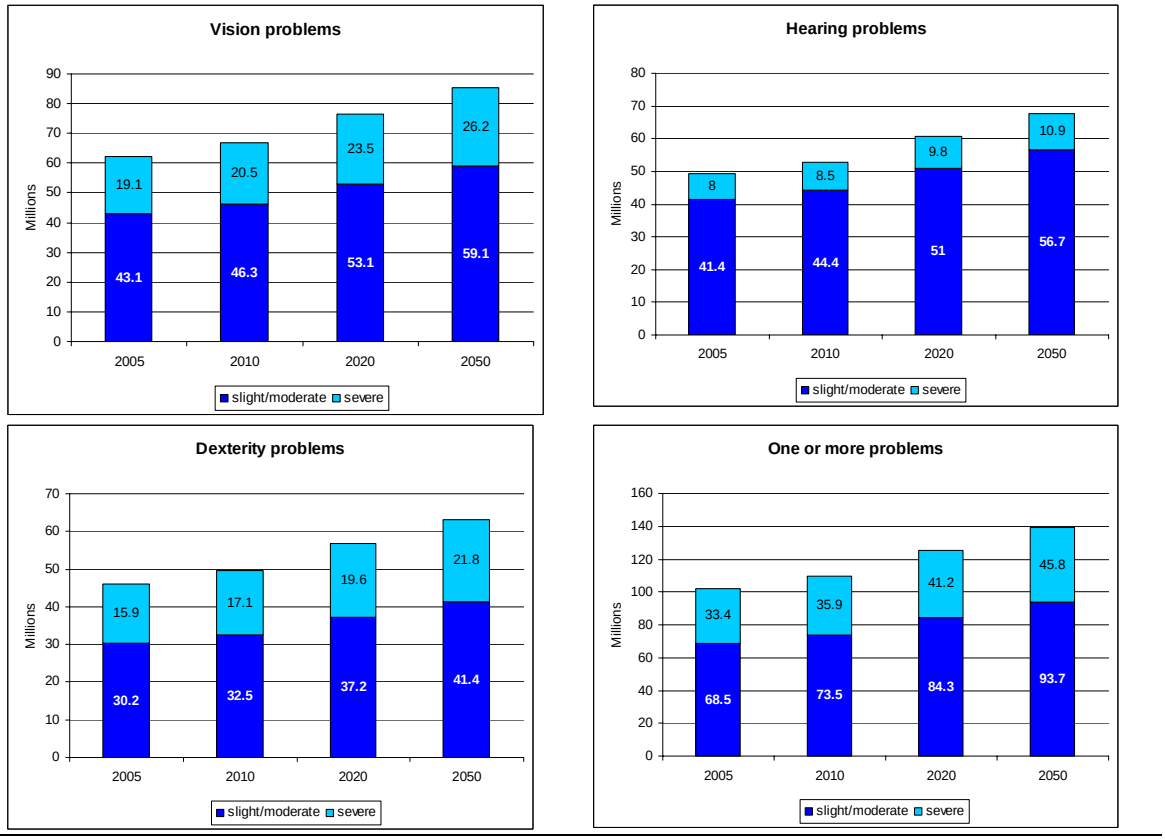
[19] Seniorwatch 2001: European Markets for IST Products and Services for Older and Disabled People. p.58ff.

[20] Forrester Research and Microsoft Corporation (2003): The wide range of abilities and its impact on computer technology.

[21] Ibid p.p. 6-7

[22] C.f. empirica and WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies - LOT/: The Demographic Change – Impacts of New Technologies and Information Society, p. 54.

Exhibit 2-29: Projected growth in the numbers with particular disabilities (EU adults aged 50+)

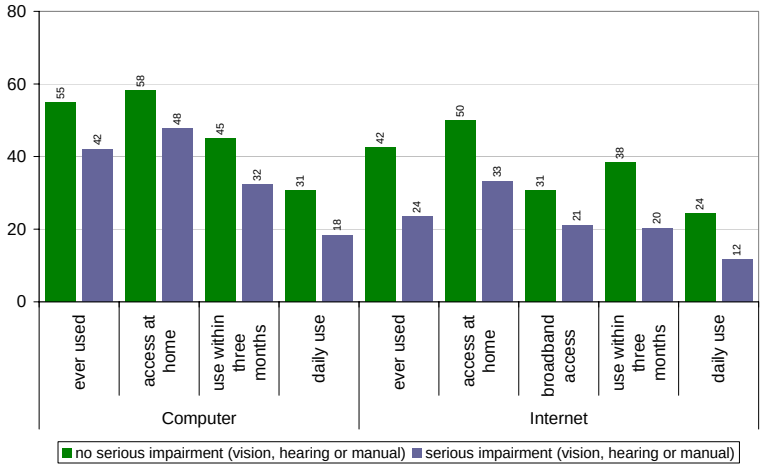


Source: empirica and WRC (2005) (Own calculations based on data available from SeniorWatch, 2002 and demographic projections from Eurostat, 2005)

Clearly, our survey data suggest that functional restrictions today represent a barrier to older people to utilise ICT products and services for their purposes. Respondents with severe impairments are for instance less likely to use a computer and the internet, and this general trend seems to apply across all age bands and disabilities, albeit with some variation in relation to the magnitude of the 'usage gap'. As a general pattern, having a functional impairment is found to negatively influence on the probability to be using ICT, whereby a strong correlation can "already" be found for having *ever* used a computer or the internet. All in all, these findings are in line with outcomes revealed by a recent Eurobarometer survey[23] according to which EU citizens with health problems, illnesses or disabilities are a lot less likely to have access to the Internet – 25% compared to the global 43%.

[23] EOS GALLUP EUROPE (2002): Flash Eurobarometer 135- Internet and the Public at Large. Online available at: http://europa.eu.int/comm/public_opinion/flash/fl135_en.pdf (accessed August 2005).

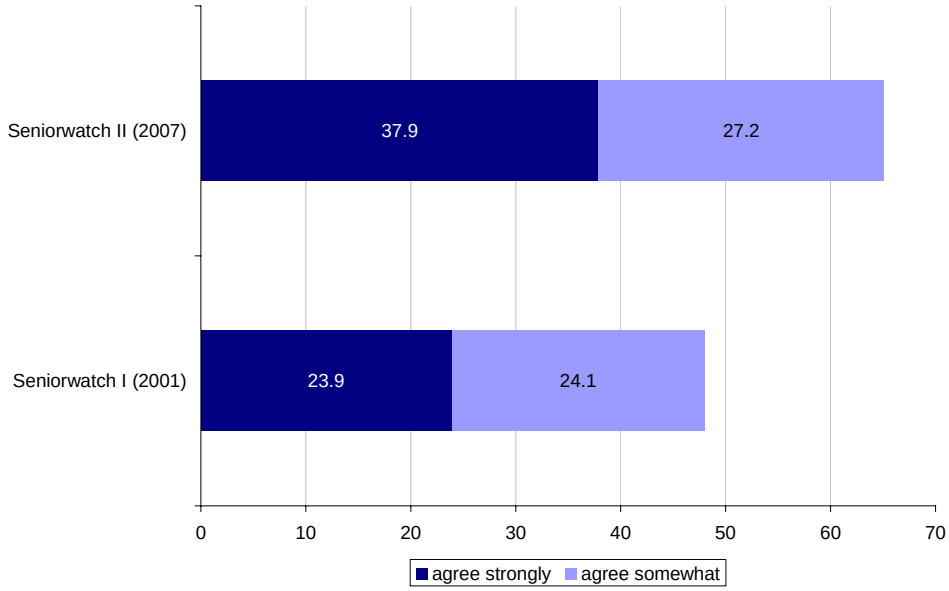
Exhibit 2-30: ICT access and usage by people with and without an impairment of either the vision, hearing or hands among the EU5 50+ population (in %), 2007



Source: SeniorWatch Surveys2007

In 2001, the first SeniorWatch survey revealed that ICT manufactures had apparently failed to adequately address this significant market segment because they did not consider older people's interest in adequate design of mainstream ICT products. Nearly one half (48%) of the respondents had stated that they did not see their requirements adequately considered by ICT manufacturers at that time, which represented some 60 million people in the 50+ age range living in the EU15 Member States. The data available from the current survey suggest that the situation has not at all improved since then. Today, an even larger share (65.1%) of the respondents state that their needs are not adequately considered by ICT manufactures. This outcome suggests that today's mainstream ICT markets do not deliver products and services that optimally meet the needs of a considerable share of the overall population. Clearly, this finding points into the direction that e-accessibility and design-for-all remain important themes on the digital divide agenda.

Exhibit 2-31: ICT related attitudes towards the design of ICT products among the EU 50+ population 2001 and 2007 (in %): Manufactures do not consider the interest of people in my age in designing ICT products



Source: SeniorWatch Survey 2007

However, the general pattern indicated by Exhibit 2-31 above masks enormous heterogeneity as regards age-related design requirements prevalent amongst the older population when it comes to specific ICT products and services (e.g. fixed and mobile telephones, personal computers including hardware and software products, web sites, self service terminals, information kiosks and the like). Simplistic assumptions and stereotypes about the design requirements older users may have in relation to particular devices and/or services may therefore not be of much help when it comes to adequately responding to ageing user populations in the different ICT domains concerned.

However, the extent to which specific ICT products and services actually meet the changing needs of older users has not yet received much direct research attention and is an area that warrants a lot more attention for the future. This concerns on the one hand the development of an appropriate set of statistical indicators reflecting the variety of ICT-related needs older users have along the full spectrum of ICT products and services that are today commonly utilised for social and economic purposes. On the other hand, this concerns the development of appropriate large-scale survey designs that are capable of rendering sufficiently robust sub-samples along the variety of functional and cognitive restrictions that tend to come with the human ageing process, and with variations in the severity of their occurrence respectively. Such a research effort would clearly go beyond the scope of the current SeniorWatch survey. The current study is rather broad in focus when it comes to the range of topics that were to be addressed, and the overall survey design that needed to be adopted for that purpose respectively.

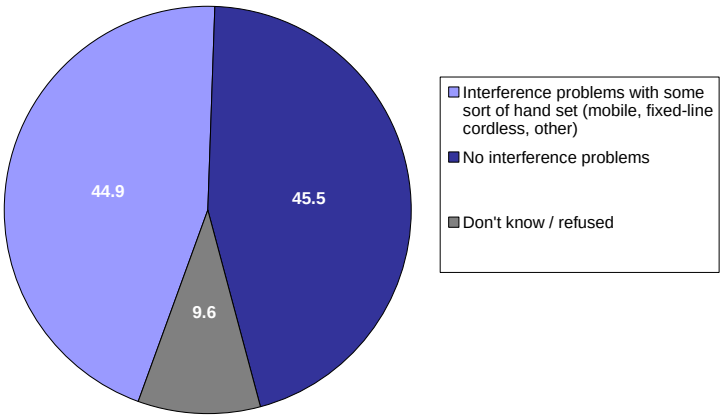
For the purposes of this study, it has therefore been decided to investigate two selected sub-themes in a more exploratory manner. Here, the focus is on the extent to which older people who rely on a hearing aid face interference problems when using a standard telephone hand

set and on the availability of specific assistive technology solutions to older people that enable usage of personal computers.

Interference problems faced by hearing aid users when using standard telephone hand sets

This requires some form of coupling of the hearing aid with the telephone, e.g. by means of inductive coupling, infrared, direct electrical connection or by matched acoustic transducers. Availability of telephone sets that provide for adequate coupling of the hearing aid used is therefore a precondition for them to be effectively used in voice telephony. In mobile telephony in particular, handsets can often not be held directly against a hearing aid, because of radio interference or the risk of magnetic damage to the hearing aid. Utilisation of an induction loop in form of a neck loop or similar devices can provide a solution, at least in principle. All in all, our data suggest that a considerable share of respondents who use a hearing aid experience problems when using a standard telephone hand set due to interferences. Somewhat less than half (45.5%) of the respondents who wear a hearing aid report not to have experienced any problems with interferences, while the other half have had such problems with either a mobile phone or a fixed line hand set (cordless phones, other types of fixed line phone) they use.

Exhibit 2-32: Interference problems when wearing a hearing aid and using a telephone (in %)



Source: SeniorWatch Surveys2007 Base: Hearing aid users, n= 93 (weighted)

This finding seems rather surprising when considering the fact that the telephony domain can be considered as a relatively mature ICT sub-market, and that the specific user requirements hearing aid users tend to have are comparatively well understood. At least in principle a range of accessible solutions has become available, including models which are hearing aid compatible as well as phones with additional relevant features such as tone controls and connections for a headset or inductive neck loop (small induction loop worn around the neck of the hearing aid user to avoid interference problems). However, hearing aid compatibility does not yet seem to have become a mainstream feature across standard model ranges offered to older consumers in the market place. For instance, when being asked for a reasoning why the respondents do not use a model that reduces interference problems

almost one third state not to know that such models are available at all (24.6%) or where to get one (6.8%).

Apart from indicating that principally available solutions to interference problems do not seem to have moved mainstream in the market place, these outcomes also point into the direction of lacking market transparency. Such an assessment is supported by outcomes of the recent MeAC study[24] suggesting that there is only limited attention being given by European mainstream vendors to the needs of mobile telephony users with restricted functional capabilities. For instance, only in seven EU Member States do the main mobile operators offer any disability-related product information via their online sales channels, and only in five countries does the second largest market player do so as well (**Exhibit 2-33**). The corresponding figures for models offered on the main operator's web sites that are explicitly stated as being hearing-aid compatible are even lower, i.e. five and four operators respectively. Although this may not necessarily mean that none of the models the other vendors have on offer are compatible with hearing aids, it points to the fact that hearing aid users – and people with restricted capacities in general – face disadvantages in terms of a lack of market transparency and choice.

Exhibit 2-33: Online provision of customer information for people with disabilities by the two main mobile telephony operators according to country

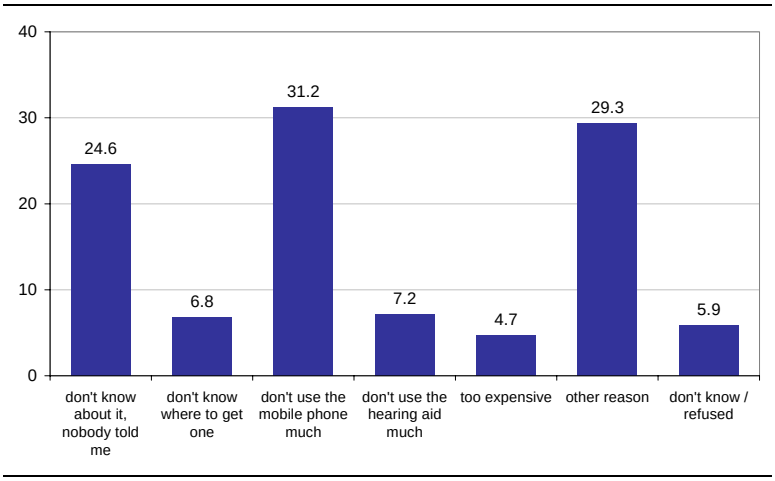
	Online provision of information on handsets that are hearing-aid compatible by 1st main mobile telephony operator in the country	Online provision of any other customer info. directed towards people with disabilities by 1st main mobile telephony operator in the country	Online provision of information on hand sets that are hearing-aid compatible by 2nd main mobile telephony operator in the country	Online provision of any other customer info. directed towards people with disabilities by 2nd main mobile telephony operator in the country
EU (# of countries)	5	7	4	5
USA	✓	✓	✓	✓
CA	-	✓	-	✓
AU	✓	✓	-	✓

Source: MeAC, 2007

Given the fact that a relatively high proportion of hearing aid users who experience interference problems are not even aware of potentially available technical solutions that would enable them to better cope with their accessibility problem, it may not come as a surprise that almost one-third (31.2%) report not to using their mobile phone much. The latter may well reflect a "chicken and egg" situation: Those who experience interference problems may be less interested in actually using of a mobile phone even if they possess one.

[24] empirica, WRC, RNIB, RNID and eWORX (2007): Measuring Progress of eAccessibility in Europe: Assessment of the Status of eAccessibility in Europe, Main Report.

Exhibit 2-34: Reasons for not using a special mobile phone that reduces interference problems with hearing aid



Source: SeniorWatch Surveys2007 Base: Having a hearing aid but not using a special mobile phone that reduces interference problems. n=85 (weighted)

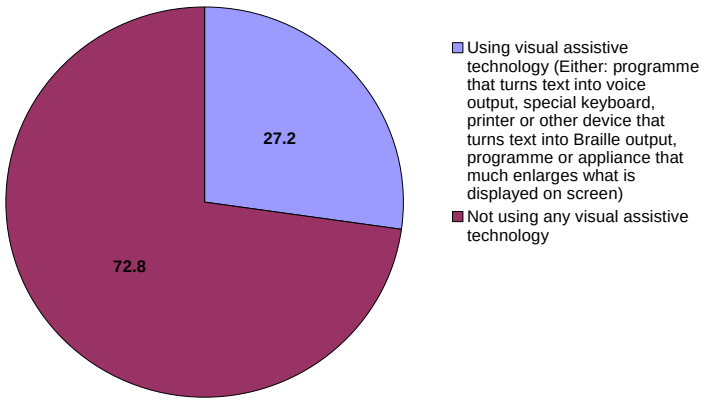
Availability of PC-related assistive technology solutions

There are a range of age-related conditions that may pose difficulties to older people to engage in computer-based activities. For instance, there are a range of eye conditions causing low vision or even loss of vision, and these can affect vision in a number of ways ranging from a slight blurring of vision to being registered blind. Depending on the individual manifestation of a particular eye condition, visually impaired users may face problems in using computing devices in several regards. Those who are partially sighted or even blind may have problems perceiving the various parts of a computing device. One solution to serving these users' needs is to make sure that visual prompts and information are clearly presented and to offer the same information in a format that can be perceived by a non-sighted person - tactile or audio. For example, Braille can be used on buttons and spoken instructions and outputs can be provided along with the visual display. People with partial sight may find small text very difficult to read. Also, special orientation in relation to displayed content may be difficult for some. For instance in relation to web pages they may have problems perceiving the various elements of a web page. They may have difficulty distinguishing buttons and navigation bars, reading the text or identifying the content of pictures. Solutions to this that are in principal available may include provision for resizing content by the user, using appropriate fonts and using colour combinations that have good contrast.

Historically, efforts directed towards making computer technology accessible to people with functional restrictions focused on the development of adaptive devices and software – 'assistive technology' - enabling people with disabilities to utilise standard hardware, operating systems and software applications (e.g. screen reader software, magnification software, speech recognition software, adapted keyboards and the like). When text screen readers became obsolete due to the spreading of graphical user interfaces, graphical screen readers were developed. Later, accessibility features began to be incorporated in standard products (e.g. speech output and magnification features within mainstream operating systems). Today, a wide range of solutions to accessibility problems exist in terms of both

specific adaptive technologies and solutions that have been incorporated into mainstream products. A key issue therefore concerns the extent to which older users with functional restrictions are gaining access to these.

Exhibit 2-35: Utilisation of Assistive Technology among computer users with severe visual limitations (in %)

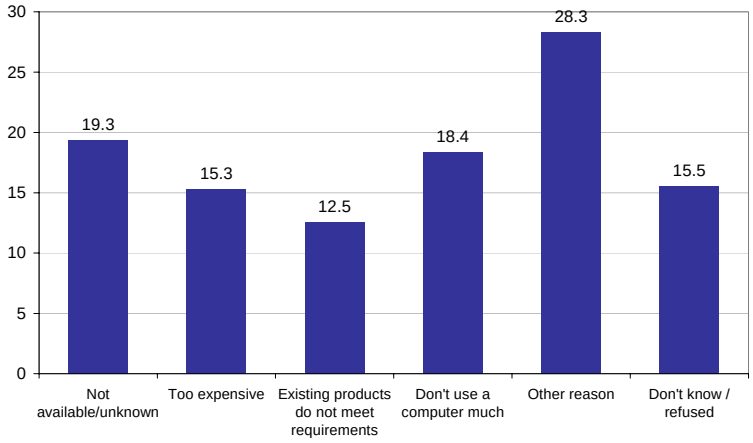


Source: SeniorWatch Surveys2007 Base: Computer users with severe visual limitations. n=64 (weighted)

Our data suggest that nearly one-in-five (18%) of those respondents who suffer from any visual restrictions seem to cope with their limitation by utilising standard software features, e.g. a built-in zoom functionality or options for changing pre-set font sizes of documents or web sites, whereby another 12% are not even aware that such features do even exist or how exactly to use them. When it comes to those respondents who report severe visual restrictions, less than one third (27.2 %) rely on hardware and/or software solutions that are specifically designed for users with visual restrictions, i.e. assistive technologies (AT) (**Exhibit 2-35**). Our data point into the direction that a number of barriers to the wider utilisation of such technologies do exist. This concerns for instance again lacking knowledge of what would be available on the market and the fact that existing products do not necessarily seem to meet actual user needs. Again, this assessment is in line with outcomes of the recent MeAC study suggesting considerable variance across countries when it comes to provision of eAccessibility-related product information via the mainstream sales channels of major market players that were included in the investigation (three hardware manufacturers and three software developers).[25] In general, the level of eAccessibility-related product information available from mainstream market players tended to be somewhat higher for software products when compared with hardware.

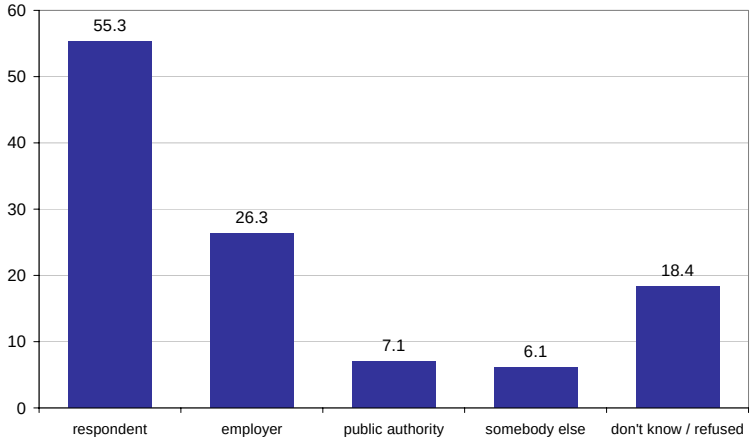
[25] empirica, WRC, RNIB, RNID and eWORX (2007): Measuring Progress of eAccessibility in Europe: Assessment of the Status of eAccessibility in Europe, Main Report, p.p. 75 - 79

Exhibit 2-36: Reasons for not using Assistive Technology solutions



Source: SeniorWatch Surveys 2007 (weighted) Base: Computer users who have ever considered using AT. n=145

Exhibit 2-37: Payers of assistive computer technology (in %)



Source: SeniorWatch Surveys 2007 Base: Users of assistive technology, including Braille output, voice, output, screen magnifier, special keyboard, voice recognition, alternative mouse, n=55 (weighted)

Also, costs seem to be an important inhibitor to the wider use of assistive technology solutions by older computer users. This seems of particular relevance as the majority of older users cannot rely on any funding of assistive equipotent, particularly when it comes to using such technologies for private purposes rather than in an occupational setting (**Fehler! Verweisquelle konnte nicht gefunden werden.**). This finding is in line with the outcomes revealed by an international survey of disability organisations that has been conducted in the framework of the MeAC study as well.[26] Although the majority of the disability organisations (63%) that had responded to the survey reported some progress in relation to availability of assistive technologies in the computer hardware/software field, high purchasing costs for end users were seen as a major barrier for wider deployment by almost three quarters (73%). All

[26] Ibid p. 77

in all, available evidence[27] indicates wide variability in levels of public support across Europe in terms of the contexts that are covered (employment, education, everyday life), the assistive technologies covered (especially in the extent to which accessible / assistive ICT are covered), the eligibility criteria that are applied, and so on.

2.3.3 Churn in internet use

Who has stopped using the internet? Among those who have ever used the internet, we find one in ten who has not recently been using the internet. Under the assumption that these resigned users have actually once been regular users (which is not to be validated from the data), one can analyse in which social groups the share of ex-users is especially high.

This share is obviously the highest among older ages: more than a quarter of ever-users in the 80+ age class have abandoned use. Also, home access seems crucial, only 4% of internet experienced broadband home dwellers have not used the internet recently, compared to 32% of people in household without access.

Among the impairments observed, hand impairment seems to entail the highest probability for internet use churn. Among internet experienced with hand impairment, 22% have stopped using the internet.

[27] DG Employment and Social Affairs (2003): Access to Assistive Technology in the European Union; also, the earlier HEART study, available at http://www.hi.se/templates/Page____821.aspx.

Exhibit 2-38: The share of internet ex-users among people having ever been an internet user

		Having ever been internet users =100	
		% Currently user	% Ex user
Total		90.0	10.0
Age	50-59	92.6	7.4
	60-69	88.6	11.4
	70-79	83.9	16.1
	80 +	72.6	27.4
Internet access	no internet access	68.1	31.9
	narrowband access	87.8	12.2
	broadband access	95.8	4.2
Receiving treatment for any long-term condition	no	91.1	8.9
	yes	89.1	10.9
Care need: In need of help with dressing or bathing	no	90.5	9.5
	yes	84.1	15.9
Severe hearing impairment	no	89.9	10.1
	yes*	*100**	*0**
Severe hand impairment	no	90.6	9.4
	yes	77.8	22.2
Severe mobility impairment	no	90.1	9.9
	yes	89.3	10.7
Severe sight impairment	no	89.9	10.1
	yes	92.5	7.5
Number of treatments received for long-term conditions	none	91.1	8.9
	one	90.3	9.7
	two or more	87.6	12.4
Educational attainment	Lower secondary or less	85.8	14.2
	Upper secondary	90.9	9.1
	Tertiary	94.3	5.7
Employment status	Working	95.3	4.7
	Retired	85.8	14.2
	Other	81.3	18.7
Serious impairment (vision, hearing or manual)	no	90.4	9.6
	yes	86.3	13.7
Income	--	85.7	14.3
	-	84.8	15.2
	+	91.5	8.5
	++	93.7	6.3

Source: SeniorWatch Surveys 2007 * based on 11 case only

2.3.4 ICT attitudes and motivation

Notwithstanding the key role socio-economics play in understanding older people's propensity to use ICT, they are still extrinsic in nature and therefore do not tell anything about the processes, cognitive and otherwise, which are involved in the decision to adopt the technology (or to stay away from it). Nonetheless of course, attitudes and motivation are also to some extent the product of socio-economic contexts.

To understand this intrinsic part in explaining ICT involvement it is necessary to take a closer look at the attitudes and behavioural patterns of ICT users and, in particular, non-users.

Many studies have confirmed that lack of interest and low motivation are key reasons for non-usage and non-access among large parts of the elderly. FOX AND PEW INTERNET[28] found wide-spread lack of interest, with eight in 10 offline seniors thinking they will never go online. These people usually do not have people who use e-mail or the web among their peers, which might be one reason why they claim not to know why they should spend time and money on learning how to use a computer. With respect to home access to the Internet, the EUSER survey revealed that in the age range between 50 and 64 years about half of those who do not want home access mentioned perceived lack of usefulness being a reason for that. Among those aged 65 years and above, the share measured even increased to 61%. For a noticeable part of older non-users the perceived potential benefits of the Internet do not seem to justify the costs and effort that would be involved in going online.

Computer anxiety and intimidation by technology also appears to affect a considerable share of older persons and many older people express a fear that they will break new technology they attempt to learn. VAN DIJK[29] distinguishes computer anxiety from computer frustration which occurs as a consequence of initial contact with computers.

Another issue is the fast pace of hardware and software development which is problematic because older people often prefer to stick to machines and programmes with which they are familiar. The EUSER (2005) survey found that, with the exception of the youngest generation in the sample (18-24), all age groups are similarly affected by the impression that “taking up with computer developments takes very much time”. Every second person over the age of 24 agrees to this statement (values 4 or 5 on the five-point scale). This, therefore, does not seem to represent a problem which is specific to age, but rather to the structure of the market and the speed of market-driven developments in the home computing area. However, it may have a stronger effect on older users because social pressure to update hardware and software is likely to be smaller.

Inhibiting factors of more intensive internet use

As described elsewhere above, among internet users there are 39% not-so-heavy (weekly), seldom or none users. These groups were asked whether they would like to use the internet

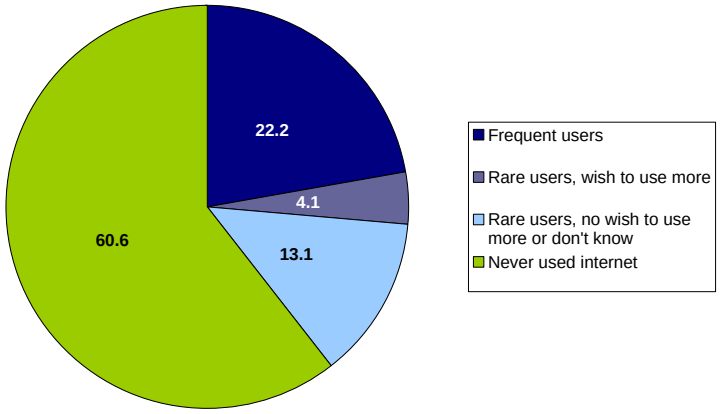
[28] op. cit.

[29] VAN DIJK, J. (2005): The deepening divide - inequality in the information Society. Thousand Oaks, London, New Delhi.

more, if they could[30], to find out whether their restraining from using the internet is rather forced or rather voluntary.

In fact, only 28% said they would actually like to use internet more.

Exhibit 2-39: Users wishing to use internet more



Source: SeniorWatch Surveys2007. F17: (A5) Would you like to use the internet more if you could?
Base: all.

Exhibit 2-40: Reason for inability to use internet more despite contrary wish

	Germany	France	Italy	Poland	UK	
a) You do not have enough time.	66.7	50.0	55.6	29.6	24.0	42.2
d) You are lacking the skills or knowledge	47.4	15.4	21.1	34.6	32.0	31.4
e) You are concerned about your security or privacy	38.9	7.1	11.1	14.8	12.0	16.7
b) It is too expensive.	11.1		11.1	46.2	20.0	21.0
c) Web sites are not user friendly or too complicated	22.2		21.1	19.2	16.0	16.7
f) You do not have an internet access at home.	21.1	28.6	5.6	25.9	8.3	17.6
g) You are experiencing any physical impairment that makes using computers and/or the internet inconvenient or difficult for you				3.7	4.0	2.0
h) Other reasons.	11.1	14.3		11.1	20.0	11.8

Source: SeniorWatch Surveys2007. F17: (A5) Would you like to use the internet more if you could?
Base: if ever used internet and not use almost every day and wishing to use internet more (ca. 5% of older population)

The reason for not doing so despite the beforehand expressed wish is lack of time, mostly. This is expressed by 46 percent of those who were asked the question (who make up only

[30] The restricted target group of this question makes sense if one considers that those without any experience of what the internet is can hardly judge about it, while those using it daily do not need any "preaching to the converted".

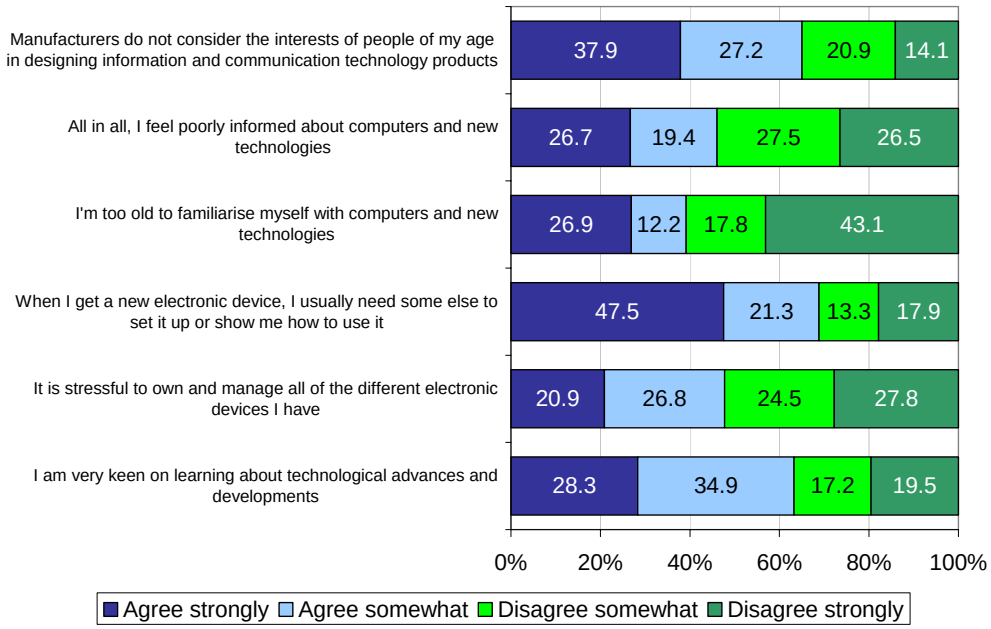
5% of the total older population, anyway). Other reasons have been stated by 4% to 34%. As the target group of this question is however rather small, we will not analyse these here.

Generic ICT attitudes

Seniorwatch 2007 has gathered degrees of agreement to six more or less generic statements about ICT. Generally, results show that there is a large variety of opinions to be found, with shares of technology enthusiasts and sceptics that balance each other out, basically. For instance, while 27 percent strongly and 28 percent somewhat disagree that they are not well informed about computers, there is an almost as large part of the population that is of the opposite opinion: 27% strongly and 19% who somewhat agree. This balanced picture is to be found more or less for every item surveyed. As has been found out for general ICT usage, where both large shares of heavy users of technology and of strict non-users who are not at all prone to availing themselves of ICT were found, one may diagnose that the European older population is strongly polarised with regard to ICT involvement and openness towards new technologies.

The highest degree of agreement is found for the item "When I get a new electronic device, I usually need some else to set it up or show me how to use it", which is agreed to by more than two thirds of respondents, including a number of heavy users. Almost as much agreement is found for "I am very keen on learning about technological advances and developments". About two thirds also reject the statement "I am too old to familiarise myself with computers and new technologies."

Exhibit 2-41: ICT relevant opinions and attitudes among the EU5 50+ population (in %), 2007



Source: SeniorWatch Surveys2007

The six items were subjected to a factor analysis[31]. The resulting two components (see table below) were termed "At ease / stressed by ICT" and "Keen / reluctant to use ICT"

Exhibit 2-42: Factor analysis of ICT attitudes.

	Component	
	At ease / stressed by ICT	Keen / reluctant to use ICT
I am very keen on learning about technological advances and developments	0.146	-0.860
It is stressful to own and manage all of the different electronic devices I have	0.665	-0.085
When I get a new electronic device, I usually need some else to set it up or show me how to use it	0.585	0.320
I'm too old to familiarise myself with computers and new technologies	0.389	0.697
All in all, I feel poorly informed about computers and new technologies	0.674	0.288
Manufacturers do not consider the interests of people of my age in designing information and communication technology products	0.660	-0.022

Source: SeniorWatch Surveys2007. Rotated Component Matrix

It comes as no surprise that heavy users of ICT are both feeling at ease with ICT and quite keen to be using technologies. More intriguing, however, it might be to see how people not using ICT are expressing their opinions.

For this purpose the four user groups of the ICT typology introduced earlier in this report were analysed with respect to their average factor scores, that is, with regard how much they are comfortable with and/or keen to use ICT. The following exhibit contains a graphical plot.

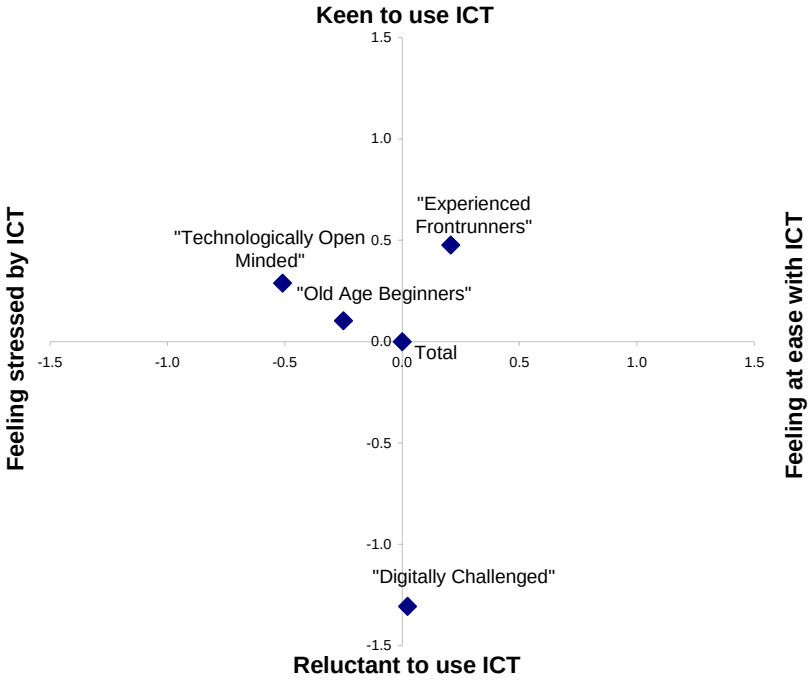
What is quite notable is to see that the "digitally challenged" are not so much stressed by technology but rather they express extreme reluctance to use ICT, with a value of 1.3 standard deviations below average. As regards the relatively neutral position with regard to comfortableness with ICT (stressed/at ease), the fact that these people hardly use any ICT (which might be the precondition for feeling "stressed" in the first place) probably comes to have an effect.

The other group of non-users of computers, the "technologically open-minded" as they were called, are positioned quite differently when compared to the "digitally challenged". This group is characterised by the most extreme feelings of being stressed by ICT and, at the same time, they are quite keen to use ICT, with an even more positive value on the keen/reluctant scale than the group of "old age beginners". This group therefore is to be of high relevance for the ICT industry: they constitute a group of untapped potential demand. While very open-minded towards technology, they are feeling that the products currently available are too demanding of them, were designed for younger target groups in the first place and are therefore felt too complicated to use.

The old age beginners, it turns out, are the most "neutral" group, being neither very enthusiastic about ICT nor much stressed by it.

[31] The SPSS standard procedure was used, with the eigenvalue >1 criterion and Varimax-rotation. Cumulative variance explained of the two factors with eigenvalue>1 is 54%.

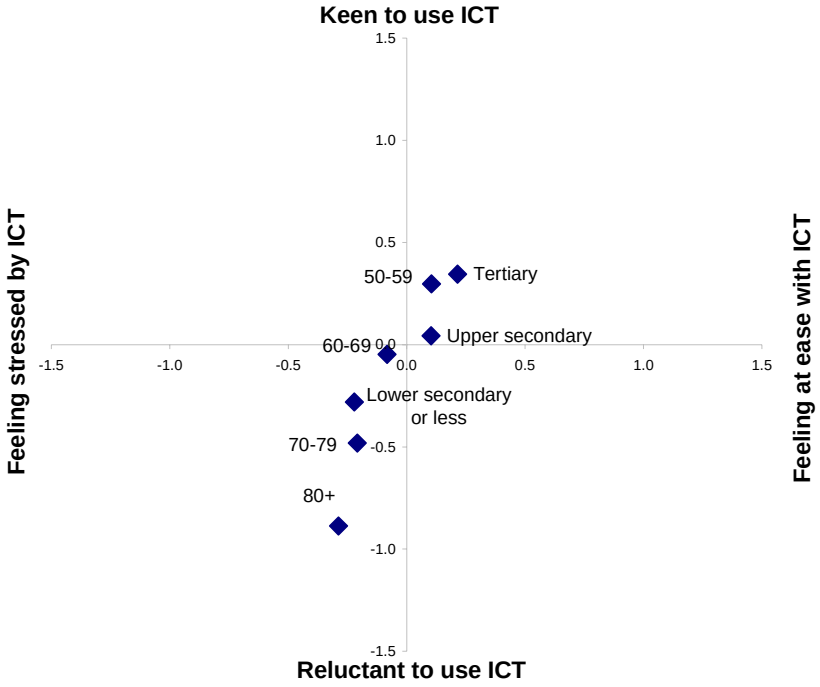
Exhibit 2-43: ICT relevant opinions and ICT involvement typology (2007)



Source: SeniorWatch Surveys2007.

It has been shown, that age and educational attainment are strong statistical predictors of ICT usage. When applying these variables to attitudes, it turns out that mostly the same direction of effects becomes visible. People with tertiary education are most likely to be in the "keen to use" and "at ease" quadrant, followed by the youngest age group. On the other hand the 80+ generation is placed most left/down, followed by the 70-79 age group and the lowest educational group.

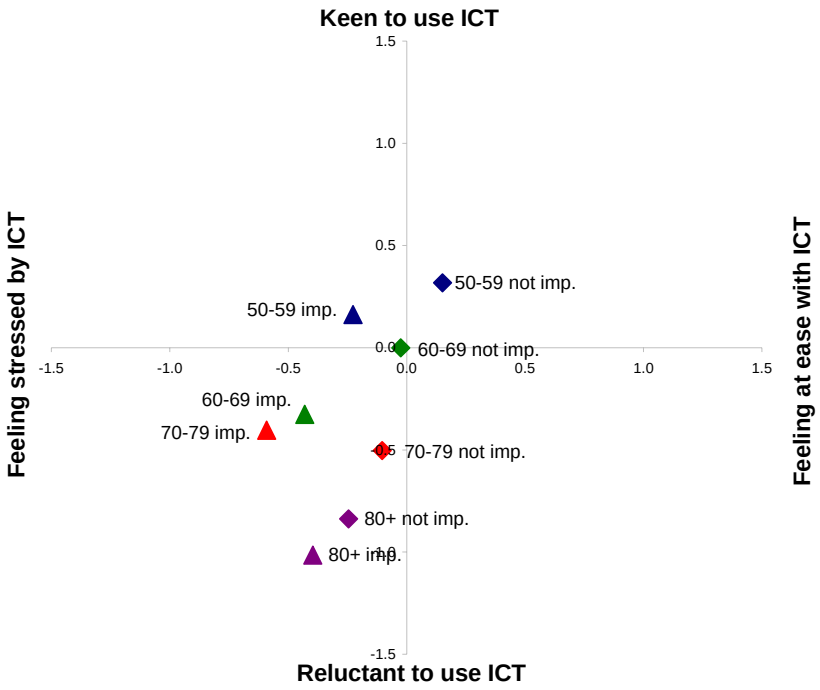
Exhibit 2-44: ICT relevant opinions by age and educational attainment (2007)



Source: SeniorWatch Surveys2007.

With regard to impairment and age, interesting observations derive from the survey data. People without any impairment of vision, hearing or hands feel significantly more at ease with ICT across the three younger age groups than their peers who have an impairment. At the same time, although varying a bit by age group, there is not (such) a clear difference in the keenness to use ICT dimension. So, **although people with impairments feel less comfortable with ICT, they are nevertheless as keen as their peers to use it**. The picture is a little different for the 80+ cohort, where one finds the lowest overall figures and an equal distance on both factors, but these groups are based on rather few cases: 151 not impaired and 58 impaired.

Exhibit 2-45: ICT relevant opinions by existence of a physical impairment and age (2007)



Source: SeniorWatch Surveys2007

Available evidence for Japan and the USA

Exhibit 2-46: EU and US: Perceived impact of ICT

	50-59	60-69	70-79	80 +	Total **EU**	50-59	60-69	70-79	80+	Total **USA**
Make my life easier	72.2	62.3	57.8	48.1	63.6	70.5	60.6	53.6	55.8	60.1
Make my life more complicated	13.3	21.4	21.9	21.4	18.6	18.6	28.9	27.3	30.7	26.4
(VOL) Both equally	10.3	11.0	9.2	10.5	10.3	7.8	6.0	7.7	4.4	6.5
Don't know/Refused	4.2	5.3	10.2	20.0	7.5	3.1	4.5	11.4	9.1	7.0

Source: EU Seniorwatch 2007 surveys, F76. USA: Pew Internet, data of Feb-Mar 2006.

Question: Thinking about ALL of the information and communication devices we've talked about…Overall, would you say these devices make your life EASIER or make your life more COMPLICATED?
Note that "all of the information and communication devices we've talked about" differs between the surveys.

In general, the numbers show that about 60% of the US and 65% of the EU-population aged 50 and older think that new technologies such as computers and mobile phones make their lives easier. The percentage of people thinking new technologies make their lives more complicated is about 9%-points higher in the USA (26,4%) than in the EU (17,6%). In age bracket 50-59 years, people seem to be much more confident using these technologies. The percentage decreases from 74 % (EU) and 71% (USA) to 50% (EU) and 56% (USA) in age bracket 80 years and older.

Exhibit 2-47: EU and US: Perceived impact of ICT on life domains

	50-59	60-69	70-79	80+	Total **EU5**	50-59	60-69	70-79	80+	Total **USA**
The way you pursue your hobbies and interests...	71.8	67.7	58.7	44.8	65.2	55.1	45.7	40.0	38.3	44.8
Your ability to learn new things...	79.3	67.2	56.7	47.4	67.4	82.5	70.5	60.9	58.8	68.2
Your ability to keep in touch with friends and family...	73.0	73.7	66.1	56.2	70.2	80.7	73.8	71.5	63.8	72.5
Your ability to share your ideas and creations with others...	62.5	56.2	50.4	38.6	55.6	54.8	48.1	44.4	34.2	45.4
Your ability to work with others in your community or in groups you belong to...	55.8	49.1	40.6	36.2	48.5	53.4	44.7	44.7	37.9	45.2

Source: EU Seniorwatch 2007 surveys, F77. USA: Pew Internet, data of Feb-Mar 2006.

USA: How much, if at all, have these communication and information devices improved…a lot and some?
EU: How much, if at all, have these communication and information technologies and devices improved...a lot and some?

Concerning the question whether new communication and information technologies and devices improved several personal or social capabilities or habits, the results of the US- and EU-survey are quite similar. In all of the five fields the tendency is that new technologies have improved abilities to a larger degree. Especially the abilities to learn new things and to keep in contact with family and friends are mentioned by 69% and 72% respectively in the two surveys. In the three other fields, more people of the European older generation utter the feeling that modern technologies improved the way they were pursuing hobbies or other interests (45% in the USA compared to 67% in the EU), the ability to share ideas and creations with others (45% in the USA to 57% in the EU and the ability to work with others in a community (45% in the USA to 51% in the EU). The quite high percentages for people over 80 show the importance of new technologies that very old people perceive, especially for learning new things and keeping contact to family and friends.

2.3.5 Multivariate analysis of socio-economic, impairment and attitudinal factors

In order to examine the independent associations between the various socio-demographic factors and the observed patterns of Internet non-usage and computer usage, a logistic regression was carried out. The results are summarised in the two tables below. Overall, the six socio-demographic factors explain a sizeable amount (45.2%) of the variance in terms of patterns of Internet non-usage.

The logistic regression of both computer use (in the last three months) and internet use accounts for the effects of age, occupation related status, educational attainment, income and the existence of any impairment and of any long term health condition.

All these variables except impairment have a significant effect on the likelihood to be a computer user while all variables except long term condition are significant for being an internet user.

When cross-correlations are controlled for, the most statistically significant divides are related first to age – with a huge effect for belonging to the youngest age group of 50-59.

This is followed by income, where the highest quartile is already twice as likely as the second highest to be computer users / internet users. Also occupation related status and educational attainment have a significant influence. Because these two variables are very much associated, the effect is also shared between them. Here, the effect of never having worked

is especially enormous as well, with "managers and professionals" being 13 times (10 times) as likely to be computer (internet users) than people who have never worked.

There is a significant effect of being treated for a long term health condition on the likelihood to be a computer user. A similar effect can be found for impairment with regard to internet use.

Exhibit 2-48: Logistic regression of computer usage

	B	S.E.	Wald	df	Sig.	Exp(B)
Age bracket (Reference: 80+)			220.8	3	.000	
50-59	3.120	.289	116.3	1	.000	22.644
60-69	2.265	.288	61.9	1	.000	9.635
70-79	1.283	.295	18.9	1	.000	3.609
Occupation related status (Reference: managers and professionals)			46.4	4	.000	
never worked	-2.559	.447	32.9	1	.000	.077
less well educated workers	-1.057	.228	21.5	1	.000	.348
skilled workers and employees	-.287	.204	2.0	1	.160	.750
well educated non-manual empl.	-.269	.219	1.5	1	.218	.764
Educational attainment (Reference: tertiary)			22.6	2	.000	
Lower secondary or less	-1.155	.243	22.6	1	.000	.315
Upper secondary	-.778	.225	12.0	1	.001	.459
Any impairment (binary)	.046	.072	.4	1	.522	1.047
Any long term condition (binary)	-.264	.114	5.4	1	.020	.768
Income (reference: ++)			147.7	3	.000	
--	-2.098	.179	137.4	1	.000	.123
-	-1.218	.153	63.6	1	.000	.296
+	-.772	.162	22.8	1	.000	.462
Constant	.236	.344	.47	1	.491	1.267

Dependent variable: Having used a computer in three months prior to survey.
-2 Log likelihood = 2304.4 Cox & Snell R Square =0.336 Nagelkerke R Square=0.452

Source: SeniorWatch Surveys2007

Exhibit 2-49: Logistic regression of internet usage

	B	S.E.	Wald	df	Sig.	Exp(B)
Age bracket (Reference: 80+)			188.571	3	.000	
50-59	2.724	.303	80.700	1	.000	15.236
60-69	1.979	.304	42.477	1	.000	7.237
70-79	.793	.317	6.267	1	.012	2.210
Occupation related status (Reference: managers and professionals)			34.916	4	.000	
never worked	-2.306	.471	23.972	1	.000	.100
less well educated workers	-1.001	.229	19.044	1	.000	.367
skilled workers and employees	-.331	.203	2.667	1	.102	.718
well educated non-manual empl.	-.423	.212	3.968	1	.046	.655
Educational attainment (Reference: tertiary)			30.615	2	.000	
Lower secondary or less	-1.288	.239	29.107	1	.000	.276
Upper secondary	-.981	.219	19.967	1	.000	.375
Any impairment (binary)	-.230	.080	8.287	1	.004	.795
Any long term condition (binary)	-.129	.115	1.258	1	.262	.879
Income (reference: ++)			153.487	3	.000	
--	-1.988	.179	122.788	1	.000	.137
-	-1.411	.148	90.430	1	.000	.244
+	-.690	.154	20.097	1	.000	.502
Constant	.280	.350	.637	1	.425	1.323
Dependent variable: Having used the internet in three months prior to survey.						
-2 Log likelihood =2206.8 Cox & Snell R Square =0.319 Nagelkerke R Square=0.439						

Source: SeniorWatch Surveys2007

2.3.6 Skills

Another cause for ICT usage and/or lack of interest, but also a logical outcome of it, is missing skills in how to access and use the Internet and the access device, which today still means a personal computer in the large majority of cases. As the first SeniorWatch study has shown, many older people appear to lack the necessary skills to fully utilise products and services, which they may in principle be interested in. For instance, about one half of those 50+ who reported to have hands-on experience with a computer said that they possessed merely rudimentary computing skills, which dropped to 45% in 2007, and 10% even said that they 'virtually do not have a clue'[32] - by 2007 this figure has changed a little, with now 4% of users saying that.

Among those who are users, there is a considerable share of at least advanced users among all age groups, more than one third among the 80+ still. However, as they are the minority among their peers, the figure corresponds to less than 5% of the 80+ age bracket if the non-users are included.

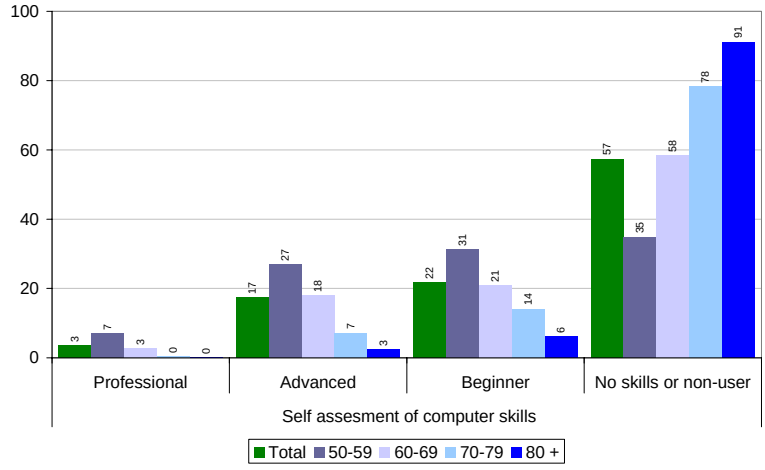
[32] SENIORWATCH (2002): Older People and the Information Society. Deliverable 5.1.

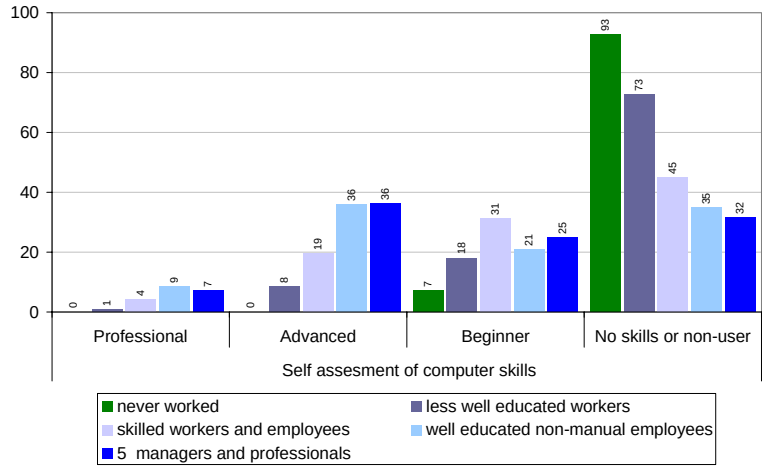
Exhibit 2-50: Self assessment of computer skills by age

	50-59		60-69		70-79		80 +	
	Computer users	All	Computer users	All	Computer users	All	Computer users	All
Professional	10.1	7.0	6.3	2.8	1.5	0.3	0	0
Advanced	39.3	27.0	41.2	18.0	31.4	7.2	26.3	2.3
Beginner	45.4	31.2	47.8	20.9	61.3	14.0	68.4	6.1
"Virtually don't have a clue"	4.0	2.7	3.5	1.5	4.4	1.0	5.3	0.5
non-users		32.1		56.8		77.5		91,1

Source: SeniorWatch Surveys2007. F59: (A4) How knowledgeable are you about computers? Would you say you are a professional user, an advanced user or a beginner - or would you say that you virtually don't have a clue? Base: computer users (left hand columns) and total population (right hand columns). DK/refusal excluded.

Exhibit 2-51: Self assessment of computer skills by age / and occupation related status (2007)





Source: SeniorWatch Surveys2007

Similarly, the figures below present the more recent results of the EUSER investigation into self-assessed skills in using Internet and computers. Note that what is assessed here is not

necessarily the degree of skills, but rather the confidence of users (and non-users) in their skills.

This difference is important because it can be hypothesized that for feeling happy with using the Internet as an alternative to more established channels to receive public services (in EUSER: government/public administration services, lifelong learning and health services), people must feel confident in using computer tools and the Internet. Confidence here means that they must feel to be in control of things and that they feel able to achieve online what they expect to achieve. The data show that among all adults with Internet user experience (however fleeting) about 58% are very confident about their skills in using search engines. This share decreases with age. Still, only 12.5% of Internet users aged 65 or older feel not confident in using a search engine.

Exhibit 2-52: Confidence in skills to use search engine, by age group

Age	not at all confident ⟷ very confident					dk	Ø	Base as share of total pop.
	1	2	3	4	5			
18 – 24 years	2.3	2.2	5.8	18.8	70.8	0.1	4.54	95.1
25 – 49 years	4.3	3.0	10.8	21.3	60.3	0.3	4.31	83.5
50 – 64 years	7.3	5.9	14.9	22.6	48.7	0.6	4.00	57.2
65+ years	7.9	4.6	15.1	28.6	38.0	5.8	3.89	26.1
Total population	4.9	3.6	11.2	21.7	57.9	0.7	4.25	68.1

Source: eUser 2005, EU6. Base: Respondents who have at least once used the Internet

Exhibit 2-53: Confidence in skills to use e-mail, by age group

Age	not at all confident ⟷ very confident					dk	Ø	Base as share of total pop.
	1	2	3	4	5			
18 – 24 years	3.5	2.4	6.3	16.0	71.6	0.2	4.50	95.1
25 – 49 years	5.5	3.5	8.0	14.7	67.5	0.7	4.36	83.5
50 – 64 years	4.9	3.3	15.8	19.3	55.7	1.0	4.19	57.2
65+ years	8.1	4.8	10.3	18.2	53.2	5.4	4.10	26.1
Total population	5.3	3.4	9.5	16.1	64.7	1.0	4.33	68.1

Source: eUser 2005, EU6. Base: All who have at least once used the Internet

Exhibit 2-54: Confidence in skills to deal with computer problems, by age group

Age	not at all confident ⟷ very confident					dk	Ø	Base as share of total pop.
	1	2	3	4	5			
18 – 24 years	18.8	18.2	32.9	18.1	12.0		2.86	95.1
25 – 49 years	26.2	19.8	27.6	14.0	11.2	1.1	2.64	83.5
50 – 64 years	39.0	16.1	23.0	12.0	8.1	1.8	2.33	57.2
65+ years	38.5	19.8	23.1	8.0	6.0	4.6	2.20	26.1
Total population	28.6	18.8	27.1	13.8	10.3	1.3	2.58	68.1

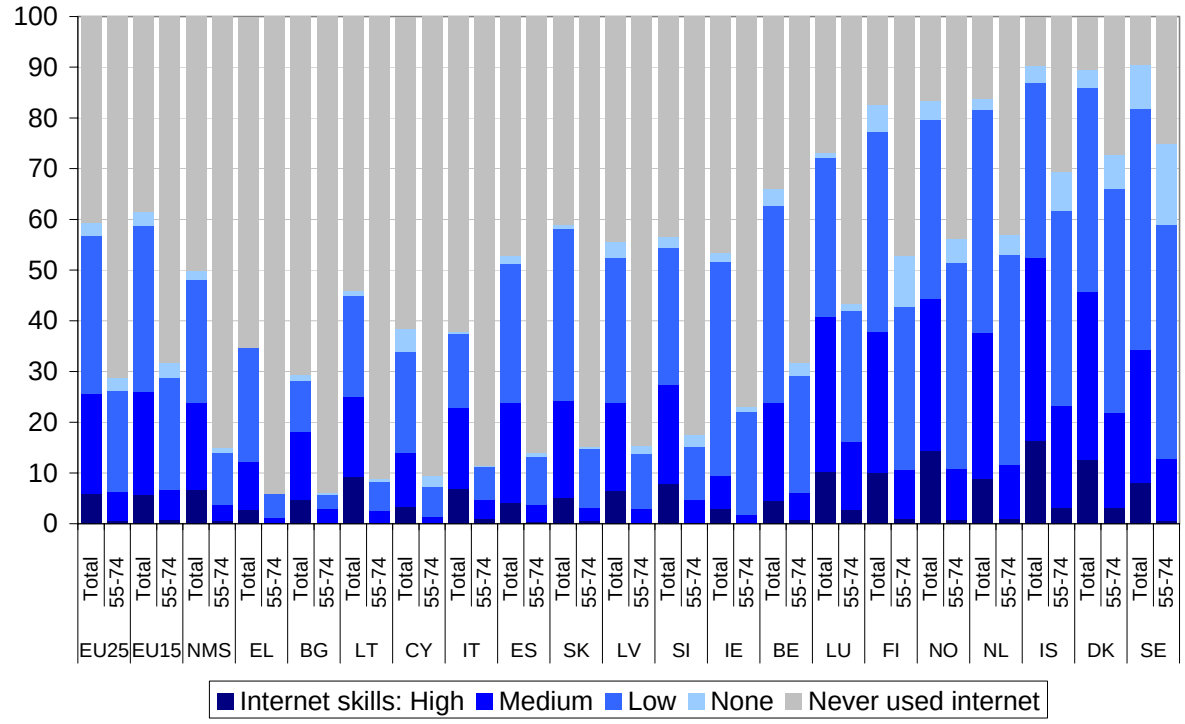
Source: eUser 2005, EU6. Base: All who have at least once used the Internet.

As regards confidence in using e-mail (cf. above) a similar pattern emerges. However, more of the older age group feels very confident in this case. This underlines the character of online mail as a “killer application” for all age cohorts. More critical is the situation with regard

to skills in dealing with computer problems (cf. above). In the age groups 50-64 and 65 or older, the majority feel not confident in dealing with technical computer problems. While this is an important issue for younger persons as well, older Internet users are much more likely to be influenced in their decisions about online activities by their lack of confidence in mastering the technology they have to use for this purpose.

When looking at further data on e-skills broken down by country it can be seen that there are huge differences (cf. below, Eurostat data): while in Denmark and Iceland more than 20 percent of the 55-74 year old population have advanced (i.e. medium to high) internet skills, in the majority of countries this value does not exceed five percent.

Exhibit 2-55: Internet skills and user usage experience of older Europeans (55-74) compared to population average by Member State (2006)



Source: Eurostat database retrieval (only those countries providing complete information)

2.3.7 Affordability - funding and other supports

The data suggests that costs and/or cost-sensitivities appear to be important factors influencing whether older people have access to a home computer and a connection to the Internet, and also in the extent to which they use the Internet. This section looks briefly at funding and related market support approaches as they arise in relation to markets amongst older people for ICT used in everyday life. Here the focus is on measures to:

- promote take-up and/or ensure access to and affordability of mainstream ICT products and services

- public services / funding for assistive technologies that facilitate accessibility/usability of mainstream ICT products and services.

Mainstream ICT products and services

There are various approaches that, directly or indirectly, can help older people to access and afford ICT and usage of the Internet.

Telecommunications: Universal service and related mechanisms

The EU Universal Service Directive[33] enables national regulators to introduce measures that help to make access to basic telephone services affordable to low income and special needs groups, including people with disabilities. Most Member States now have schemes in place under their national universal service regulations that provide some degree of cost subsidy for vulnerable groups. The subsidies may take various forms and may be paid for in different ways, including various mixes of universal service funds operated by telecoms providers and financial subsidy from government. Apart from provisions within the universal service context, many Member States also have provisions through social protection schemes that provide support for telephone costs for low income people and households. These now extend to mobile phone costs for at-risk individuals in some countries.

An issue that has been on the agenda in the universal service debate for a number of years has been whether the scope of such provisions should be extended from basic telephony services to mobile services and, indeed, to Internet access. This is an issue that has been examined in various studies in the 1990s and the argument has been put forward that if access to services that can be considered to be "public goods" (e.g. health services) is increasingly dependent on Internet access then Internet access should fall within the scope of the universal service concept.[34]

In the particular case of access to online health information and services a study for the European Commission in 1999/2000 concluded that any need for extension of universal service obligations in a manner that would facilitate the affordability of online access to health services for citizens would depend on the extent to which such services become a normative and central feature of health activity of citizens[35]. The study recommended that this issue be kept under review as the Information Society evolves in Europe. The latest evidence suggests that the Internet is now coming to play an increasingly central role in the public's health management in Europe and that enduring income-related digital divides now pose a risk of contributing to wider health divides[36]. Against this background it seems timely that the issue of financial support for access to the Internet be revisited and re-examined.

[33] Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services. ("Universal Service Directive")

[34] Study on the re-examination of the scope of universal service in the telecommunications sector of the European Union, in the context of the 1999 Review. Scanlan, Mark and Neu, Werner. Study for the European Commission, DG Information Society, Final Report, Bad Honnef, April 2000

[35] Study on the use of advanced telecommunications services by health care establishments and possible implications for telecommunications regulatory policy of the European Union. empirica / Work Research Centre: Bonn/Dublin, Oct. 2000; http://ec.europa.eu/ISPO/infosoc/telecompolicy/en/Study-en.htm.

[36] eUSER project, 2005 http://www.euser-eu.org/eUSER_PopulationSurveyStatistics.asp?MenuID=73

PC / Internet access & affordability

Some Member States, sectoral interests and ICT suppliers have implemented financial approaches to help overcome cost barriers to access to ICT and the Internet[37]. These have included discounted prices, direct subsidies, financial incentives to taxpayers and financial incentives to employers. However, many of these measures are, by their nature, not very relevant for older people who are not in employment or for whom tax relief may not be relevant.

Another relevant approach is through the provision of Public Internet Access Points (PIAPs). Driven in part by the eEurope initiative, most Member States (particularly the New Member States) have implemented significant initiatives as regards the installation of PIAPs, although there are relatively few examples of initiatives targeted specifically towards older people. In addition, the evidence suggests that older people are a lot less likely to use PIAPs than younger people so other types of interventions are also important. In addition, although Public Access Points can play an important role, the real convenience benefits of the Internet especially derive from personal access at home, particularly for those who do not have workplace access.

Exhibit 2-56: Examples of funding for PC/Internet costs or access (various countries)

Belgium
- Allowance to help purchase ICT and Internet access for NAPs target groups (includes older people as a mentioned group)
- Seniornet Vlaanderen agreement with Internet service providers to offer subsidy to Seniornet members for Internet subscription.

Spain
- Special microloans for citizens to help buy ICT equipment (ICO/Mityc)

Italy
- Vouchers (200 euro) to subsidise PC costs for low income families

United Kingdom / Sweden
- Workplace-based schemes to promote / financially support acquisition of home computers

Denmark / Finland / Switzerland
- Drop-in IT centres / Internet cafes specifically for elderly

Source for the above countries:

empirica, Work Research Centre & University of Bath (2005). Thematic Study to Analyse Policy Measures to Promote Access to Information Technologies as a Means of Combating Social Exclusion. http://ec.europa.eu/employment_social/social_inclusion/docs/2006/ict_en.pdf

US
- Seniornet discount arrangements with ICT suppliers
  Source: http://www.seniornet.org/php/default.php?PageID=7924

[37] empirica, Work Research Centre & University of Bath (2005). Thematic Study to Analyse Policy Measures to Promote Access to Information Technologies as a Means of Combating Social Exclusion. http://ec.europa.eu/employment_social/social_inclusion/docs/2006/ict_en.pdf

Digital TV

Finally, some countries have also given attention to supporting older people and/or other groups, financially and in other ways, to deal with the challenges posed by the roll-out of digital TV.

Exhibit 2-57: Funding / support for digital TV (various countries)

UK

Digital UK's Help Scheme: Aims to ensure that everyone can benefit from the digital switchover in the UK - those aged 75 years and older are eligible (also others on various disability benefits). Provides practical support to help people select, install and use digital TV equipment. Where necessary this may include the provision of a set top aerial or a rooftop aerial upgrade. A subsidised charge of £40 is made, although those on very low incomes are provided with the service for free. Help is given to convert one TV set and there is also a choice of equipment for those who may require features such as audio description.

Source: http://www.digitaluk.co.uk/en/how/help-scheme.html

US

All US households are eligible to request up to two $40 coupons to be used towards the purchase of up to two digital-to-analogue converter boxes that will enable them to continue receiving free, over-the-air television when full-power television stations cease analogue broadcasting in 2009.

Source: http://www.ntia.doc.gov/ntiahome/frnotices/2007/DTVFinalRule_part301.htm

Assistive technology / eAccessibility solutions

Funding / affordability issues also arise in relation to the costs of assistive technology to support usage of everyday ICT. Two types of products have relevance: those that can be used as add-ons to enable a mainstream product to be used (e.g. screen reader software for a PC) and products that provide an alternative way of doing things (e.g. text telephones for people with hearing or speech impairments who cannot use voice telephony, and text telephone relay services to enable text telephone users to communicate with voice telephone users).

In general, public or other funding schemes to help with the end-user costs of these types of products and services tend to be oriented towards people with disabilities (many of whom are older people) as oppose to older people, per se.

Assistive technology services

Most European countries have some level of publicly funded assistive technology services. However, the evidence indicates wide variability in levels of public support / service across Europe in terms of the contexts that are covered (employment, education, everyday life), the assistive technologies covered (especially in the extent to which accessible / assistive ICT are covered), the eligibility criteria that are applied, and so on[38]. Exhibit2-57 presents some

[38] DG Employment and Social Affairs (2003) Access to Assistive Technology in the European Union; also, the earlier HEART study, available at http://www.hi.se/templates/Page____821.aspx.; MeAC study (2007) http://ec.europa.eu/information_society/activities/einclusion/docs/meac_study/meac_report_06_11_final.pdf

examples of the more developed types of services from the point of view of accessibility of ICT for everyday use.

Exhibit 2-58: Public funding for assistive technologies

Denmark

Municipalities are responsible for providing grants for assistive devices and consumer goods for people with long-term physical or mental disabilities where it could relieve the long-term effects to a great extent, facilitate day-to-day home life to a great extent, or is necessary to allow the person to do a job. The scope includes special IT-based assistive devices and assistive devices to support these. The regional authority will grant support for special IT aids and IT-based aids (Act on Social Services, section 112(2), no. 4.) etc. (e.g. magnifying programs, screen readers, point displays and synthetic speech).

No grants are provided for general equipment (e.g. TVs); 50% grants are available for consumer products that are of special value to disabled people (e.g. computers for people unable to talk)

Finland

Disabled people receive reimbursement (complete or partial) from the municipalities (Act on service and support due to disability, 380/1987); by using the services and assistance for the disabled act the social welfare offices can pay for the re-adaptation of dwellings and acquire new dwelling equipment and devices (like telephone, text telephone, etc.). Reasonable costs are totally reimbursed. In addition, the Act makes it possible to reimburse half of the costs for devices that facilitate coping with daily routines as well as devices for hobby or leisure time use.

Sweden

Health and Medical Services Act (Hälso och sjukvårdslagen) SFS 1982:763 obliges county councils and municipalities to provide people with disabilities with assistive technologies. They decide their own rules and charges, so the situation may vary across the country. In general, access to Assistive Technology (including ICT-related) is good and typically is reimbursed.

Source for this exhibit:

http://www.nsh.se/download/Provision_Assistive_Technology.pdf

Sector-related provisions

In addition, some countries make specific provisions within relevant sectors, such as telecommunications and TV. There are also examples of private sector initiatives in some of these areas. Exhibit 2-58 presents some examples.

Exhibit 2-59: Sector-related Measures for Assistive Technologies / eAccessibility solutions

Telecommunications

Denmark

Under the universal service obligations, the designated universal service operator must provide a PC-based text telephone service for deaf persons, persons with acquired deafness, deaf-blind persons as well as groups of persons with impaired speech or hearing. As part of the text telephone service, Internet access is to be offered, and the communication centre of the text telephone service is to be open 24 hours.

In relation to the text telephone service, the USO terms stipulate that the designated operator shall make terminal equipment for the service available to entitled end-users. The operator is also responsible for repair and replacement of the terminal equipment. In addition, relatives of entitled end-users and other interested persons may purchase a special text telephone program and modem for their own PC from the operator to obtain access to the text telephone service.

Australia

Under the telecommunications regulations, the designated operator ensures equivalent pricing for accessibility-related services so that, for example, someone needing a text telephone does not pay more than someone would for a standard rental telephone.

Cyprus

A mobile operator has introduced a free ‘talking phone’ service for visually impaired mobile users that lets them listen to a range of text-only functions. The ‘Speaking Phone’ service is free to all registered members of the Pancyprian Organisation for the Blind who are subscribers to the mobile operator.

TV

The Netherlands

The 'komfox' device has been developed which converts subtitles into a synthetic voice and will make television far more accessible for the blind. The supply of the 'komfox' device falls under new broadcasting legislation (based on Media besluit, nr. 06.002565. 19-9-2006) and the device is offered to people with disabilities through funding.

Source for this exhibit: MeAC study (2007)
http://ec.europa.eu/information_society/activities/einclusion/docs/meac_study/meac_report_06_11_final.pdf

2.4 Summary and main conclusions for policy

The 'age divide' has only slightly narrowed during the last six years. Available statistics indicate a slight narrowing of the age divide in the virtual space. For instance data available from Eurostat suggest that internet use among the 65-74 population increased by 11%-points since 2002. A closer look at different age cohorts reveals that this has been due to

- a positive (carried over) cohort effect (users starting early grow older)
- a negative drop-out effect (some users tend to stop using as they get older)
- a positive market diffusion effect (still dynamic propensity of anybody to adopt ICT, people become new users even in old age)

With regard to mobile telephony, we see a completely different picture. Mobile telephony has rapidly spread through all parts of the population and with a decreasing age divide the market saturation even in older age groups is looming. Usage patterns of mobile telephony seem similar to those of younger age groups, unlike the results of Seniorwatch 1 in 2001, when the mobile phone was viewed as a security device among the target group.

Other ICT, especially everyday consumer electronics, are widespread among the older population today as well.

With regard to computers and the internet, usage has increased but at the same time other age groups are also changing, so the relative overall changes amongst the older age group results in a more or less stable (first order) age divide. There a very little signs that the speed of uptake among the older population will not continue to be as slow as it has been in the past decade. If it remains like this, the first order age divide will only very slowly reduce and remain a significant characteristic of the European Information Society over the foreseeable future.

In parallel to the alarming first order divide (the divide between users and non-users, to put it short), we see a severe second order digital divide (between users) with regard to especially user skills. While some improvement has been found with regard to the number of ICT users in older age, these users remain unconfident about what they can achieve, while the savvy users strongly concentrate in the younger age cohorts. This lack of trust in their own efficacy will hamper older users to use ICT to its full potential.

While there is an age divide between older and younger Europeans, what we see within the age group of European 50+ citizens today is quite probably more heterogeneous than ever before. What can be observed is a nearly polarised situation: 57% have computer access at home, and 43% have not; 47% have internet home access, and 53% have not. So the digital divide does not only separate generations but also users and non-users within the older generations.

Of special concerns should be that the group of non-users who are also not interested in using ICT at all has hardly decreased since 2001. The so-called "digitally challenged" population still account for more than a quarter of the older population. So while the users have slowly turned to more variegated and somewhat more sophisticated uses of ICT, a good part of non-users remains strictly averse and falls behind more and more.

On the user side of the digital divide, we see encouraging signs with regard to the dynamics of the use of online public services and the uptake of broadband among older age users. Usage patterns of older people are solidifying. Analysing the purposes of internet use, one finds more extensive usage patterns than compared to 2001. Those who use the internet today use it for a huge array of everyday life aspects. Also broadband is much wider spread today while it was practically non-existent among the older population in 2001.

Socio-economic stratification keeps playing a major role. ICT use in the older generation is quite strongly determined by socio-economic factors, so that the digital divide not only exists between the younger and older cohorts but there is also a vast digital divide among the older population. Examples: 16% of people with lower education use computers on a daily basis, while 62% of people with tertiary education do. In the lowest income quartiles, 15% have ever used the internet – 75% in the highest quartiles. Among these, the chance to become frequent user is also much higher in the higher income groups.

The multivariate analysis of factors influencing computer use and internet use reveal significant effects of age, occupation related status, educational attainment, income and the existence of any impairment and of any long term health condition. The highest influence comes from age, with 50-59 year olds being up to 22 times more likely to be users than 80+ year olds, after controlling for the effects of the other variables. Another strong effect comes from work related experience, with "managers and professionals" being up to 13 times as likely to be users than those who have never been in employment.

Apart from the socio-economic factors there is a significant correlation between impairments and usage, as the statistical analysis has shown. It should be taken note of that at the same time disabled user share an equally broad and varied interest in content.

Beyond the statistical analysis based on the large number of all survey respondents, it is instructive to look especially at the sub-groups of people with severe impairments of vision, hearing or dexterity and to look into how they cope with ICT and the barriers posed by technologies that are not conforming to their special user needs.

A good example is hearing aid users. We find that half of all hearing aid users are regularly experiencing interferences when using a telephone. At the same time many state not to know that models that reduce interference problems are available at all (24.6%) or where to get one (6.8%). Given the fact that a relatively high proportion of hearing aid users who experience interference problems are not even aware of potentially available technical solutions that would enable them to better cope with their accessibility problem, it may not come as a surprise that almost one-third (31.2%) report not to use their mobile phone much.

The other exemplary group concerns visually impaired users who may face problems in using computing devices in several regards. We find that computer users with severe visual limitations only partly use any assistive technology – with a majority of 73% not using any at all. Again, a number of barriers to the wider utilisation of such technologies do exist, including for instance again lacking knowledge of what would be available on the market and the fact that existing products do not necessarily seem to meet actual user needs.

While people with severe usage problems seem to know too little of assistive devices, a problem people with more slight visual problems see is that they often do not know how to use standard features that could make usage more comfortable, such as zooming features or font sizes.

As regards people with dexterity problems it becomes apparent that ICT drop-outs in the older age range are found to be strongly overrepresented among those with hand impairments.

The finding that hearing aid users are poorly informed seems rather surprising when considering the fact that the telephone handset market can be considered to be a relatively mature one, with a range of accessible solutions that have in principle become available, including models which are hearing aid compatible

Both the examples of visually and hearing impaired users point into the direction of lacking market transparency when it comes to the availability of telephone hand sets that accommodate the specific needs of hearing aid users or the availability of visual assistive technologies, an assessment which also supports the outcomes of the recent MeAC study.

Although costs can be an important inhibitor of ICT take up and usage for older people, there appear to be relatively few examples of financial support schemes targeted towards the older age group, per se. Costs and (lack of) funding availability also seem to be important inhibitors to the wider use of assistive technology solutions by older computer users. Existing public services in this field are in the main targeted towards people with disabilities. In addition, the available evidence indicates wide variability in levels of public support across Europe in terms of the contexts that are covered (employment, education, everyday life), the assistive technologies covered (especially in the extent to which accessible / assistive ICT are covered), the eligibility criteria that are applied, and so on.

2.4.1 Main conclusions for policy

Issues to be tackled by policy, industry and research include:

Reducing the 'first order' age-divide

Despite slightly increasing adoption rates of online media among older Europeans, the data indicate a persisting and substantial age-related access and usage divide in the virtual space. The gap widens with increasing age, per se, but there are also major divides amongst the older age groups linked to socio-economic status and prevalence of age-related impairments. The persistence of these divides reinforces the need for further efforts to develop both demand side and supply side measures, as has been recognised in the Commission's 2007 Action Plan on Information and Communication Technologies and Ageing. The findings of this study provide pointers to some key priority issues and types of approach that seem to merit particular attention.

Reaching the 'digitally challenged'

In relation to the demand side, a key finding is that attention needs to be given to the development of measures that indeed reach those who are least likely to become engaged in ICT, the so called "digitally challenged" who's share has remained more or less stable since the first SeniorWatch survey in 2002. Measures that may have worked well in reaching the "technologically open minded" during the early days of Internet uptake in many Member States (e.g. public access points, awareness raising campaigns) seem to have remained largely ineffective in relation to the former group.

Preventing 'drop-out'

Focused attention needs to be given not only to those who have never been online but also to those who have stopped engaging in online activities. It seems that a considerable number of older people who have once used ICT (for example at work) have since stopped using them. Special attention may need to be given to transitional stages, such as retirement, where efforts could be made by the various stakeholders (public policy, employers, active retirement organisations, ICT industry) to encourage and support maintenance of ICT usage. In this regard, our data indicate for instance that the share of "drop outs" is particularly high among those who have no home access (32%) while "drop out" rates among older users living in broadband households (4%) is considerably lower (arguably both might be cause or effect). Also, prevalence of functional restrictions (in particular dexterity problems) and –

perhaps not surprisingly against this background – older age seem to have a comparatively strong impact on "drop out" rates.

Better industry response

As regards the supply side, our data confirm that there is still a lack of adequate market response to the ICT-related needs of the ageing population – in 2007 an even larger share of older people felt that their design-related needs were not being adequately considered by industry when compared with the 2002 survey. This outcome reinforces the need for dedicated efforts directed towards stimulating mainstream ICT industry to recognise and better address the economic opportunities potentially provided by the global trend towards population ageing.

eAccessibility – more solutions are needed and more take-up of existing solutions

As shown, for example, in the access barriers faced by hearing aid users and those who rely upon assistive technology when using a computer, e-accessibility and design-for-all issues need to receive reinforced attention in relation both to better mainstreaming of solutions that are in principle available today and developing new solutions as technology further progresses.

On the demand side, the data show that there is a lack of transparency for consumers and users in relation eAccessibility solutions (in terms of both dedicated assistive technology and accessibility features embedded within mainstream products) – many users are not aware of existing solutions or do not know where to find them. In addition, the issue of affordability poses barriers that need to be tackled. Today's national assistive technology schemes seem generally to be less well geared towards older users as opposed to those who are formally recognised as 'disabled' and a widening of the focus of these schemes would be very beneficial for older users. Consideration also needs to be given to addressing affordability of online access in the framework of Universal Service regulation and by means of other measures targeting older people in particular as they have for instance emerged in some Member Sates (e.g. micro loans for purchasing equipment, direct or indirect subsidies of online costs, tax incentives and the like).

Reducing the 'second-order' age divide

The data also show an emerging "second order age-divide" (i.e. usage disparities between older and younger users and between older users from different social backgrounds). Older users tend to feel less confident with ICT and are less able to fully exploit the potential for their own purposes (e.g. in terms of using internet-based health services, government/public administration services, life-long learning services, digital broadcasting services and the like). According to our analysis, particularly the less educated sections of the elderly population and those who have functional impairments seem to be less au fait with the actual usage of online media, although they may have access in principle. Again, consideration needs to be given to interventional measures addressing both the supply side (e.g. provision of plug-and-play solutions that are intuitively usable by a diverse range of users) and the demand side (e.g. capacity building specifically geared towards the needs and circumstances of relevant sub-categories of older users and non-users). Strong national disparities observed with respect to skills levels processed by older user seem to indicate that such measure can work well, at least in principle.

Better measurement and monitoring

The development of a more differentiated measurement and monitoring approach would merit attention with a view to facilitating a better response to the current situation by policy and by market actors. Clearly, the persisting access divide and 'second order' divides in the virtual space are connected with patterns of socio-economic stratification and the prevalence of functional restrictions among older people. Against this background, consideration should be given to developing and implementing a more differentiated monitoring approach that would enable gathering of robust data on relevant subsections of the overall 50+ population (e.g. low education, different types of functional restriction) and in relation to an increasing variety of ICT, through the development of suitable sampling approaches and indicators respectively.

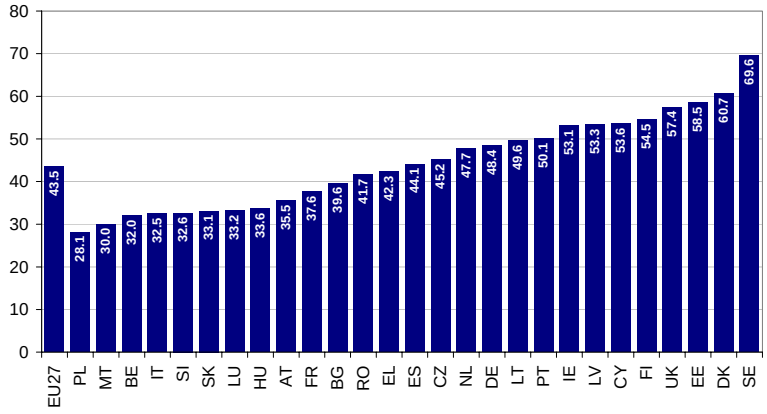
Specific attention should be given to the monitoring of user needs of older people with functional restrictions, their awareness barriers and accomplishments. The current study had a broad scope and thus addressed these issues mainly in an exploratory manner and only in relation to selected e-accessibility / design-for-all challenges. A follow-up dedicated exercise to develop and implement a more comprehensive set of indicators to benchmark and monitor eAccessibility issues amongst older people would be very valuable.

3 ICT for work

3.1 Trends and drivers in the ICT-for-work market

This section deals with the developments in the second sub-market, i.e. the one for ICT products and services that can be used in the context of work and employment for older people. Overall, workers aged 50 years and older now comprise just a little under one-quarter of the EU workforce and projections based on population trends for the EU 15 suggest that the share of older workers may increase to almost one-third by 2021[39]. Older workers are therefore an increasingly important group whose needs must be given consideration within the workplace, including issues arising in the context of ICT-related technological change.

Exhibit 3-1: Employment rate of older workers (55-64), 2006



Source: Eurostat New Cronos. Provisional data for France and EU27.

Policies to keep workers in working life longer in their lives have moved higher on the political agenda in recent years. There is now widespread agreement that the economic and fiscal challenges of demographic ageing will only be overcome if the practice of early retirement, widespread across Europe until recently, is given up. For those who retire early, European pension systems are said to be very unlikely to pay sufficient pensions in the future. Further to this, many older people have been forced to retire prematurely in recent years, lead by policy incentives that are now recognised to be economically and fiscally dysfunctional.

At the business level, older workers hold a large amount of valuable knowledge that is lost with their retirement and that could be retained if alternative forms of, for instance, part time working were in place. Although a distinction has to be made as to existing physical wear out symptoms especially in physically demanding labour, many older people in fact wish to continue working longer than institutional incentives today induce them to.

Obstacles to working up until or longer than a determined age threshold often include employers' reservations or stereotypes, changing skill requirements, and lack of opportunities

[39] Source: EU LABOUR FORCE SURVEY for 2001.

for part-time work. Seniority rules of pay are also significantly contributing to the problem of older workers' unemployment. Also, older laid off workers face severe difficulties finding new jobs as well as to start self-employment.

For the individual worker, challenges to keep on working are manifold. Working life and the requirements of the labour markets have been and will very probably continue to be constantly changing and consequently demand of the ageing workforce to adapt to these requirements. These changes include the organisation of work, changing skills requirements and importance of life long learning.

Many older unemployed and older workers on the verge of retiring today are from the post-war generations that have not been able to benefit from the educational expansions in many western European countries in the 1960s and 1970s. As a result, there are significantly less workers with college education, many have enjoyed lower secondary education only, and many have worked in blue collar (even if promoted to white collar jobs later on) work circumstances, including little opportunities for life-long learning.

These difficulties and institutional settings find their expression in partly very low labour participation rates of older people. These are particularly found in continental Europe: While in Sweden more than 66% of the population aged 55-64 are still working, Austria, Italy, Poland and Slovenia represent the other end of the spectrum, with rates each below 30%.

In sum, the key features of current and future demographic change include:

- ageing of the workforce,
- encouragement of increased employment rates for older workers,
- discouragement of early retirement.

In terms of technologies used in this context, there is a close proximity to the two other areas of ICT observed here (mainstream ICT and independent living ICT). In particular, solutions used include:

Mainstream ICT-related tools: One dimension to technological change concerns changes in the basic tools that are used to perform work. There are many different technologies, services and applications of relevance in this regard, with variations depending on sector, occupation and so on. They include the computers, computerised applications and systems, and Internet-based applications and services that are becoming a ubiquitous feature of office-based work; the computerised tools and process control technologies that are increasingly utilised in manufacturing; and the various hand-held devices that are becoming commonplace in many other service areas. These tools share some commonalties in the types of interface (visual displays and input devices) and associated modes of interaction (various forms of information input, finding, manipulation and output). A key issue concerns the extent to which these features match the perceptual, motor and cognitive capacities of older workers.

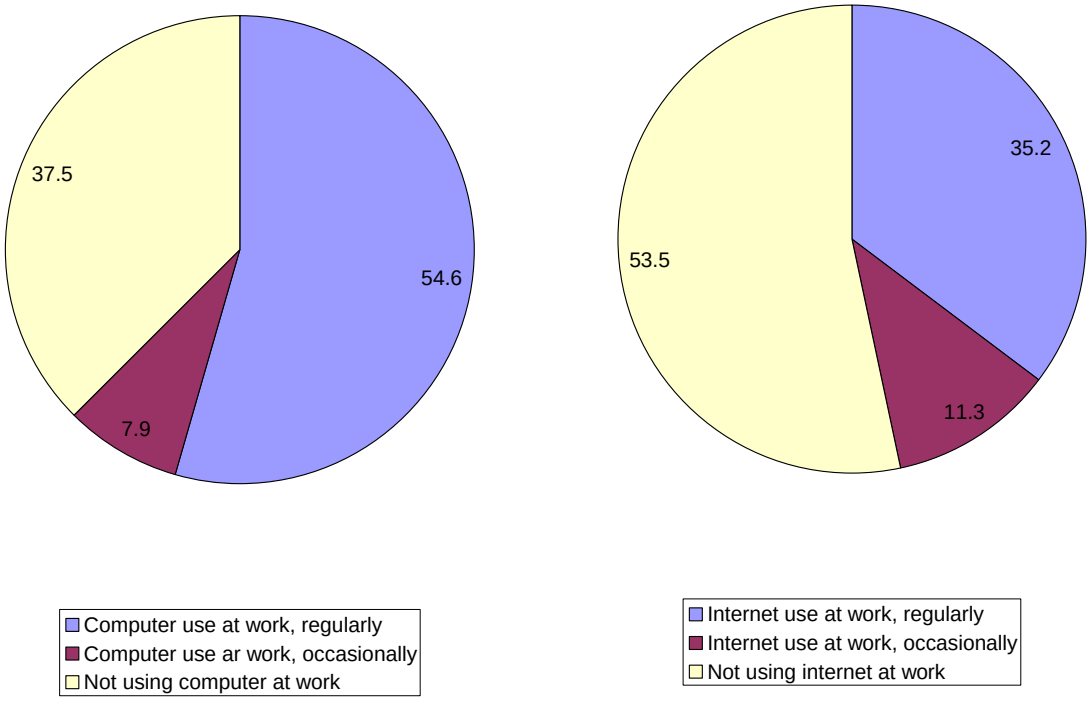
ICT-related assistive technology: Another dimension to technological change is the potential offered by ICT to support older workers in dealing with challenges that they may face in the workplace because of age-related changes in capacities and functioning. There is a large variety of such assistive technologies that have been developed for use in the workplace, in educational settings, in the home and in the wider environment. Many of these are relatively simple low-tech devices and others are based on ICT. Two somewhat different types of application of ICT-based assistive technologies are important – those aiming to make ICT more accessible and usable, and those aiming to support wider work activities. A key issue

concerns the extent to which older workers have needs for assistive technology and the extent to which these needs are being provided for in the workplace.

3.2 ICT use at work

Those who are in employment do also to a large degree use computers and the internet. 60% and 42% respectively of the older population working even use it regularly at work; another 9 and 12% respectively use it occasionally.

Exhibit 3-2: Computer use and internet use at work by population in gainful employment



	Germany	France	Italy	Poland	UK	Total EU5
Computer use at work, regularly	55.6	65.0	48.2	41.9	59.4	54.6
Computer use at work, occasionally	11.1	1.4	7.0	10.1	10.5	7.9
Internet use at work, regularly	33.3	40.0	29.8	25.6	46.1	35.2
Internet use at work, occasionally	15.6	5.0	12.2	14.7	9.8	11.3

Source: Seniorwatch 2007 surveys. F16: Do you use the internet at work? F15: Do you use a computer at work? Base: if in gainful employment currently (incl. self-employed).

Compared to 69% of today's workers in the sample, former workers (whether retired, unemployed or not working for another reason) have used computers only to a smaller extent. Among those who stopped working in the previous five years, 54% were computer users, 44% of those who stopped working another five years earlier, 30% for those in 1992-97 and 12% for those who before 1991were in gainful employment for the last time.

Exhibit 3-3: Computer use at work by last employment

	Computer use at (former) work	
Date of last employment	regularly	occasionally
1991 and before	6.7	5.5
1992-1996	16.7	6.4
1997-2001	30.4	9.3
2002-2007	37.3	10.8
Currently working	54.6	7.9

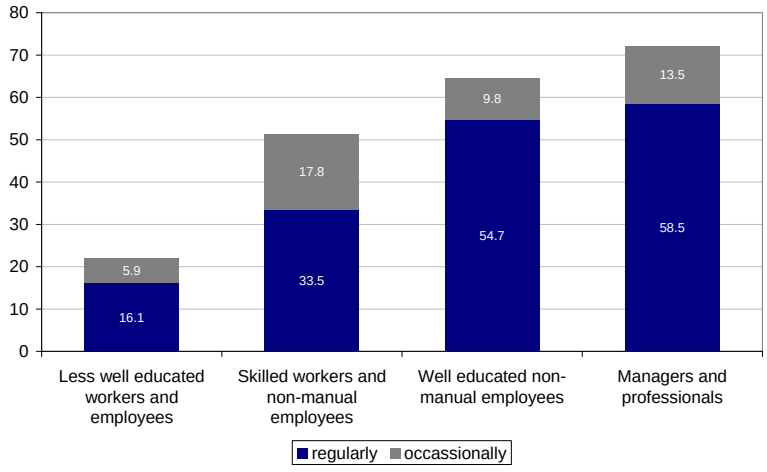
Source: Seniorwatch 2007 surveys F15: Do /Did you use a computer at work? Base: last working in period.

To put the data of today's workers into perspective, also other, older data sources suggest a tremendous increase in work use of ICT by older people. A Eurobarometer survey in 2001 found that little more than half (53%) of the workforce of all ages in the than EU 15 used ICT for their work, an increase of one fifth over 2000, with remaining significant differences across the Member States, with computer use for work in 2001 ranging from 27% in Portugal to 73% in Denmark.

In some occupational groups computer usage is becoming ubiquitous also for older workers. Seniorwatch data show that among older workers, as expected, the use of computers and the internet is more common among white collar workers than among blue collar workers. More than 80% of non-manual and managerial workers use computers at work, and clearly more than two thirds the internet.

This finding conforms to 2001 data of the European Commission, where 87% of managers and 77% of other white-collar workers used a computer in their work. This was in contrast to less than one quarter of manual workers. Computer use also varies by company size, ranging from 45% of workers in micro-enterprises to more than 70% in large companies[40].

Exhibit 3-4: Internet use at work by occupational status (2007)



Source: Seniorwatch 2007 surveys. F16: (B1) Do you use the internet at work? Base: in employment currently

[40] CEC- COMMISSION OF THE EUROPEAN COMMUNITIES (2002): Employment in Europe 2002 - Recent trends and prospects. Luxembourg.

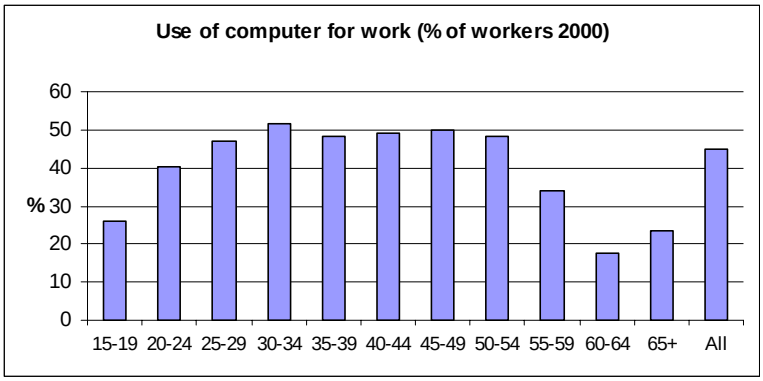
Exhibit 3-5: Computer and internet use at work by occupational status

Employment related social status	Computer use at work		Internet use at work	
	regularly	occasionally	regularly	occasionally
Less well educated workers	7.0	13.0		5.5
Manual workers and poorly educated non-manual employees	35.3	5.5	17.8	5.9
Skilled workers and employees	60.1	9.0	33.5	17.8
Well educated non-manual employees	73.8	9.6	54.7	9.8
Middle Managers	61.6	5.6	45.5	14.8
Top Managers and professionals	79.4	9.1	66.7	12.7
Total	54.2	7.8	34.8	11.3

Source: Seniorwatch 2007 surveys. F15: (B1) Do you use a computer at work? F16: (B1) Do you use the internet at work? Base: if in gainful employment currently

Compared to older data regarding age and computer usage for work, available data for 2000 suggest that computer usage was lower amongst the younger age groups and then starts to fall off again amongst workers aged 55 and over (Exhibit 3-6). When looking at the situation in 2005 (Exhibit 3-7) it can be seen that in comparison to the Eurobarometer 2000 data the situation has already considerably changed for older workers, with then about 40% of employees aged 55+ using a computer for work as compared to about 35% for ages 55-59 and about 18 for ages 60-64 in 2001 (values validated only graphically). The usage rate of older workers was however even higher than that of the youngest age group (younger than 25).

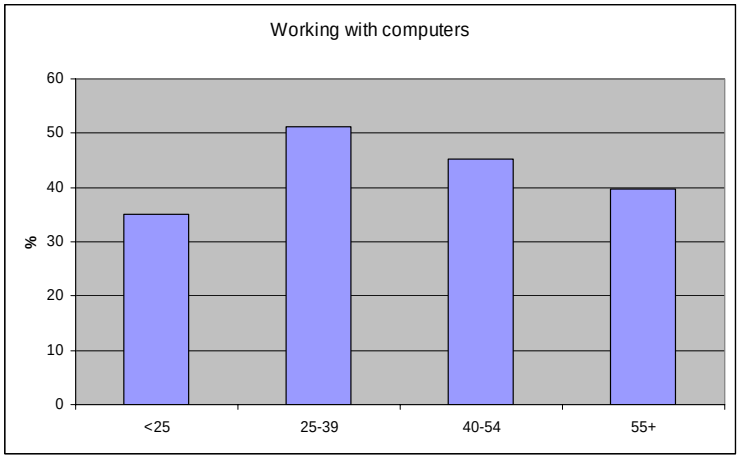
Exhibit 3-6: Use of computer for work by age (EU15, 2000)



Source: Eurobarometer 2000

Considering these data, a steep increase in computer usage of older workers is to be stated from the Seniorwatch data, with, in 2007, 60% of older workers using computers at work regularly, and 69% at least occasionally. This share is considerably higher than the respective share in EU15 in 2001 of workers of all ages.

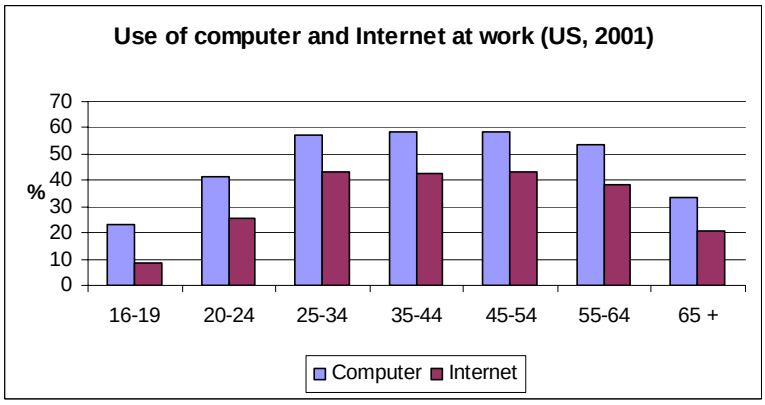
Exhibit 3-7: Employers working with computers by age-group, EU27, 2005



Source: European Foundation Working Conditions Survey 2005

As also shown below, U.S. data present a similar picture, with American older people using computers at work somewhat more frequently compared to the EU15[41] data at that time, and with the divergence between the older age and younger groups not as deep.

Exhibit 3-8: Use of computers and the Internet at work (U.S., 2001)



Source: BLS 2002

[41] BLS- US DEPARTMENT OF LABOR- BUREAU OF LABOR STATISTICS (2002): Computer and internet use at work in 2001. BLS NEWS, October 23.

3.3 Impacts of ICT use at work

It has often been argued that the use of ICT at the workplace is a strong predictor of ICT involvement also in private life. First, however, another association can be found: among those who never worked, the share of computer users is lowest, with only 9% regular users.

Exhibit 3-9: Today's computer use by last employment

	Today's computer use (any purpose)	
Date of last employment	last three months	daily use
Never working	6.6	4.4
1991 and before	15.6	8.9
1992-1996	25.1	14.3
1997-2001	37.0	23.1
2002-2007	55.4	31.5
Currently working	76.3	57.8

Source: Seniorwatch 2007 surveys
Base: working in period

Among those who have stopped working in the last five years, those who had used computers at work are by a majority of 78% computer users today, while only 38% of those who have not used computers at work today are computer users. These figures decrease for all work end cohorts, down to 40% computer users among former computer workers compared to 14% among non computer workers among those who stopped before 1991.

Exhibit 3-10: Today's computer use by last employment and computer use at work

		Today's computer use (any purpose)	
Date of last employment	computer use at work	Computer use last three months	Computer use daily
1991 and before	no	12.6	7.4
	yes	37.3	19.1
1992-1996	no	16.7	7.7
	yes	53.0	36.4
1997-2001	no	20.4	11.1
	yes	62.2	41.2
2002-2007	no	36.1	16.1
	yes	76.2	48.1
Currently working	no	43.1	23.7
	yes	96.1	78.3

Source: Seniorwatch 2007 surveys
Base: working in period

3.4 Funding and other schemes for ICT for work and employment

Because the likelihood of disability increases with age and because of the more general functional changes associate with ageing, older workers (and potential workers) are more likely to experience needs in relation to eAccessibility. Increasing likelihood of poor health or disability amongst older workers, as well as their greater likelihood to be informal carers, suggests that work-life and work-family balance may be especially important for older workers, including teleworking and other arrangements facilitated by ICT. This section discusses and presents examples of funding and other schemes addressing:

- assistive technologies / accessibility of ICT in the workplace
- supporting new / more age-friendly working arrangements that address work-life / work-family balance issues for older workers.

3.4.1 Accessible / usable ICT and assistive technologies

In considering funding and related measures in this field, it is useful to distinguish between built-in accessibility/usability features in the types of mainstream ICT used in the workplace (computers, telephones, other office equipment and so on) and solutions that require specifically designed assistive technologies to be acquired and implemented.

For mainstream ICT, issues of funding are less likely to arise. If the mainstream ICT that are typically used in the workplace already have built-in accessibility features that ensure that they are accessible/usable by older workers, then the question of funding, as such, does not really arise (accessible/usable ICT will be available as a matter of course to any older worker who needs them). On the other hand, if certain models have better accessibility/usability features than others, then specific funding or other related measures may be needed to ensure that they are available and affordable to those that need them. If the costs of accessible/usable models are not substantially different from other models then, again, funding, per se, is not likely to be a relevant issue, although employer procurement practices to ensure availability of accessible/usable models when needed will be important. Inclusion of accessibility requirements in procurements by public entities is now an important policy issue in both the EU and US. [42] More generally, encouragement of the ICT industry to include accessibility as a standard feature as extensively as possible across the spectrum of ICT that are used in the workplace is of central importance. In this regard, proposals for horizontal legislation on eAccessibility are currently being considered in the EU.[43]

If the costs of accessible/usable models are substantially higher than other mainstream models, then the issue of funding (who should/will pay) may arise. For specifically designed assistive technologies, as already mentioned in relation to ICT for everyday use, two types of product/application may be loosely distinguished - those whose role is to add-on to mainstream ICT to make them accessible/usable (e.g. screen reader software, alternative input/output devices and so on), and those whose role is to provide a specific (alternative)

[42] In the EU, the revised public procurement directives of 2004 encourage public procurers to include accessibility requirements in their procurements whenever possible; in the US, Section 508 of the Rehabilitation Act of 1998 requires federal agencies to include accessibility requirements in their procurements of ICT

[43] Communication on: European i2010 initiative on e-Inclusion:"To be part of the information society". COM(2007) 694 final. Brussels, 8.11.2007

way of doing things (e.g. a text telephone). Issues of funding do arise in relation to these technologies, because they are or may be perceived to be outside of the standard equipment provided for workers.

In this section, therefore, the funding perspective is primarily concerned with assistive technologies and/or substantially more expensive versions of mainstream ICT for the workplace. There are, in principle, three main potential sources of funding for such ICT for the work purposes of older workers - employers, public services / funds, and insurers - as well as the possibility / necessity of self-funding (self-purchase) by older workers themselves.

Finally, it should be noted that the main focus of funding in this area to date has been in relation to *disability* rather than age. There are few if any examples of funding measures dedicated to older workers, per se. Instead, most if not all current funding measures focus on disability so that, to be eligible for consideration, older workers typically need to be classified as being disabled (according to whatever definitions apply under the particular funding regime). Many older workers with accessibility / assistive technology needs will be likely to qualify but others may not.

Legal obligations on employers

Developments in equality/anti-discrimination legislation in the field of employment has introduced obligations on employers to address employment, workplace and work accessibility issues for disabled people (and thus for older people who qualify as 'disabled'). Typically, the main implication of such legislation is the establishment of a right to seek redress by a disabled person who feels that they are being discriminated against in relation to employment / the workplace. The scope of coverage in Europe generally includes both the public and private sectors, although in some other countries coverage may be limited to the public and/or other specified sectors. Some laws also include more positive duties or components that aim to encourage more systemic action (more generalised changes across the workplace to anticipate the needs of disabled people).

A key concept here is the notion of ”reasonable accommodation”, whereby laws typically require employers to make reasonable efforts to accommodate the needs of disabled people, on a case-by-case basis on request. The extent to which such accommodations are explicitly or implicitly recognised to include eAccessibility-related issues (such as accessibility of ICT in the workplace and/or provision of ICT-based assistive technologies), where relevant, may vary. Assessment of what is reasonable is an important element in this, and may take into account factors such as the scale of the financial or other burdens that would be imposed on the employer in making the necessary accommodations. This may involve taking into consideration the level of available public supports that employers can avail of in order to meet the needs of a disabled person.

In order to be effective the anti-discrimination approach needs to be supported by a good system of redress, whereby appropriate institutions are in place to help people to take cases, to adjudicate on cases and to decide on consequences (which may include monetary compensations and/or imposition of a requirement on an employer to make changes to accommodate the needs of the disabled person(s)). The effectiveness of anti-discrimination legislation in the employment field often depends on case law, that is, on the extent to which successful precedents have been established in one or more judgements. The extent to which there have been (successful) cases on grounds relating to eAccessibility issues is therefore also an important factor at the national level.

The most well-known example from outside Europe is the Americans with Disabilities Act. In Europe, the 'employment equality' Directive[44] addresses this field and all Member States should have implemented it by now. Exhibit 3-11 presents the key features of the EU Directive.

Exhibit 3-11: European 'employment equality' Directive (EU)

Description of the measure

Directive 2000/78/EC of 27 November 2000 *Establishing a general framework for equal treatment in employment and occupation* includes a requirement that employers make reasonable accommodations to ensure equality of access to employment for people with disabilities unless such measures would impose a disproportionate burden on the employer. Although no specific reference to ICT accessibility is made, the Preamble mentions adaptation to equipment as an example of appropriate measures that may need to be taken. The Directive also states that the burden on employers is not to be considered disproportionate when it is sufficiently remedied by measures existing within the framework of the disability policy of the Member State concerned. Although not made explicit in the text, this provides a linkage to public supports in relation to eAccessibility, for example, through assistive technology service delivery systems.

Key features / learning points

- provides the potential to require employers to fund eAccessibility / assistive technology if the costs are reasonable, although not made explicit
- links the question of 'reasonableness' to the extent to which public supports are available
- strength of implementation has been uneven across the Member States and impact has been limited to date - needs to be followed-up

Sources:

Directive 2000/78/EC of 27 November 2000 establishing a general framework for equal treatment in employment and occupation.

The evidence from the MeAC study[45] suggests that whilst the EU's 'employment equality' Directive has led to the establishment of a good potential to leverage eAccessibility benefits in the Member States this potential is not yet being realised to any appreciable extent.

On the positive side, EU employment equality policy as presented in the Directive seems to broadly be implemented in most, but not all Member States. On the negative side, the MeAC evidence shows that the current implementations and follow-up activity in the Member States have important limitations in relation to the achievement of eAccessibility policy objectives, including:

- not much impact to date in terms of visibility of and attention to eAccessibility in the Member States, probably at least in part due to the fact that this is not directly emphasised in the current text

[44] Directive 2000/78/EC of 27 November 2000 establishing a general framework for equal treatment in employment and occupation

[45] empirica, WRC, RNIB, RNID and eWORX (2007): Measuring Progress of eAccessibility in Europe: Assessment of the Status of eAccessibility in Europe, Main Report. http://ec.europa.eu/information_society/activities/einclusion/docs/meac_study/meac_report_06_11_final.pdf

- the link in the Directives between reasonable requirements and available public supports for employers is not being made in most Member States in relation to public supports for assistive technologies for employers/employees

Although the situation across Europe can be considered to be underdeveloped to date, there are some examples of countries that can be considered to represent good practice, including the UK (**Exhibit 3-12**) and Sweden (**Exhibit 3-13**).

Exhibit 3-12: Disability Discrimination Act (UK)

Description of the measure

Under the *Disability Discrimination Act (DDA*) of 1995, an employer has a duty to make 'reasonable adjustments' to employment practice and premises if these place a disabled person at a substantial disadvantage. The guidance documentation for employers gives specific mention of and a high profile to accessibility of ICT as examples of reasonable adjustments ("getting or modifying equipment such as a CCTV, voice-activated computer software or a telephone adapted with an amplifier; translating instructions and reference manuals into accessible formats, such as large print and audio cassette"). It also makes specific reference to available public supports for equipment. Redress mechanisms are provided, including support through the Disability Rights Commission (DRC), now the Commission for Equality and Human Rights (CEHR).

Key features / learning points

- clearly includes eAccessibility / assistive technology within its scope

Sources:

Disability Discrimination Act (1995) and associated codes of practice and guidance documentation

http://www.direct.gov.uk/en/DisabledPeople/RightsAndObligations/DisabilityRights/DG_4001068

Exhibit 3-13: Law against discrimination in the working life due to disability (SE)

Description of the measure

The *law against discrimination in the working life due to disability* of 1999, as amended in 2003 to include provisions from the EU Directive applies in Sweden. ICT-related assistive technologies are covered by section 6, which obliges the employer to create a situation for a person with a disability that is equivalent to that for persons without such a disability (to include the acquisition of technical support if needed). In practice this means that a person with a disability has the right to obtain AT at a reasonable cost to the employer. The employer is also responsible for setting up a vocational rehabilitation plan if an employee acquires an injury, disease or disability. This involves a review of the complete work situation of the individual, including his/her ICT workstation. The review could result in a need for a redesign of the workstation and to acquire an assistive device.

Furthermore, the state actively intervenes in this area and in case the employer does not have enough resources, the Swedish Social Insurance Administration can provide financial assistance.

Key features / learning points

- clearly includes eAccessibility / assistive technology within its scope

Sources:

Law 1999:132 against discrimination in the working life due to disability, as amended in 2003; now being updated http://www.eu-upplysningen.se/templates/EUU/euu-doc3____12103.aspx

Assistive Technology services

Most countries in Europe have some level of public service / support to help people with disabilities gain access to assistive technologies in relation to work/employment. However, the available evidence suggests wide variability in levels of public support / service across Europe in terms of the assistive technologies covered (especially in the extent to which accessible / assistive ICT are covered), the eligibility criteria that are applied, levels of funding and so on[46].

Two examples of countries with relatively good provision / funding of ICT-related assistive technologies for work/employment are provided below - Sweden (**Exhibit 3-15**) and Ireland (**Exhibit 3-14**).

Exhibit 3-14: Public funding for assistive technology for work / employment (IE)

Description of the measure

There are two main schemes of relevance - the Employee Retention Grant and the Workplace Equipment / Adaptation Grant. These are administered by FÁS, the government agency responsible for providing labour market services for people with disabilities. The schemes / grants described can be utilised for providing ATs.

The Employee Retention Grant is to assist employers to retain employees who become disabled through illness or injury. Through this grant such employees can be offered re-training so that they can undertake alternative duties or continue to work at their existing duties, using modified techniques, which includes assistive technologies

The Workplace Equipment / Adaptation Grant is available to disabled persons or their employers in relation to an offer of employment or existing employment. Examples given of adaptations for which a grant may be given include alarm systems with flashing lights, and equipment adaptation such as, voice synthesisers for computers or amplifiers for telephones. A maximum grant of €6348.70 is available towards the cost of adaptations to premises or equipment. This grant can also be used to upgrade adapted equipment funded previously. It also supports any additional costs of self-employment for people with disabilities.

Key features / learning points

- clear funding stream (and reasonable levels of funding) that can be drawn down to acquire ICT-related assistive technology for work/employment

Sources:

Employee Retention Grant and Workplace Equipment / Adaptation Grant;
http://www.fas.ie/disability/weag.htm.

empirica, WRC, RNIB, RNID and eWORX (2007): Measuring Progress of eAccessibility in Europe: Assessment of the Status of eAccessibility in Europe, Main Report. http://ec.europa.eu/information_society/activities/einclusion/docs/meac_study/meac_report_06_11_final.pdf;

DG Employment and Social Affairs (2003) Access to Assistive Technology in the European Union; also, the earlier HEART study, available at http://www.hi.se/templates/Page____821.aspx.

Exhibit 3-15: Public funding for assistive technology for work / employment (SE)

Description of the measure

Responsibility is divided between the Swedish National Labour Market Administration (getting a job) and the Social Insurance Office (continuing in employment), with the latter being the main provider of assistive technologies.

There are grants available to employers and/or employees (up to 50,000 SEK - more for ICT). These cover the full cost if the equipment is not of any other value, otherwise the employer gets half of the cost. Free training on how to use ICT-related AT is also provided.

Key features / learning points

- clear funding stream (and reasonable levels of funding) that can be drawn down to acquire ICT-related assistive technology for work/employment

Sources:

Provision of Assistive Technology in the Nordic Countries. Nordic Cooperation on Disability (NSH) 2004

3.4.2 New forms of work / work-life / work-family balance

Few direct examples of ICT-related initiatives addressing older workers in this area could be found. In the US, however, the approach applied in a number of States to support disabled people to set up as teleworkers is an interesting example of a model that could be applied for older workers as well. **Exhibit 3-16** presents an example of this approach in the State of Iowa.

Exhibit 3-16: Funding to set-up as teleworker (Iowa, US)

Description of the measure

The Iowa Telework Lending Program is operated by a non-profit organisation, IowAble Foundation, supported by government funds and with State officials represented on its Board. It provides loan funds used for the purchase computers, software, peripherals and other equipment deemed necessary to become employed or self-employed through a home based or Telework setting. Individuals with disabilities who are residents of the State of Iowa or their guardians, family members, employers, advocates and authorized representatives are eligible to apply to the Telework Program. Eligibility is also based on the likelihood of the funds to adequately secure employment or develop a self employment venture at a level of sufficiency necessary to repay loan funds.

Loans can cover equipment deemed by an employer as necessary for telecommuting, or equipment deemed by the entrepreneur as necessary for home-based employment including computer and peripheral equipment, internet services, assistive technology hardware (AT), software, equipment and modifications to home-based work site to facilitate increased productivity.

The minimum loan value is $500. While there is no specific maximum limit to the loan amount, the amount of money a person can borrow is related to factors such as credit, ability to repay and debt to income ratio. Loan repayment schedules are termed at levels appropriate with the ability to repay and at interest rates dependent on the prior credit history and size of the loan request.

For loans under $10,000, the Iowa Able Foundation can make direct loans to consumers. For loans greater than $10,000, an application to a partner lending institution will be made and final approval will be determined by the partner lending institutions. The Iowa Able Foundation has the ability to utilize loan guarantees as requested by the partner lending institutions.

Key features / learning points

- arrangement of repayable loans for people with disabilities to set up as teleworkers, either as employees of self-employed
- targets low income / poor credit ratings

Sources:

http://www.iowaable.org/uploads/pdf/iowaable_app_10_15_07.pdf

3.5 Summary and main conclusions for policy

For reasons based among others in the demographic development, it is now high on the policy agenda to keep older workers in their jobs for as long as possible. Projections come to the conclusion that the share of older workers is likely to increase by one-third by 2021. Workers' ICT skills will play a key role in reaching this goal.

For many, ICT use at work remains main avenue towards home usage; it is the prime opportunity for many to get involved with ICT at all. Consequently it is a strong predictor of remaining an ICT user after retirement. On the other hand, those who never worked were found to be the most likely group to abstain from ICT use completely.

Those who had not used ICT at work do not exceed a share of computer users of 43% in the latest retirement cohort, while already in the 1992-96 retirement cohort, those who used computers at work are by a majority of 53% users still today. The last retirement cohort (2002-2007) even has 76% of computer users among those who also used it at work.

In recent years, we have witnessed a steeply increasing ICT usage among older workers. Among older people who are still working in gainful employment (or self-employment), we find that, at least occasionally, 63% use computers and 47% the internet at work. Comparing this with former workers shows that a tremendous increase in ICT use at the workplace, also of older workers, has taken place recently. Compared to today's 63%, among those who retired/ were last employed before 1991, only 12% used computers at the workplace, and for instance those before 2001 but after 1997 already had a 40% share of computer users.

However, blue collar workers and low skilled keep lagging behind. Today, ICT use not unexpectedly is more common among white collar workers than among blue collar workers. More than 80% of non-manual and managerial workers use computers at work, and more than two thirds the internet. Among blue collar workers the share of computer users ranges between 20% for the least skilled and 40% for other blue collar workers.

Those who had not used ICT at work do not exceed a share of computer users of 43% in the latest retirement cohort, while already in the 1992-96 retirement cohort, those who used computers at work are by a majority of 53% users still today. The last retirement cohort (2002-2007) even has 76% of computer users among those who also used it at work.

The strong effect of occupational proximity to ICT on later usage in a private context, plus the fact that people who have never worked (who are almost exclusively women) are the least likely to be computer users today, considerably reinforce the digital divide as diagnosed in chapter 1.

The rising share of mainstream ICT users at the workplace makes it clear that ICT skills will more and more be a prerequisite of employability. The tendency to have an on average older workforce will therefore also link the increasing ICT deployment to the more and more critical factors of assistive technologies and age-friendly working arrangements. The findings about mainstream ICT it can be applied in analogy: critical factors will include user skills, confidence, and accessibility.

Funding in the area of accessible ICT and Assistive Technologies in the workplace has usually been in relation to disability rather than age. Most countries have some level of public funding and/or provision of assistive technologies in the workplace, but the quality of such services seems to vary widely. Anti-discrimination legislation also imposes obligations on employers to meet needs of workers with disabilities, on a case-by-case basis on request.

Overall, these approaches do not yet seem to be well targeted towards the older worker population, per se.

More proactive efforts by the ICT industry and by employers to ensure that the mainstream ICT used in the workplace are accessible are also of great importance. The European public procurement directives encourage inclusion of accessibility in procurements by public agencies. In addition, a proposal for horizontal legislation on eAccessibility is now being considered at European level.

As regard new working arrangements, there seems to be little attention yet being given to the potential of telework and other such arrangements to facilitate work-life and work-family balance of older workers. Some initiatives have focused on funding and supporting people with disabilities in this area but there has yet to be much attention given to older workers in this regard.

3.5.1 Main conclusions for policy

The issue of ICT and ageing in relation to work and employment needs reinforced attention from two points of view - the workplace as a key point of access to ICT and development of ICT skills; the opportunities and barriers that ICT developments in the workplace present for older workers and for the achievement of the EU's employment rate targets for older workers

The role of the workplace in the age-divide

The survey data confirm the key importance of the workplace in relation to the observed age-related digital divides in Europe. There are two aspects to this. First, those older people who are in work or who have been in work in the relatively recent past are a lot more likely to use ICT than are those who have not. Second, the socioeconomic stratification in relation to ICT access and usage that can be observed for the population as a whole can also be observed within the workforce. Those in lower / manual occupations are a lot less likely to have access to ICT in the workplace and to develop ICT competencies there. Public policy therefore needs to adopt a dual approach, involving initiatives to encourage wider access to ICT and ICT skills across the workforce (there are interesting examples of this approach by some employers already) and focused efforts to reach those now outside the workforce who have not had an opportunity to acquire ICT skills whilst at work. In addition, as mentioned earlier, the transition from work to retirement can be a critical point in determining whether older people maintain their ICT usage or become ‘drop-outs’. This needs to be given appropriate attention in policy as well.

eAccessibility needs of older workers

Although not all occupational groups are yet being reached, the Seniorwatch and other data do show that ICT usage in the workplace by older workers continues to grow. This brings to the fore the work-related eAccessibility needs that increase with ageing and this is an important issue for attention in public policy and by the other relevant sectors. To date, however, it seems that eAccessibility for older workers has yet to receive much in the way of focused attention either in public policy or in the activities of employers or the ICT industry. The main focus to date has tended to be on people with disabilities and there is a need to extend this with more targeted attention to the needs of older workers, some of whom will be defined has having a disability but many of whom will not.

Work-life balance

Finally, despite the fact that work-life balance issues are increasingly important for older workers, especially issues relate to combining work and care, it seems that little attention has been given to exploiting the possibilities offered by ICT to enable more flexible and new forms of working arrangement, such as teleworking. Again, the main focus of efforts in this regard to date has tended to address people with disabilities and there is a need to extend this to include the wider group of older workers who may stand to benefit.

4 ICT for Independent Living and Care

This section focuses on the sub-market for ICT supporting independent living and care, with a focus on older people who need support in their everyday lives because of functional difficulties associated with the ageing process. Key features of demographic change which are relevant for this area include:

- a substantial increase in the number of older people facing difficulty in coping with daily life due to age related restrictions and health problems,
- an increase in the share of those older people who may not be able to rely upon informal forms of support due to changing family structures,
- looming shortages in the labour supply in the field of health and social care due to a shrinking work force,
- increasing economic pressure on existing health and care systems due to the fiscal and budgetary implications of demographic change,
- rising expectations on the part of citizens in respect of the quality of care.

For the purposes of this section the umbrella term “care / independent living” is used to denote the variety of fields of service provision relevant in the context of these processes and changes. These include medical care, municipal (social) care and family care.

4.1 Needs and demand for ICT for Care / Independent Living

4.1.1 Health and other care-related needs

Medical conditions

Most people are receiving treatment for at least one long term condition. High blood pressure is the most prevalent among the observed most common conditions in older age with 41% of the population stating to be treated for that kind of diseases, a sharp increase compared with 2001 data for EU15.

The second highest prevalence (26%) is found for joint, bone or muscle diseases. 20% declare to receive treatment for a heart disease of any kind, 11% state diabetes and 9% respiratory diseases. Other long term conditions are mentioned by 21%. In sum, 67% receive treatment for at least one condition, including 35% of people treated for more than one condition.

The share of people receiving treatment for multiple chronic diseases, as expected, increases across age groups, from 22% of people aged 50-59, to over 50% in the ages above 70.

Exhibit 4-1: Receiving treatment for (multiple) chronic conditions

	Germany	France	Italy	Poland	UK	Total EU5	EU15 2001
high blood pressure	44.8	30.5	42.8	47.1	40.0	41.1	33.7
heart disease of any kind	18.4	13.2	16.8	37.3	15.6	20.3	16.8
any chronic respiratory disease	5.4	5.6	8.6	13.9	9.4	8.6	8.5
diabetes	12.8	6.8	12.4	12.7	10.4	11.0	9.2
joint, bone or muscle diseases	25.7	19.6	27.0	38.4	23.8	26.9	25.6
any other long term condition	16.2	16.6	12.2	30.4	27.4	20.6	18.7
Summary: any long term condition	66.6	57.1	71.4	76.3	67.2	67.7	61.9
one	33.2	32.3	36.8	21.5	33.8	31.5	N/A
two	16.2	17.0	23.6	24.5	16.0	19.5	N/A
three or more	17.2	7.8	11.0	30.3	17.4	16.7	N/A

Source: Seniorwatch 2007 surveys – F91: Are you currently receiving treatment or medication for...?
Base: all

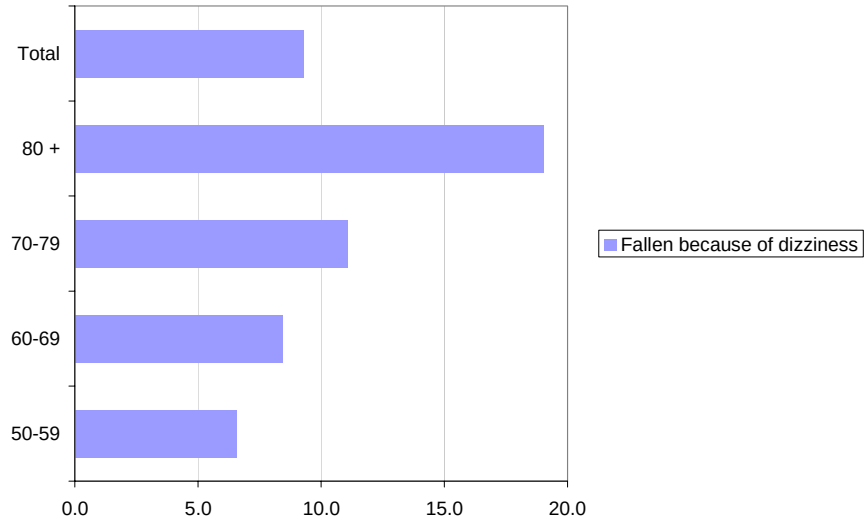
Exhibit 4-2: Receiving treatment for chronic condition – time comparison

	EU5, 2007				EU15, 2001			
	50-59	60-69	70-79	80 +	50-59	60-69	70-79	80 +
high blood pressure	26.9	40.9	58.3	53.8	23.1	34.8	44.9	41.7
heart disease of any kind	9.1	21.0	32.2	31.9	7.4	14.5	27.4	35.7
any chronic respiratory disease	6.0	8.8	10.9	11.8	5.4	8.8	11.5	11.4
diabetes	4.8	12.5	17.9	12.9	6.8	9.4	12.2	10.1
joint, bone or muscle diseases	18.3	24.7	38.2	40.2	18.9	27.0	30.3	35.2
any other long term condition	18.7	19.9	23.8	21.9	16.7	18.5	20.9	22.2
Summary: any long term condition	49.5	69.4	86.2	87.1	49.0	64.2	73.5	74.0
one	27.9	35.0	31.5	33.6	N/A	N/A	N/A	N/A
two	13.2	17.9	27.2	30.8	N/A	N/A	N/A	N/A
three or more	8.4	16.6	27.5	22.7	N/A	N/A	N/A	N/A

Source: Seniorwatch 2007 surveys –F91: Are you currently receiving treatment or medication for...?
Base: all

Another threat to living independently in the home environment is the threat of falling due to dizziness. Almost one in ten respondents reports that this has happened in the twelve months period prior to the survey

Exhibit 4-3: Fallen because of dizziness



Source: Seniorwatch 2007 surveys – F88: (C2/D1) Have you, in the last 12 months, fallen because of dizziness?
Base: all

Care needs

A minority of 6.7 percent receive support with the basic activities of daily living, bath or showers and getting dressed and undressed – while 12.2 percent say they actually have difficulties with these activities. These 12.2 percent were defined "in need of care" for the terms of the Seniorwatch surveys. The figure is rather constant across countries, with figures ranging between 15% in the UK and 10.5% in Germany

Being in need of care thereby clearly correlates with age, the share of people in need of care remains below one in ten for the under 70 year olds, while 17% of those 70-79 and 29% of the 80+ population are found in need of support. These figure do not divert much from the findings in the precursor study in 2001.

Exhibit 4-4: Difficulty with daily activities

	50-59	60-69	70-79	80 +	Total EU5
a) with bath or showers?	6.4	7.3	16.6	25.7	10.7
b) with getting dressed or undressed?	6.4	5.4	9.7	14.8	7.6
c) with going shopping?	9.8	10.2	17.8	32.9	13.7
in need of help with dressing or bathing	8.7	9.0	20.2	29.2	13.3
For comparison: EU15, 2001: in need of help with dressing or bathing	6.9	12.0	17.8	28.0	12.9

Source: Seniorwatch 2007 surveys – F92_01-03: (D1) Do you currently have any difficulty with daily activities such as ...:
Base: all

When it comes to actually receiving care, the situation has improved compared with 2001. While the number of people needing support with activities of daily living is slightly lower for the 2007 sample of countries, the share of people receiving care has increased from 5.4 to 6.7% (although again one needs to always consider the different sample frame). Especially

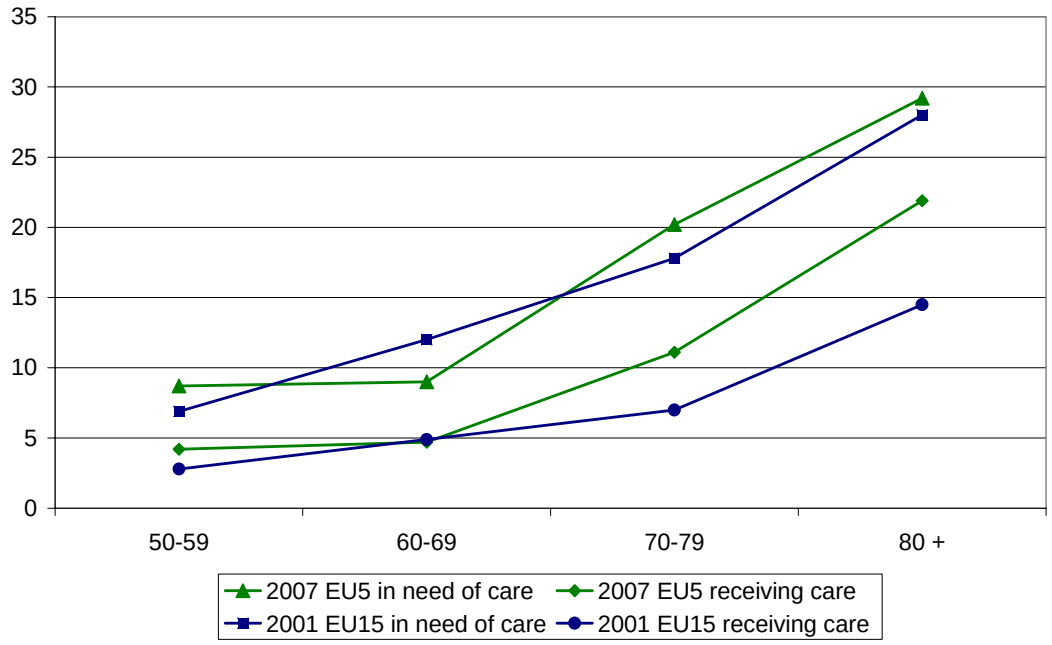
the gap for the over 80 year olds has narrowed (20.4% receiving care compared to 14.5 in 2001, while in need of care rate remained about constant).

Exhibit 4-5: Receiving care (by age)

	50-59	60-69	70-79	80 +	Total
Yes	4.2	4.7	11.1	21.9	7.5
No	4.7	4.5	10.2	9.1	6.2
No and not in need of help	91.1	90.8	78.7	69.0	86.3
For comparison: EU15, 2001: receiving care	2.8	4.9	7.0	14.5	5.4

Source: Seniorwatch 2007 surveys –F95: (D2) Does anyone regularly help you with these activities?
Base: all

Exhibit 4-6: Care: population with support need and population actually receiving care (2007 and 2001)



Source: Seniorwatch 2007 surveys (EU5) and Seniorwatch 2001 surveys (EU15)

About 20% of those needing help with activities of daily living receive help by a professional carer i.e. from by care service company or community care. An exception is France, where more than 40% of those in need of care receive professional care service.

Exhibit 4-7: Percentage of people in need of by type of their carer (family/professional)

Receiving help by	Germany	France	Italy	Poland	UK	Total EU5	2001 EU15
A family member or other non-professional carer	85.7	59.3	93.8	87.5	90.7	85.2	81.5
A professional carer	14.3	40.7	19.4	16.7	22.2	21.8	22.2

Source: Seniorwatch 2007 surveys. F96 – 97: Who helps you, is it a family member or other non-professional carer professional carer?
Base: if receiving help.

Family carers

Demographic ageing of western societies does not remain without implications for family structures and family functions. Societal shifts in generational proportions correspond with shifts in inner familial age proportions. The prolongation of life expectancy and the current low fertility rates go along with a shift in the main functions of care and maintenance, namely away from the descendant and towards the antecedent generations, or: towards taking care of one's parents, rather than one's grandchildren.

At the same time, family remains the main agent of intergenerational societal integration. While, as the SHARE study says, "Contemporary ageing societies are age-graded and to a large extent age-segregated societies"[47], research consistently reveals high degrees of intergenerational cohesion and emotional as well as material solidarity.

The nuclear family – i.e. the cohabitation of only two generations – has evolved as the main type of family cohabitation in Europe. Correspondingly, many older Europeans go through the so called "empty nest phase" at least for once in their lifetime. This is the life phase after all children have left the parents' house. This stage of life in the parent generation often comes at a point in time when one or two of the spouses still are in working life and are of good health.

Around the same time many people experience grandparenthood for the first time. Also at the same time or later, one's own or spouse's parents can become in need of care. If this coincides with taking care for one's grandchildren, one also speaks of the so called sandwich generation or pivot generation.

A life event typical for women is caring for their husband, which is far more common than the other way. Finally, the death of their partner and living alone affects many older aged women. Due to the fact that women's life expectancy is about seven years higher than men's and that women are on average several years younger at marriage, women experience a stage of widowhood, often living alone. Although the trend towards higher rates of divorce has not yet reached the very old aged, the share of people living alone may in the future of course also be significantly influenced by high divorce rates among the baby boomer generations.

Some background data shall illustrate the current state of family structures in Europe. Although co-residence has decreased, one still finds that across Europe there is a widespread geographical proximity of the elderly and their adult children. This has of course

[47] Kohli, Künemund, Lüdicke (2005: 164): Family Structure, Proximity and Contact. Chapter 4.1 in SHARE: Health, Ageing and Retirement in Europe. First Results from the Survey of Health, Ageing and Retirement in Europe.

implications for the availability of support and care for the elderly parents. Empirically there are also high rates of frequent contact with each other to be found. However, one can already find that the population proportions of being grandparents decrease dramatically in the "younger old" cohorts, due to lower and later propensities of their children to have children.

According to the SHARE study, among the 50-59-year-olds 76 percent of the men and 71 percent of the women live as a married couple. There is a rise of proportion of never-married men, while among women the opposite patterns holds, with the oldest group having the largest proportion of never-married (12 percent), mainly due to the specific historical constellation of WWII and its aftermath. Due to the diverging life expectancy rates, 63 percent of men but only 16 percent of women over 80 still live with a (married or registered) spouse.

Co-residence among adult family generations has decreased massively in all western societies. There are however huge differences with regard to the average age of children leaving their parental home. In Southern Europe, youths tend to live longer with their parents then in many central and northern European countries.

For example, the SHARE study found that in Denmark and Sweden, 13 and 15 percent of survey respondents (i.e. the population aged 50 and older) who have at least one living child live with a child in the same household, in the 'centre' countries this amounts to between 20 and 27 percent, but in Italy and Spain to 49 and 52 percent. On the one hand this reflects the southern European inclination to leave parent's house late: Among the cohorts aged 50-59, 79% and 77% respectively of the Spaniards and the Italian live in a household with children, while only 24 of the Danish and 35 of the Swedish. In continental Europe, this figure is at around the 40% mark. But also in later life, there is closer geographical proximity between parents and children in southern Europe than in the Nordic countries. In Sweden, only one in four of those age 70 and older has children within a distance of 1 kilometre, while this ratio is about three in four in Spain.

Exhibit 4-8: Proximity to Nearest Living Child (percentages)

	Total	50-59	60-69	70-79	80+
Same household	31.5	53.9	23.1	14.6	14.6
Same building	9.0	4.2	9.7	13.3	14.2
Less than 1 km	14.8	7.7	16.5	20.8	21.4
1 – 25 km	29.6	21.2	34.0	35.0	34.9
25 – 100 km	7.2	5.6	8.1	8.5	7.2
> 100 km	7.9	7.4	8.7	7.8	7.8

Source SHARE (pp215ff). Totals for ten countries.

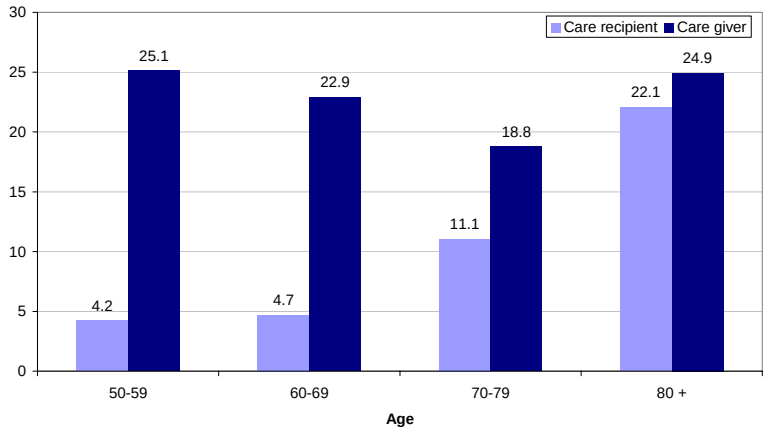
Still, for many, there is a significant life phase of living in a one or two person household again, after the children have left home. In this regard, one may speak of an "empty nest" phase, including all kinds of social and psychological implications this may have, from regained liberties to the feeling of hollowness for having lost support and responsibility.

The pivot generation represents those individuals that face a dual help demand, namely those that have to give help or care to their elderly parents and at the same time help their adult children managing their family life, most prominently by looking after grandchildren. The SHARE project found out that about 10 percent of the European elderly populations belong

to these active "sandwich" or pivot generations. Individuals in their sixties are most likely to belong to this group, that is, at an age that precedes or coincides with statutory retirement age[48].

Being carer status varies considerably between countries, with a third of population in Italy compared to 11% in Germany. It shows, however, little variance across age groups, with a share varying in between 18.8 and 25.1%.

Exhibit 4-9: Care recipients and family carers as percentage of age groups



Source: Seniorwatch 2007 surveys. Base: all.

When it is said that more than 80% of those older people who receive care are cared for by a non-professional carer, indeed these family carers are "older people" following the actual operationalisation for the Seniorwatch surveys, age 50 plus, as well. Actually, many more older people are carers than there are older people receiving care. This may be due to multiple causes – there may be more than one carer per needy person, the definition for being in need of care is necessarily very narrow (help with dressing or bathing) for the purposes of our survey – actually there are many more activities of daily living that are met through care. Also, people may tend to underreport their actual neediness or over-report the helper status – both for reasons of social desirability. Furthermore there are issues of survey non-response and reachability that will systematically discriminate against a representative share of needy, frail or persons confined to their bed in a population survey.

An indication about the real incidence of care is also given by the question whether other household members regularly receive care. This has been stated by 8% of the respondents. Remarkably, these people to a larger degree receive professional care (33%). Under the assumption that professional care on the average equals a more severe health constitution, this finding supports the suspicion that people severely in need of care are to some extent

[48] SHARE has raised though not yet analysed the possible interrelationships between the decisions to give help to children and parents, and to retain or give up working. The question of also macro-economic relevance hence is whether older people chose to become more involved in family help activities when they retire or whether they are rather persuaded to cease paid work by family members in need of support.

underrepresented *as survey respondents.* Nevertheless these people can at least to some extent be covered here through the reporting of the other household members.

Exhibit 4-10: Other person in household receiving care

	Germany	France	Italy	Poland	UK	Total EU5
Yes	1.2	17.0	10.6	5.6	7.4	8.3
No	98.0	82.8	89.2	94.2	92.4	91.3
Don't know	0.8	0.2	0.2	0.2	0.2	0.3

Source: Seniorwatch 2007 surveys. F101: (D3) Is there one more adult person in your household regularly receiving care? / Is there another adult person in your household regularly receiving care? Base: all

Exhibit 4-11: Other person in household receiving care by type of carer

	Germany	France	Italy	Poland	UK	Total EU5
professional or community care organisation	20.0	43.5	1.9	10.3	13.5	22.5
family care	80.0	40.0	94.3	65.5	59.9	61.7
both		9.4	1.9	20.7	27.0	12.0
DK / refused		7.1	1.9	3.4		3.8

Source: Seniorwatch 2007 surveys. F102: (D2/D3) Is that care provided by a professional or community care organisation or is it family care or both? Base: if other person in household receives care

Restrictions in Mobility

Restrictions in mobility are a major threat to independent living. 11% of the sample find climbing stairs very difficult or impossible, 10% standing for a longer time and 8% walking a distance of 100m. All in all, 16% have severe problems with one of these three activities. On the other hand, 52% state all three were "easy" to do.

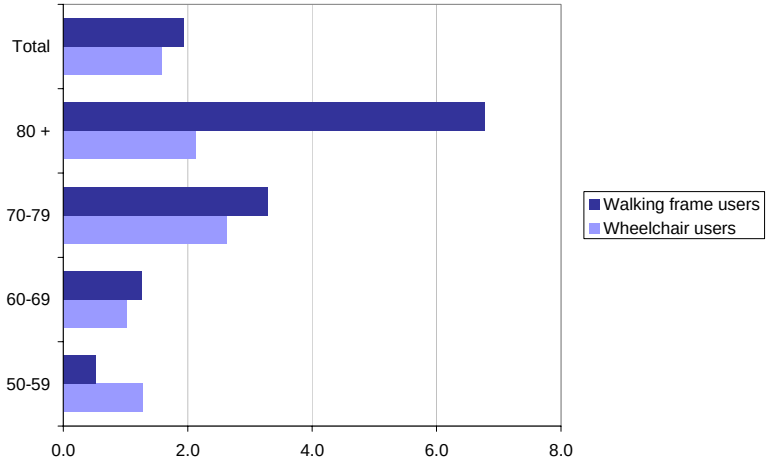
Exhibit 4-12: Mobility difficulty

Percent finding … very difficult or impossible		Germany	France	Italy	Poland	UK	Total EU5
walking a distance of 100m	very difficult	7.2	5.0	4.8	7.9	8.0	6.6
	impossible	2.0	0.4	3.4	1.4	3.0	2.0
standing for longer time	very difficult	7.4	8.2	4.6	12.1	9.8	8.4
	impossible	3.8	0.6	1.6	1.0	2.2	1.8
climbing stairs	very difficult	14.6	6.4	5.0	17.1	8.6	10.4
	impossible	1.0	1.0	2.2	1.8	2.8	1.8
Impaired mobility (either of three very difficult or impossible)		19.8	10.8	11.4	25.5	18.4	17.2
No mobility impairment at all (all three items "easy")		47.4	62.5	61.4	29.3	52.8	50.7

F82 F86 F87: Do you find … easy, somewhat difficult, very difficult or impossible?
Base: all

Among the sample, there are 1.4% of wheelchair users and 1.5 percent of walking frame users. Wheel chair users were asked about accessibility of the public infrastructure items "automatic teller machine" and "public phone" in their vicinity.

Exhibit 4-13: Wheelchair and walking frame users



	Germany	France	Italy	Poland	UK	Total EU5
Wheelchair	2.4	.2	1.0	1.4	3.0	1.6
Walking frame	4.6	1.2	.6	.6	2.8	1.9

F83_01: (C2/D1) F83_02: (C2/D1) Do you, if temporarily, use a wheelchair / a walking frame? Base: all

Because of the limited sample of wheelchair users, the results should not be generalised. Of the 37 responding wheelchair users (figures unweighted), 14 said using the ATM was easy, most of them from the UK, and 11 said it was very difficult or impossible.

Regarding public phones, 5 respondents said it was easy to use, 17 very difficult or impossible and 14 could not give an answer, probably because the diffusion of mobile phone access lets public phones abscond from people's minds more and more.

4.1.2 Use of health related and care supporting ICT

Use of internet for health information

Internet users are very keen to use the internet for health information. Two thirds have informed themselves about health matters in one way or another. Information about any specific condition was the item most commonly mentioned, with more than 50% agreement. 40% inform themselves about healthy living, be it about diet, fitness or other lifestyle issues. 30% have used the internet after they were seeing a doctor and wanted to follow up on the treatment or recommendation received, while half as many used the internet for that intention before the actual doctor visit. Finally, a quarter of internet users have used the internet to find out about health services

Exhibit 4-14: Internet use in health matters by age

		Age				
		50-59	60-69	70-79	80 +	Total
	Health information (any of a-e)	67.5	66.7	55.1	26.7	65.3
a	obtain information on a specific health matter, disease or medication	53.6	51.6	39.3	26.7	51.1
b	get information on healthy lifestyles, such as fitness, diet or similar	43.8	36.9	34.1	12.5	40.9
c	to follow up on a diagnosis or treatment recommendation by a doctor	30.1	34.8	24.7	13.3	30.7
d	to find information about health services, e.g. what services are available, your entitlements for treatment and so on	28.4	20.1	17.0	13.3	24.5
e	to prepare yourself before visiting a doctor	13.5	17.9	12.4	6.3	14.6
	e-mail or internet: to communicate about health matters with physician	4.3	2.9			3.4

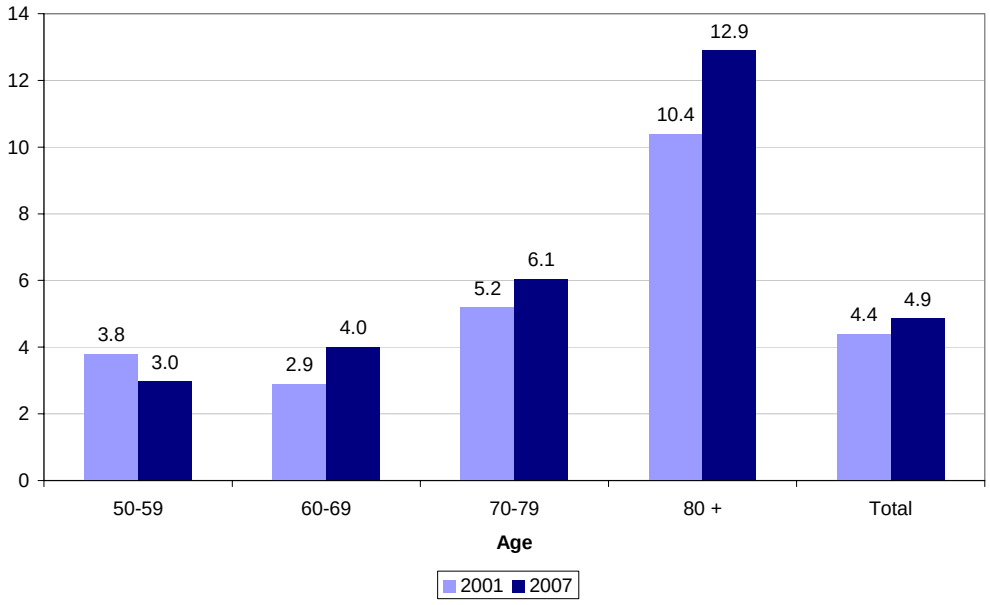
Source: Seniorwatch 2007 surveys – F68-70
Base: Internet users in the last three months

Use of social alarms

There is a social alarm in the households of about 5% of the 2007 survey respondents. 2001 data from the first SeniorWatch study suggest that usage levels vary considerable across the European Union.

It will not come as a surprise that the older old (80+) seem to make more use of alarm services when compared with younger age cohorts. Overall, there has been a slight increase in the spread of social alarms, which is mainly due to an increase in the oldest age bracket (from 10% in 2001 to 14% in 2007).

Exhibit 4-15: Community alarm services in 2007 (EU5) and 2001 (EU15) by age



Source: Seniorwatch 2007 and 2001 surveys

For many, today, alarms are not home-bound anymore. In Italy and Poland, more than 40% and more than 30% in Germany and France use a social alarm that is also working outside the home.

Exhibit 4-16: Social alarm in household – mobile alarm vs. home only

	EU5
Only inside home	66.1
Also away from home	26.4
Don't know / refused	7.4

Source: Seniorwatch 2007 surveys. F104: Is it for use inside your home only, or also when you are away from home? Base: all with social alarm at home

About 70% of respondents use the social alarm themselves, while 36% say that there are other people (also) using it.

Exhibit 4-17: Social alarm in household – used by respondent or someone else

	EU5
Respondent	54.1
Other person in household	21.3
Both (respondent and other person)	13.9
Don't know / refused	10.6

Source: Seniorwatch 2007 surveys. F105: (D4) Is the social alarm for use by you or by somebody else in your household? Base: all with social alarm at home

Use of mainstream ICT by carers

As can be expected from their age structure, care recipients and people in need of care are using ICT to a lesser extent than the population average. Nevertheless, almost one in three people in need of care is at least sometimes using a computer, and one in four uses the internet. Daily users are naturally found less often, one in five uses computers on a daily basis and one in seven the internet. Actual recipients of care are more unlikely to be using ICT: One in four is a computer user, and one in six an internet user.

Exhibit 4-18: ICT usage by people in need of care, care recipients, and family carers

		People in need of care	Thereof: Care recipients	Care giver	For comparison: Total population 50+
Computer use	last three months	26.8	20.7	39.8	42.8
	daily	16.0	7.4	25.3	28.5
Internet use	last three months	20.4	14.9	33.5	35.4
	daily	9.6	5.3	20.1	22.2
Internet access		29.4	24.5	45.6	52.2
	Broadband	16.8	11.7	28.3	29.1

Source: Seniorwatch 2007 surveys. Base: All.

Family carers, on the other hand, are almost as likely to be ICT users as the average: 40% of them are computer users (34 %internet), and 25% on a daily basis (20% internet). Almost half have internet access, which is broadband for a majority.

4.1.3 Interest in enhanced products and services

Those experienced with social alarms, either because they use it themselves or because they care for someone who has one, were asked whether they would see any benefits in two sets of additional features of the alarm service, namely security features and additional health features. As for security features, these were introduced as "for instance to automatically detect a fire or gas leak", and health features as "to automatically detect when a person has fallen or some other medical crisis occurs". A majority each found these features beneficial.

Exhibit 4-19: Social alarm in household – assessment of benefits of additional security features

	Germany	France	Italy	Poland	UK	
Yes, would be beneficial	66.0	42.9	50.0	84.6	73.3	63.6
No, would not be beneficial	25.5	39.3	28.6	7.7	23.3	26.1
Don't know / Refused	8.5	17.9	21.4	7.7	3.3	10.2

Source: Seniorwatch 2007 surveys. F106_1: There are nowadays additional security features to some social alarm systems, for instance to automatically detect a fire or gas leak. Would you think that such features would be beneficial to you or the person using the social alarm?
Base: all with social alarm at home or who give care to someone with a social alarm

Exhibit 4-20: Social alarm in household – assessment of benefits of additional health features

	Germany	France	Italy	Poland	UK	
Yes, would be beneficial	76.6	67.9	72.4	64.3	77.0	73.7
No, would not be beneficial	23.4	21.4	17.2	14.3	21.3	20.7
Don't know / Refused		10.7	10.3	21.4	1.6	5.6

Source: Seniorwatch 2007 surveys. F106_2: There are also additional health related features, for instance to automatically detect when a person has fallen or some other medical crisis occurs. Would you think that such features would be beneficial to the person using the social alarm?
Base: all with social alarm at home or who give care to someone with a social alarm

Among those who do not have a social alarm at home, almost one in four say that they would benefit from it if they had one. Social alarms are quite well known by the older population in total, as the share "don't know" or refusal answer makes up only 5%.

Asked why they do not own any social alarm despite the assumed potential benefits did not yield satisfactory response, considering that 40% said "other" reasons, which were obviously beyond the pre-defined options.

Exhibit 4-21: Social alarm in household – assessment of benefits by non-users

	Germany	France	Italy	Poland	UK	
Yes	17.0	5.8	29.7	52.6	13.8	24.1
No	82.4	90.4	61.5	36.4	82.3	70.2
Spontaneous: Don't know what social alarm is	0.7	0.2	0.2	1.6	0.4	0.6
Don't know / Refused		3.5	8.5	9.3	3.5	5.0

Source: Seniorwatch 2007 surveys. F107: Do you think that a social alarm would be beneficial for you or for a person living in your household? Base: all without social alarm at home

Exhibit 4-22: Reasons for not having a Social alarm in household

	Germany	France	Italy	Poland	UK	
You do not know where to get it from.	25.6	10.7	2.1	53.1	22.2	31.1
It is too expensive.	16.7	25.0	7.7	19.2	6.3	14.8
It is too complicated to use.	7.6		2.1	4.6	4.8	4.2
It intrudes too much into the private sphere.	7.6	3.6	8.4	3.1	11.1	5.9
Other	47.4	51.9	62.2	23.5	31.7	38.7
Don't know / Refused	5.1	14.3	18.2	12.7	22.2	14.2

Source: Seniorwatch 2007 surveys. F108: What are the reasons for not having a social alarm? I am going to read a number of possible reasons. Base: all without social alarm at home

Apart from social alarm usage, only e-mail usage was surveyed with regard to interaction with care service providers. This is practically non-existent, however, as the following table shows.

Exhibit 4-23: E-Mail usage to get in touch with care service providers

	Germany	France	Italy	Poland	UK	
yes, regularly	4.2		2.0		2.7	1.5
yes, occasionally	4.2	13.2	8.2	4.1	9.6	8.1
No	91.7	86.8	89.8	95.9	87.7	90.5

Source: Seniorwatch 2007 surveys. F109: (D4) Do you ever use e-mail or internet to get in contact with care organisations? Base: family carers and care recipients who are also computer users.

4.2 Supply side: funding schemes for ICT for independent living and care

This is the sector where funding and other market support mechanisms have perhaps the most important and fundamental role to play, in relation both to initial market development and ongoing market functioning.

4.2.1 Initial market development

The emergence of a well-functioning marketplace for ICT in support of independent living and care has been slower than might have been expected[49]. Technologies and application concepts that have been around for many years have generally yet to become mainstreamed within the home care and independent living sectors, either public / non-profit or private / for-profit.

A number of lines of intervention to support initial market development can be identified:

- pump-prime funding for service providers
- preparation supports for service providers
- funding for innovation by relevant ICT and/or care sector industries
- public-private collaboration in research / RTD funding
- public procurement.

Some measures may focus only or mainly on one element whereas others may combine all or a number of these elements.

Pump-prime funding for service providers

One approach involves public pump-prime funding of home care and independent living service suppliers in order to encourage wider and faster deployment of already available ICT and ICT-supported applications as part of their services. One of the clearest and largest example of this approach is the Preventative Technology Grant in the UK (Case 1: Exhibit 4-24).

Preparation supports for service providers

The market barriers in this field are more complex than a simple lack of initiative on the part of service providers and the industries that can supply them with innovations. Analyses have identified wider barriers that can make the marketplace a difficult and even unattractive one to enter, including regulatory complexities, high costs and long lead times for testing and clinical trials, and the difficulties of establishing the business case for product and service innovation[50]. Two examples of public efforts to address these areas again come from the UK, in the form of a business modelling tool (Case 2: Exhibit 4-25) and public funding for large-scale test-bed demonstrators (Case 3: Exhibit 4-26), respectively.

[49] empirica and WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies - LOT/: The Demographic Change – Impacts of New Technologies and Information Society

[50] Technology and Innovation in an Emerging Senior/Boomer Marketplace. US Department of Commerce, technology Administration (2004)

Exhibit 4-24: Case 1: Preventative Technology Grant (UK)

Description of the measure

The UK Government has made available £80 million (105 MEuro) for the Preventative Technology Grant over the period 2006-2008. This centrally-funded government scheme provides grants to local authorities in England to invest in care-related technology, especially telecare and also electronic assistive technologies. The funding goes to the local authorities but they are expected to work with partners in housing, health, voluntary and independent sectors, as well as service users and carers.

The grant is intended to be used to implement telecare in order to increase the numbers of people who are supported to remain independent and it is expected that most of the beneficiaries will be older people. The initial target set was to help an additional 160,000 older people to live at home with safety and security and reduce the number of avoidable admissions to residential/nursing care.

The initiative is intended to pump prime change and the incorporation of telecare in the delivery of mainstream services. *A Telecare Implementation Guide* and accompanying support materials were developed to give detailed guidance on developing and implementing a telecare service. Active ongoing support is provided through the Telecare Learning & Improvement Network (LIN) of the Care Services Improvement Partnership (CSIP).

The grant is paid as a specific formula grant to each local authority with no conditions attached. The amount to be allocated for each local authority is calculated according to a common formula based on their relative share of older people's needs in the overall needs profile of the local authority based on population size, structure and so on (Relative Needs Formulae - RNF). Based on the overall allocation of 105 million euro and the targeted reach of 160,000 people, it can be roughly estimated that the grant amounts to about 650 euro per client served, although there is likely to be a lot of variation given that the grant may be spent on infrastructural development as well as on direct services for clients, so that more or less may be directly spent on client services depending on the existing level of development of relevant services.

Key features / learning points

- focused, centrally-driven effort to kick-start publicly-supported telecare services across the country
- central government funding allocated on pro rata basis to all local authorities
- extensive promotional efforts and support/guidance materials
- clear focus on mainstreaming and sustainability of telecare once pump-prime funding ceases

Sources:

Building Telecare in England (2005)
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4115303

Local Authority Circular (LAC (2006)5), March 2006.
www.dh.gov.uk/assetRoot/04/13/21/69/04132169.pdf

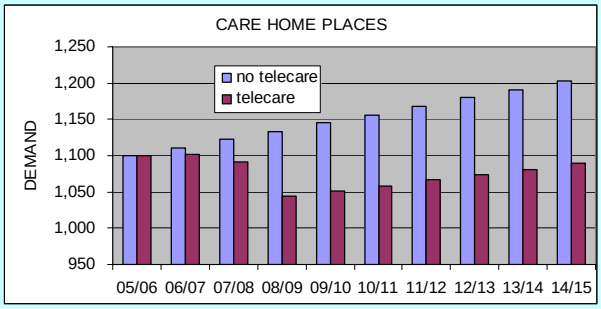
Telecare LIN http://www.integratedcarenetwork.gov.uk/telecare/index.cfm?pid=162

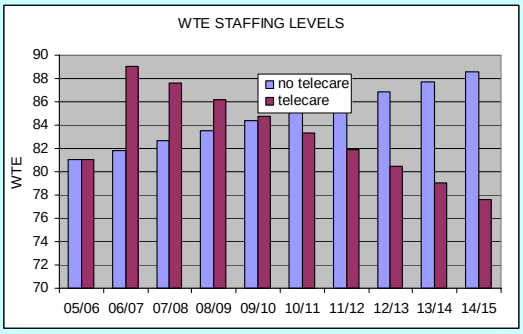
Exhibit 4-25: Case 2: Telecare business case modelling tool (UK)

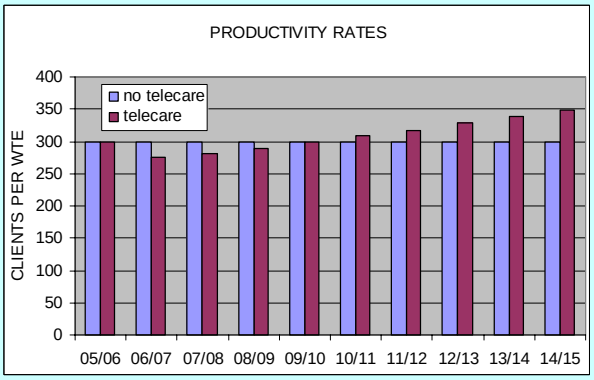
Description of the measure

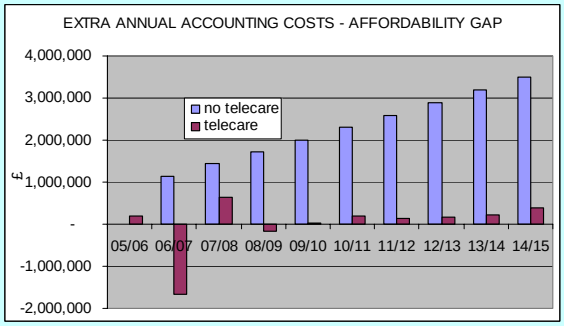
The Telecare Learning & Improvement Network in the UK has developed a business case modelling tool to support social service departments in the development of strategy and business cases for local telecare projects. The immediate aim was to support councils in making decisions about how to spend the Preventative Technology Grant.

Using spreadsheets, the tool provides a range of return-on-investment calculations and projections. Some illustrative examples of the type of output that could be produced are provided below:









Key features / learning points

- appears to be the first modelling tool specifically focusing in business case for telecare for public service providers
- useful analysis and metrics for identifying and quantifying inputs and outputs

Sources:

http://www.integratedcarenetwork.gov.uk/telecare/index.cfm?pid=361

http://www.integratedcarenetwork.gov.uk/_library/Resources/Telecare/Telecare_advice/Strategic_Business_Case_Model_-_Balance_of_Care.xls

Exhibit 4-26: Case 3: Whole system long term conditions (LTC) demonstrators (UK)

This is a major and large-scale government funded programme commencing in mid 2007, with expected sharing of initial findings by early 2009. It will establish three demonstrators (in Kent, Newham and Cornwall) to test the benefits of and business case for integrated health and social care supported by advanced assistive technology and telecare. The main focus for all three sites is to provide the evidence for more widespread use of telecare and telehealth.

The demonstrators will target a total population of one million across 3 sites, involving around 7500 'users' - 3-4,000 Telehealth and 4,500 Telecare. There will be a dual focus:

- people of any age who are at risk of current or future hospital admission, due to at least one of the following conditions: chronic heart disease, COPD or diabetes;
- the frail elderly who are at risk of current or future hospital admission, who have complex health and social care needs; they may have one or more of the above conditions.

The aim of the demonstrators will be to show that people with more complex needs can be supported to maintain their independence, achieve significant gains in quality of life and reduce unnecessary acute hospital and care home use. Robust and rigorous programme management practices are being employed at each site and centrally, in order that documentation records all the planning and implementation steps of the programme and captures learning and best practice to inform wider roll out for the future.

An evaluation team will examine the effects of the technology on emergency admission rates, patient/carer experience, and quality of life, as well as looking at the impact on primary care. The demonstrators are expected to lead to a better understanding of the level of benefit associated with such developments. They will also help fast track future change by addressing key implementation barriers and providing solutions for the wider NHS and social care.

The technology to be employed by the pilots will include a mix of telecare, telehealth and information integration. Sites will procure their own telecare and telehealth devices from the NHS PASA framework (see Case 5).

In addition to the main programme, the demonstrator sites are running additional pilots tailored to their own needs. In Cornwall this will involve recruiting 7500 for 'light touch' telehealth delivered via telephone support to patients and in Newham, the project hopes to tackle high rates of diabetes by offering telehealth via mobile phones to around 1000 patients.

Key features / learning points

- this will be the largest single test-bed to date
- the approach to setting up, monitoring and evaluating the trials to provide learning points for others

Sources:

http://www.integratedcarenetwork.gov.uk/icn/index.cfm?pid=105&catalogueContentID=850

Cornwall trials: http://212.104.147.54/media/pdf/0/m/Newsletter3__Dec_07.pdf

Exhibit 4-27: Case 4: The Law for the promotion of independent living and help for dependent individuals (Spain)

Description of the measure

The Law for the promotion of independent living and help for dependent individuals (Ley de Promoción de la Autonomía Personal y Atención a las Personas en Situación de Dependencia) from November 2006 establishes a new approach in this field, including public-private partnership approaches. It includes within its scope, amongst other aspects, tele-assistance (art.22), like telecare service**,** homecare service and day and night care centre service.

With this law coming into force, the government will provide in this pre-funded tax-based system more than 12.638 million euros to guarantee benefits and services of the dependence system, until 2015. In total, 66% is public funding, 33% of general administration of the government and 33% of autonomous communities, and the other 34% comes from private funding.

The provision of these services, though as yet uncertain, depends on the degree of dependency and on assessment of care needs, and also on the economic capacity of the beneficiary, for which a structure of co-payments is defined according to income and financial assets. It is not yet possible to say how the tele-assistance system will be integrated in the whole program and what the user cost will be.

Key features / learning points

- The development of the National Long-Term Care System is one of the political reforms of major relevance to the health and social care field
- extent of forecasts evaluating its likely economic effects
- interesting co-ordination mechanisms between health and social care services and among ACs.

Sources:

http://www.imsersomayores.csic.es/productos/dependencia/documentacion.html

http://www.hpm.org/en/Surveys/CRES_Barcelona/10/Longterm_Care_System_Implementation_in_Spain.html

Funding for innovation by relevant ICT and/or care sector industries

Another approach involves targeted public funding to promote innovation in ICT and/or care industry sectors that address independent living and home care. Such approaches may have a dual focus - on the one hand, to stimulate national industrial innovation and associated export possibilities, and on the other hand to increase the availability of relevant products and services. There are thus both industrial and welfare benefits to be gained. One of the clearest examples of this approach can be found in the iWell and FinnWell programmes in Finland (Case 5: Exhibit 4-28).

Exhibit 4-28: Case 5: iWell and FinnWell (Finland)

Description of the measures

iWell was a technology programme operated by Tekes, the National Technology Agency of Finland, from 2000-2003. The objectives of the programme were to:

- develop services and products
- support and maintain citizens' health by voluntary follow-up of 'life functions'; this included lifestyles, fitness, corporate wellness and eHealth solutions
- support the independent living of all citizens, the elderly and disabled, as well as those suffering from a long-term disease
- encourage companies and service providers to direct their products and services to senior citizens and health markets
- stimulation of domestic markets, new modes of operation and corporate group activities
- active follow-up on international markets, joint activities.

The emphasis was on taking ICT technology and solutions that were originally developed for production, logistics and construction sectors and turn them into well-being applications. The aim was to provide Finnish companies with a competitive edge in the expanding global market for well-being technology. Research projects in the field were also funded as part of the programme, but the emphasis was on supporting activities that were close to the market. Projects were part-funded, with Tekes providing 110 FIM (20 MEuro) of a total programme size of about 250 million FIM (45 MEuro).

FinnWell is a five-year (2004-2009) technology programme of the National Technology Agency of Finland, Tekes. Its objective is to improve the quality and profitability of healthcare, and to promote business activities and export in the field. Three main themes will be addressed by the programme: development of technologies for diagnostics and care; development of IT products and systems that support care, follow-up or prevention of illnesses; development of the operational processes of healthcare. The estimated overall value of the programme is 150 million euro, of which Tekes will invest about half and the participants in the programme fund the other half. Independent living and home care services for older people are just one area being supported, amongst many others.

Key features / learning points

- the clear-linkage of industrial and welfare objectives, and the recognition of the synergies between these

Sources:

http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/iWell/en/etusivu.html

http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/en/etusivu.html

Public-private partnership in research / RTD funding

Funding for research / RTD where the focus is further back from market deployment also has an important role to play in this field. Here public-private partnerships have potentially an important contribution to make. The TRIL Centre initiative in Ireland is a good example of this approach (Case 6: Exhibit 4-29).

Exhibit 4-29: Case 6: TRILCentre (IE)

Description of the measure

The Irish Industrial Development Authority (IDA) and Intel Corporation are jointly investing approximately 20 MEuro in a Technology Research for Independent Living (TRIL) Centre over a period of three years to collaborate with several leading Irish universities in creating one of the largest research efforts of this type in the world. TRIL is a virtual centre that brings together world-class industry and academic experts who are inventing and testing new technologies with older people, and their families, to support them in continuing to live independently. The Centre will focus on three key areas: improving social health and community engagement for older people, detecting and preventing falls in the home, and helping those with memory loss to maintain their independence.

TRIL operates as a coordinated collection of research projects addressing the physical, cognitive and social consequences of ageing, all informed by ethnographic research and supported by a shared pool of knowledge and engineering resources. It is a collaborative effort combining Intel personnel and researchers from Irish universities and hospitals in multi-disciplinary teams. Its mission is to discover and deliver technology solutions which support independent ageing, ideally in a home environment.

From the industrial development perspective TRIL is expected to have a high strategic value to Ireland in terms of collaborative work between leading academic institutions and Intel, enhancing skills development, knowledge acquisition and making Ireland highly competitive within Europe and the world in this field. Ireland has an active, high-quality research sector in the healthcare domain including bio-engineering and bio-informatics. The TRIL Centre is expected to build on this and position Ireland as a centre of excellence for this type of research in Europe.

For Intel, the TRIL Centre is part of a wider global approach by the company to build on its current U.S. ageing research and expand its understanding of the social and cultural differences of the ageing demographics of Europe – ensuring the development of the most appropriate technologies suitable for a wider multi-cultural audience. Intel recently formed the Health Research and Innovation Europe (HRIe) team, their first health research innovation resource outside the U.S., based at Intel's European manufacturing headquarters in Ireland.

Key features / learning points

- public-private partnership to promote research / RTD

Sources:

http://www.trilcentre.org/

Public procurement

Finally, an important cross-cutting issue for public funding oriented towards market development concerns how to fit such activities within the rules of public procurement. On the one hand, there is a need to ensure that this type of funding is not contrary to any European or national rules that apply to the relevant context. On the other hand, there has been increasing interest in the potential offered by public procurement to drive innovation in Europe[51].

[51] http://ec.europa.eu/invest-in-research/pdf/download_en/aho_report.pdf; http://ec.europa.eu/information_society/research/key_docs/documents/procurement.pdf

The '**pre-commercial procurement of innovation approach'** seems especially suitable for encouraging innovation in the ICT for independent living / care domain, due to features of the demand-supply situation that have slowed the emergence of mature, commercialized solution 'packages' that public health and social care services could procure through normal procurement processes. The result is a situation where in some cases there are no commercial stable solutions yet available for particular types of need/application and for others existing solutions often have shortcomings that require additional research and/or development. The nature of the domain also suggests a need for shared risk-taking (given the 'chicken-and-egg' characteristics of the demand-supply interaction) and for close cooperation between the demand and supply sides both to enable mutual learning between procurers, users and suppliers and to ensure effective and efficient attention to specific areas, such as implementation of large-scale clinical and other trials, ensuring standardization and interoperability, and so on. Overall, the domain is a 'classic' one as regards the need for co-evolution of demand and supply, and the role that pre-commercial public procurement can play in this.

As regards the '**innovative procurement'** approach, the focus is on using innovative approaches to procurement of commercially available products and services. Relevant examples may include pooled / joint procurement, service level agreements, framework agreements, etc.

The clearest example of explicit implementation of public procurement in this field is the UK's National Framework Agreement for Telecare (Case 7: Exhibit 4-30). This incorporates elements to both approaches - pre-commercial public procurement of innovation and innovative public procurement.

Exhibit 4-30: Case 7: National Framework Agreement for Telecare (UK)

Description of the measure

The National Framework Agreement for Telecare is perhaps the most developed approach in this field internationally. Apart from its role in facilitating market take-off and development it has also been judged to be of a high quality in its own right - the developer's, the National Health Service's Purchasing and Supply Agency (NHS PASA) telecare team, won the UK's Chartered Institute or Purchasing and Supply (CIPS) supply management award in 2007 for best public procurement project, acknowledging their work on telecare.

Procurement is referred to in 'Building Telecare in England' as a key element in the Department of Health's vision, with local authorities being encouraged to follow best procurement practice. To support this, NHS PASA established a specific project management group to deliver the procurement solution and sourcing activity required for telecare. A restricted procedure advertisement was placed in the OJEU on 22 November 2005. In addition to the standard procurement activities to set up the framework agreement, parallel activities included stakeholder engagement and consultation (through workshops and focus group with the intended users - local authority commissioners) to develop the evaluation and award criteria; data gathering exercise to develop understanding of marketplace and to benchmark existing practices; research exercise to understand both the supply/product and customer/demand bases.

The agreement covers the following modalities:

- Telecare / community alarms (Equipment to assist in reducing accidents and incidents in the home; Home activity, lifestyle and environmental monitors; Integrated systems for Telecare and healthcare; Community (social) alarms)
- Telehealth/medicine (Blood pressure monitoring; Blood glucose monitoring; Cardiac arrhythmia monitoring; Asthma monitors; Home personal medical assistant units; Integrated health monitors; Medication reminder systems).

In addition to telecare equipment, the national framework agreement also includes relevant installation and maintenance services for equipment, monitoring and response services. There are currently 14 suppliers covered in the agreement.

Entities that can access the agreement include: local authorities; social care; NHS trusts, strategic health authorities, collaborative procurement hubs and supply management confederations; housing organisations / associations; voluntary and/or charitable organisations; community equipment services; independent sector providers (third parties); non-departmental bodies charged with delivery of health and social care/services; these organisations and their equivalents in England, Scotland, Wales and Northern Ireland.

Key features / learning points

Most comprehensive example of a framework agreement for public procurement in this area

Source:

National Framework Agreement for Telecare. NHS Purchasing and Supply Agency. Contract for June 2006 to May 2102. http://www.pasa.nhs.uk/PASAWeb/Productsandservices/Telecare/NFA.htm

4.2.2 Ongoing funding and market support mechanisms

This section focuses on funding and other market support mechanisms provided on an ongoing basis as the market becomes established. Here it is necessary to take into account differences in the health and social care systems across countries. In fact, there are a myriad

of different systems, each with its own funding characteristics that impact on how ICT-related products and services for independent living and care are likely to be provided and funded.

As far as we are aware, however, there has not yet been any effort to develop a comprehensive conceptual mapping of the characteristics of different national systems and how this impinges on funding for ICT-related products and services, nor does the scope of the current study allow for the development of such a comprehensive framework. There is some European research underway on this theme, but results are not currently available[52]. For purposes of the current study, therefore, the conceptual/analytic approach has been to identify some key lines of stratification that can help to guide the identification and selection of examples of funding approaches and systems.

Sectoral demarcation

One important dimension concerns the scope of the home care / independent living service provision 'system', in particular, what services and products are covered. Typically there is a division of responsibilities and coverage between services addressing medical, social care and housing needs, respectively. The extent to which there are strict boundaries and demarcation lines between these areas can vary widely, however, and the new services enabled by ICT (e.g. telecare / tele-monitoring) can cut across existing demarcation lines. Likewise, the emergence of a more integrated 'long-term care' approach / sector is encouraging the removal of unhelpful demarcations in some countries.

Intersecting with this are the different lines of technology and associated application/service of relevance, which may themselves be linked to different funding mechanisms and / or provider sectors. A basic classification might distinguish between telecare, telehealth, eHealth, assistive technology and smart homes:

Telecare can be defined as the 'continuous, automatic and remote monitoring of real-time emergencies and lifestyle changes over time in order to manage the risks associated with independent living'. Thus, funding for telecare might be expected to be found within the social care domain.

Telehealth can be defined as the 'delivery of healthcare at a distance using electronic means of communication - usually from service user to clinician'. An example might be a service user measuring their vital signs at home and this data being transmitted via a telehealth monitor to a clinician. Thus, funding for telecare might be expected to be found primarily within the health care domain.

eHealth can be defined as 'health services, information and education delivered or enhanced through the internet and related technologies'. In fact, from the funding perspective, a distinction can be made between self-directed activities by users and formal user-clinician interactions (e.g. teleconsultations and 'web-visits'). Funding for the former might be found within the public health domain and for the latter in the reimbursement systems that apply in relation to healthcare consultations.

Assistive Technology can be defined as standalone technological devices that help with activities of daily living. Funding may be found within disability-oriented systems and/or more broadly-focused social care systems.

[52] http://www.independent-living-for-elderly.eu/

Smart homes can be defined as ICT-based networking and control systems, operating within the home and often also linked to external services. Funding might be expected to be found within the housing / housing-related services sector, social care or disability-related services.

Financing models

A second key dimension concerns the financing models that apply in a country and/or for particular sectors (health, social care, housing, long-term care) within a country.

One important issue is whether the system(s) are mainly based on direct public (taxation-based) provision and those which are insurance-based. Insurance-based systems may be not-for-profit ('social insurance') or for-profit (private insurance). The characteristics of each type of system will influence what services are available, to who and at what cost, as well as who provides the services and the reimbursement processes that are involved.

In either case, but especially under insurance-based system, two aspects of financing have potential relevance - financing directed towards the service user (to defray costs of services or products that are offered by public or private service providers) and financing directed towards service providers (to reimburse them for services that they provide to eligible clients). The former is important in ensuring affordability of available services; the latter is important in ensuring that the types of services in question are offered in the first place.

Financing directed towards the service user

In this context, 'funding' is taken to refer to any mechanisms to meet, partially or completely, what would otherwise have to be final out-of-pocket expenditure at market rates by older people or their families.

Forms of 'funding' include:

- Direct provision of services to (eligible) clients without charge or at reduced charge (this is the typical organization of many aspects of health and social care in many countries)
- Provision of ‘reimbursement’ for (eligible) services from (eligible) service providers under (public or private) social, health and/or specific long-term care insurance schemes; this may be organized ‘in advance’ so that there is no (temporary) out-of-pocket payments made by the client or may be in the form of a full or partial refund after the event
- Provision of care service vouchers, allowances, personal budgets and so on, that allow older people (and sometimes care-giving families) discretion in relation to who they purchase services from and (sometimes) what services they purchase

In some countries, reimbursement is also provided through the taxation system, whereby eligible expenditure on care can be tax deductible (in some countries, such as Ireland, this be an important component of the system).

Linked to this is the overarching issue of eligibility, particularly eligibility for publicly provided or supported services. There are two set of factors - needs-related and income-related - that can be especially relevant in this regard.

In most countries, access to particular services is contingent on an assessment of need for that service. The stringency of requirements and extent of rationing of services may vary considerably; a given type of service may only be available on a very restrictive basis, to those with very high levels of already identified health or social care problems, whereas in

others there may be much broader availability in the context of a more preventative orientation of service delivery and funding.

Countries also vary in the extent to which publicly-provided services take income of potential service recipients into account. Such rationing of services on the basis of means-testing is more associated with taxation-based systems than insurance based systems.

In some countries, both income-related and needs-related rationing apply, meaning that publicly-provided services are often only available to low income individuals and/or households reaching a defined level of care need on the basis of established assessment criteria.

Funding / reimbursement of providers

Here the focus is on the financing systems that apply in the reimbursement of providers who are centrally reimbursed on a fee-per-service basis. If a service, such as telecare, is reimbursed then it is likely to be offered by the provider; if it is not, then there may be no incentive for it to be offered.

Examples of funding approaches and schemes

Direct provision / funding as part of public social care services

The provision of telecare services by local authorities in the UK is probably the most well-developed example internationally to date, even if this is only really due to become widely mainstreamed from 2008 onwards. Case 8 (Exhibit 4-31) presents some of the main overarching elements of the current perspective/approach in the UK. Case(s) 9 (Exhibit 4-32) present some examples of different approaches being adopted by local authorities. Case 10 (Exhibit 4-33) presents the approach to provision / funding of social alarms services in Germany and Case 11 (Exhibit 4-34) presents an example of the approach currently in operation in one of the Spanish regions (Andalucia). Finally Case 12 (Exhibit 4-35) presents an example of a service based on video telephony from Sweden.

Direct provision / funding as part of public housing-related services

ICT-based solutions for independent living and care may also be provided through the housing sector. Cases 13 (Norway) and 14 (Netherlands) provide some examples of this.

Direct provision / funding under assistive technology services

Finally, ICT-based solutions for independent living and care may also be provided through assistive technology services. Case 15 presents the example of the service in Denmark.

Exhibit 4-31: Case 8: Direct Provision of Telecare services - emerging framework (UK)

Description of the approach

Following a build-up period in 2006 and 2007, supported by the Preventative Technology grant, telecare and some telehealth services will begin to be mainstreamed by local authorities and their partners in the UK in 2008. Currently, charging systems in operation appear to be quite variable across the local authorities, reflecting both differences in the maturity and degree of mainstreaming of their telecare activities to date, as well as differences that pertain across the authorities in relation to charging for social care (and community alarms) more generally. Against this background, the Care Services Improvement Partnership (CSIP) has examined issues of commissioning and charging for telecare with a view to establishing an appropriate and consistent basis across the local authorities.

One important issue concerns who the telecare services should be offered to, with CSIP pointing to the need to get the balance right between various possible client groups, such as those who are eligible for home care services because of identified current needs, targeted efforts addressing particular groups (e.g. falls, dementia support), those who might be targeted for preventative inputs (including housing related) and those who may be users in a self-care or self-directed capacity.

At present, it seems that the majority of social care local authorities provide telecare for people with levels of assessed social care need in the 'critical/substantial' category (according to the social service eligibility assessment framework, Fair Access to Care Services - FACS). However, the new requirements for integrated needs assessment and commissioning approaches between the local authority social (and housing) services and the local health services (Primary Care Trusts) under the Local Government and Public Involvement in Health Act (2007) will mean that telecare should become more widely offered for preventative purposes as well.

According to *Building Telecare in England* the following charging principles should apply. Where, as a result of a community care assessment, telecare equipment is provided by a local authority as an aid for the purposes of assisting with nursing at home or aiding daily living, it should be provided free of charge. A charge may be made for the service elements (revenue) of telecare. Charging should be in line with local Fairer Charging and Fairer Access to Care Services (FACS) policies. Where it is part of the local strategy to provide telecare packages to people who are not assessed as requiring them as an aid for the purposes of assisting with nursing at home or aiding daily living, for instance as a preventative service, a charge can be made for the equipment and the service (revenue) elements. In these instances the FACS means test can be used. Where telecare is part of a joint package of health and social care, providers will need to agree their respective responsibilities and charge accordingly.

Within this overall framework, charging is a local decision and local authorities have powers to charge for certain social care services such as telecare. There is considerable variability in the approaches adopted by local authorities who offer telecare as a mainstream service.

Key features / learning points

- co-payments at different levels may be required depending on assessed need and/or income
- different financing approaches / levels for equipment and service elements of telecare
- different financing for those with (substantial) already developed need as opposed to those where the objectives would be more preventative

Sources:

Building Telecare in England, DH, July 2005; CSIP Telecare eNewsletter, January 2008 (1)

Exhibit 4-32: Case(s) 9: Examples of local authority approaches to telecare provision (UK)

Description of the approaches

Lancashire

Lancashire Telecare is run by telecare service providers that administer and run the service independently of the local authority. The Telecare Service involves full installation of equipment, monitoring, maintenance and the emergency response service. In addition, local wardens visit the user every month to check the monitors are working and the person is comfortable using the equipment.

People can receive the service directly on a private self-funding basis or be referred by adult social care services, occupational therapists and community nurses, district councils and housing associations. Lancashire County Council commissions the service in cases where it is judged to improve the lives of its service users and may include the charges within existing packages of care (depending on clients' financial circumstances). The service is provided following an assessment. The Council has no involvement in the Telecare service for those who pay directly for Telecare and who have not qualified to receive Telecare as part of a Package of care.

The service will be available free of charge to many people who are currently eligible for social services as part of their social care package to supplement their existing care provision such as home help. This will depend, however, on the individual's financial circumstances. If, following a social care assessment, an individual does not meet the criteria, the Telecare equipment can still be installed and provided on lease from the local service provider.

For existing Lancashire County Council service users that have been assessed as also needing Telecare, the council may include the weekly cost of Telecare (currently £8.86, a little under 12 euro) within their existing package of care (depending on financial circumstances). For those who are not a Council social care service user and decide to get the Telecare service privately, there is a weekly charge payable directly to the local Telecare service provider.

Source: www.lancashire.gov.uk/telecare

Warwickshire

The cost of the telecare equipment, installation and maintenance is provided free of charge. This cost is met by Warwickshire County Council, Adult Health and Community Services. The equipment remains the property of Warwickshire County Council and should be returned to the telecare service provider when no longer needed.

There is no charge for the telecare service for the first six weeks. After this time: if the client's needs are eligible to be met by the Adult Health and Community Services, they will carry out a financial assessment of ability to pay for the telecare service. This takes account of other services that they may already receive such as Home Care. In such cases the telecare service will form part of the client's Assessed Package of Care. Those in this category receive an invoice from WCC for any charges that they have to pay. The financial assessment may determine that they do not have to pay any charge for the telecare service, and therefore they will continue to receive the service free of charge after the initial six week charge free period has expired.

For those with less serious needs, the charge for the service will be £4.50 (about 7 euro) per week after the initial six week charge free period unless they are in receipt of Housing Benefit or Council Tax Benefit. Those in receipt of either of these benefits will receive the telecare service free of charge after the initial six week charge free period.

http://www.warwickshire.gov.uk/web/corporate/pages.nsf/Links/F62CE18D0D676FD4802573AA004B849B

Case(s) 9 (contd.): Examples of local authority approaches to telecare provision (UK)

Description of the approaches

Mole valley

There are two schemes running in the area and they are designed to complement each other.

One is the PTG Telecare scheme, which offers, after assessment, suitable sensors to an individual to assist them to live more independently at home. The sensors when linked to a community alarm will provide daily 24 hour unobtrusive monitoring of the client's safety. This will act as a reassurance to them and their family, friends or carers.

The second is the CAT (Community Alarm Telecare) hospital discharge scheme, which offers a community alarm and pendant free for the first 12 weeks to those aged 65 and over (in Elmbridge, Mole Valley, Spelthorne and Woking there is no age restriction) who do not already have the service.

The basic alarm and pendant, which has been available for more than 20 years, will be charged at the current weekly fee by whichever Borough or District the client lives in. As a guide they should expect to pay in the region of £3.60 - £3.70 (5.40 - 5.60 euro) per week for this, apart from those eligible for the CAT scheme above, who as already stated receive the first 12 weeks free.

In the North West, North East & South East Surrey areas, due to the Government funding the PTG Telecare scheme, the additional sensors will be free to all clients for the first 12 weeks and after that will attract a fee of £1 per week, in addition to the basic alarm cost above, irrespective of the number of sensors installed. For smoke detectors some areas are charging less than £1 or providing them free.

Charging is not means tested and referral to the service can be via the health or social services, or by the individual themselves.

http://www.molevalley.gov.uk/index.cfm?articleid=266

Cumbria

There are two parts to the cost of Telecare:

- The cost of the Telecare equipment, its installation and maintenance - this is provided free of charge. This cost is met by Adult Social Care as the Telecare equipment is provided on a loan basis and remains the property of the council.
- The weekly service charge for the call handling centre and the mobile response service (if this is available in the area one lives). This charge varies but is around £9 (13.50 euro) per week. The client may be asked to contribute to this cost.

Clients having Telecare may well also be receiving other services such as home care. The weekly service charge for Telecare will be added to the cost of other services like home care to arrive at an overall care cost. A financial assessment (or means test) is then conducted to work out how much the client will be expected to pay towards the cost of their care. The amount they pay will include a contribution to the cost of the Telecare service charge.

Key features / learning points

- how telecare eligibility and charging is being positioned within the overall service provision framework
- different approaches to needs assessment, user charging and so on
- different charging principles for the equipment and service elements.

Exhibit 4-33: Case 10: Social alarm service (Germany)

Charities like Caritas, Diakonie or German Red Cross and Emergency Medical Services like Johanniter, Malteser, Arbeiter Samariter Bund, local authorities, hospitals and private providers offer social alarm services. They have together 350.000 users which means that at a minimum 2.9 % of people over 65 years in Germany use social alarm services.

Besides the traditional social alarm service, many social alarm service centres also use their technical and personal 24hour infrastructure to offer additional services, which are currently still not very much demanded.

The social alarm systems and services are not financed if specific reasons are not established. Social alarms are not listed in the aid catalogue of the health insurances, which is a legal basic of the funding. Based on SGB XI, §78 Abs. 1 also the care insurance reimburses social alarms only if a high-maintenance level was assessed by the medical service of the care insurance (MDK) and in addition if the person lives alone, life-threatening situations are to be expected and this person would be not able to initiate an emergency call using a standard telephone. Even if the MDK agrees, only the system costs and not the social alarm service costs will be paid.

Exhibit 4-34: Case 11: Andalusian Telecare Service (Spain)

The Andalusian Telecare Service is a service of the Andalusian Regional Government (Junta de Andalucía). Older people can use this service if they have the Andalucía Junta sesentaycinco Card, an electronic chip card. This is made available free of charge by the Regional Ministry for Equality and Social Welfare of the Andalusian Regional Government to people over 65 years of age, through the Andalusian Social Services Foundation. Users can get the Andalucía Junta sesentaycinco Gold Card if they are older than 65, live in Andalusia and get less than 75 per cent of the minimum wage.

The sesentaycinco Card gives a discount to the user of 40%, 80% and up to 100% to the telecare service. The telecare program includes immediate personalized care, mobilization of resources in the event of an emergency and regular contact and personal monitoring. The user can also use other home services like free pharmacy home delivery or telephone management of home procedures.

It is not clear what the exact user costs are to use the telecare services of Andalusia.

Exhibit 4-35: Case 12: ACTION (Sweden)

Assisting Carers using Telematics Interventions to meet Older people's Needs (ACTION) began in 1997 with a three-year EU funded project within the Fourth Framework, Telematics Integration for Disabled and Elderly sector. ACTION now exists in five municipalities in Sweden. It includes a information and educational program and a videophone system to maintain contact with health and social care staff and other families in a similar situation to their own.

The second program, built on the original ACTION service, is the ACTION Living with Dementia support programme which is designed especially for those older people with early stage dementia and their families. It includes also the information and educational programme (multimedia programme) which contains different computer exercises from the Lexia cognitive training programme. Moreover a twelve week support group for older people with early stage dementia and their family members is offered. Members meet up on a weekly basis for three hours.

The ACTION-service is offered to municipalities at a fixed price of SEK 2.990 (about 315 Euros) per month and user. Cost analyses reveal that there is an approximate saving for municipalities of 96 000 Swedish kronor per family per year.

Exhibit 4-36: Case 13: Smart home technology in service flats (Norway)

The National Insurance Administration administers the system of assistive technology or technical aids in Norway. Disabled persons may apply for such support, which they might receive, free of charge, if the criteria for support are fulfilled. So far, smart home technology is not defined as assistive technology by the National Insurance Administration, whereas several devices that can be integrated in the smart home are. Examples are environmental control systems and some alarms.

About 20 of the 434 municipalities have built flats with smart home technology.

Exhibit 4-37: Case 14: Smart home technology in service flats (Netherlands)

The Ministry of Health, Care and Welfare pays € 2500 – 3000 for smart home technology per apartment, in which an older person who needs home care will live independently. Only care organizations and/or housing associations who build serviced housing can ask for the allowance. Also housing associations invest, most of the time, in the flexible ICT infrastructure in houses they build for rent to their tenants.

The funding principle of the government is that only those apartments, in which older people will live, who need professional care, will be granted with full payment of the smart home technology.

Exhibit 4-38: Case 15: Assistive technology for home use (Denmark)

Within the scope of the Act on Social Services, municipalities are responsible for providing grants for assistive devices and consumer goods for people with long-term physical or mental disabilities when an assistive device could relieve the long-term effects of the disability to a great extent, could facilitate day-to-day home life to a great extent, or is necessary to allow the person in question to do a job.

County councils provide grants for a range of equipment including special IT-based assistive devices and assistive devices to support these. In Denmark, there is no complete list of the assistive devices that can be provided, or a list of products considered to be assistive devices. However, amendment of the law in June 1998 resulted in the division of assistive devices into three groups: general equipment, consumer goods of particular value to users with disabilities, and assistive devices.

General equipment includes products which anyone requiring them can acquire, such as ordinary beds, TVs, mattresses, chairs, telephones, etc. No grants are given for these. Consumer goods are products manufactured and sold widely in anticipation of ordinary use among the general populace, but which are of special value to people with disabilities (e.g. computers for people unable to talk). 50 per cent grants are awarded for these types of assistive devices, which then become the property of the user. Finally, we have the assistive devices category. These are regarded as products manufactured with a view to helping to alleviate the effects of physical or mental disability.

In general, assistive devices and other services provided to compensate for impairments are financed by the public sector through taxes. However, the exceptions described previously apply: for example, users themselves have to pay 50 per cent of the price of consumer goods. There is a general administration principle which states that the body granting the funding is also obliged to make the payment.

In the case of assistive devices and consumer goods for people aged under 67, municipalities and county councils pay 50 per cent of the cost each, while on the other hand municipalities pay the full amount for assistive devices allocated to people aged 67 or above. However, when the Services Act came into force in 1998, county councils – as mentioned previously – were given authorisation to allocate assistive devices and full financial responsibility for optical assistive devices, prosthetic arms and legs and hearing aids, as well as special ICT-based assistive devices.

Source: http://www.nsh.se/download/Provision_Assistive_Technology.pdf

4.3 Technological developments

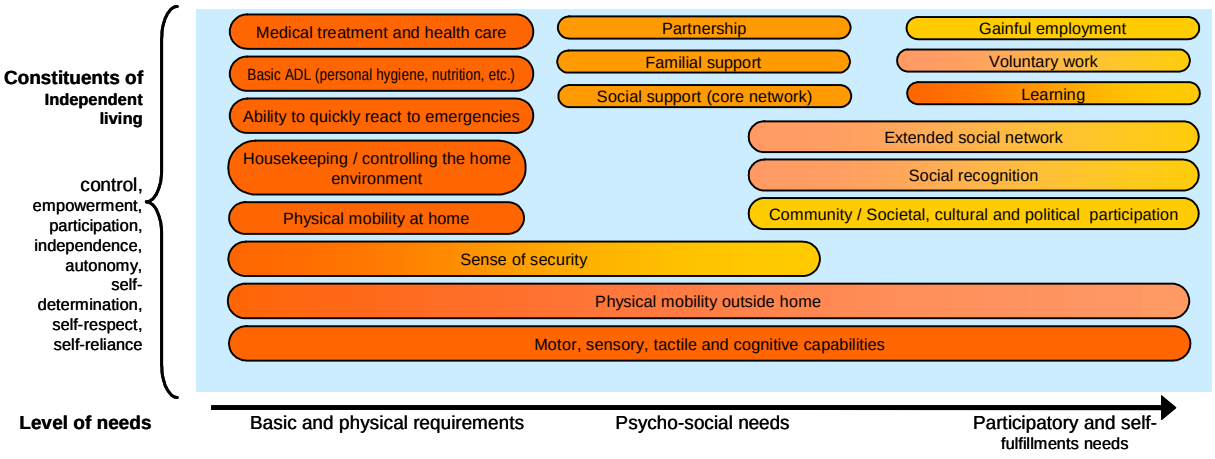
This section looks at another dimension of the supply side, namely, the technological developments in the short- to-medium term that will influence what is available to support independent living and care for older people. In this regard, attention is given both to technologies that are already in use or ready for use (even if not yet made available as mainstream offers) and technologies that are still under development.

4.3.1 Overview of the domain

There has so far been no complete mapping of the full range of applications of relevance for care / independent living and the technology developments that underpin these. Some useful perspectives have been developed, however, and are briefly discussed below.

One useful perspective comes from a study commissioned by the Institute for Prospective Technology Studies (IPTS) during 2005[53], with a focus on ICT products and applications as well as services that enable people whose independence of lifestyle is challenged to lead a more independent and participatory life. The study evaluated the demand for future ICT-based products and services in Europe's ageing society, in the context of an active ageing strategy, by taking into account technological, political, ethical and social factors.

Exhibit 4-39: Constituents and shaping factors of independent living

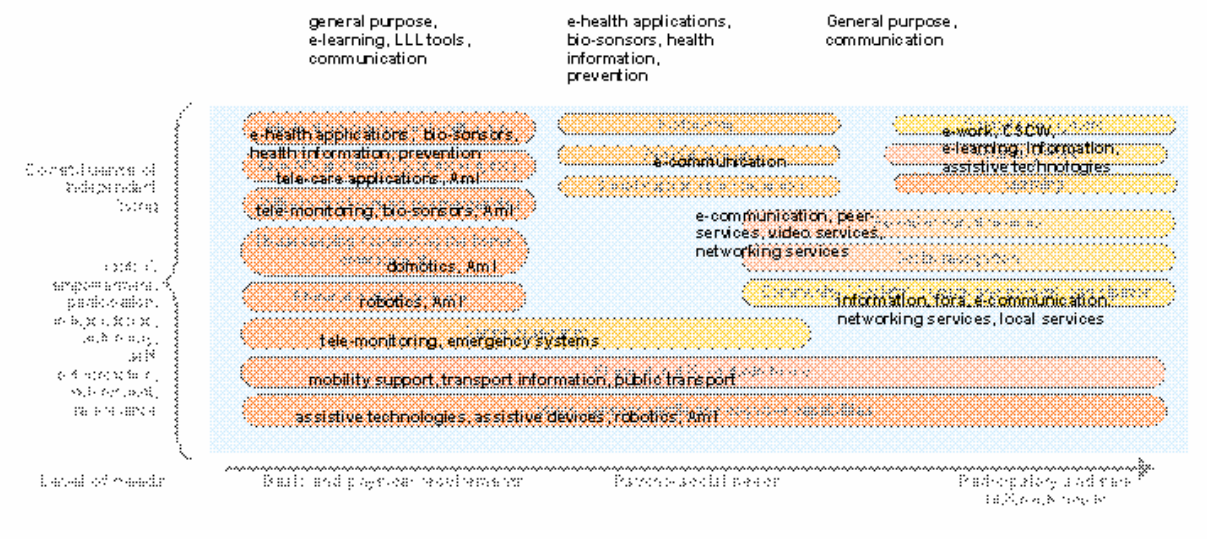


Source: empirica 2005 (Study on the future of ILS)

Adopting a life course perspective, the study identified a very wide range of threats to independent living, and technologies and ICT applications that hold the potential to better address these threats respectively. As visualised by the figures above and below, a wide ranging field of ICT applications are identified that hold the potential to support independent living in old age.

[53] TNO, empirica, VUB (2005): ILS – The Future of Independent Living Services in the EU Final report. Available at: http://fiste.jrc.es/pages/documents/ILSfinaldraft.pdf (accessed 15.09.2006)

Exhibit 4-40: ILS application potentials mapped on constituents of independent living



Source: empirica 2005 (Study on the future of ILS)

Another relevant perspective comes from a study in the field of "Small and smart technologies for ambient assisted living"[54]. Here again a very broad ranging approach was adopted when it comes to defining technologies and applications of relevance for independent living and care. A range of potentially relevant technology themes were identified in terms of an open listing:[55]

- New Materials (e. g. polymer technologies)
- Micro- and nanoelectronics (nanocoatings, polymer actuators)
- Embedded Systems (e.g. as in smart textiles)
- Micro System Technology, including biomicrotechnology (biochips, sensors to measure values like blood pressure, temperature, weight, respiration, urine output and to observe activity patterns, nutrition, gait, sleep)
- Energy generation and control technologies (energy harvesting)
- Human Machine Interfaces (display technologies, natural language communication)
- Communication (e.g. body area network)
- Software, web & network technologies (e.g. tele-services)
- …

Moreover, a range of exemplary sectors for applications and products are identified – again in terms of an open listing - including:

- Health care, medical devices
- Geronto-techologies
- Wellness

54 http://www.aal169.org/default.html

55 VDI/VDE/IT (2006):Ambient Assisted Living – European Overview Report. Available at: http://www.aal169.org/Published/Final%20Version.pdf (accessed on 14.09.2006)

- Services
- Smart home
- Smart textiles
- Robotics
- Consumer-electronics
- …

A recent study entitled "Ensuring Good Care for Older People" investigated options for ensuring high quality social care for older people in the UK[56]. The potentials provided by new technologies in general and ICT in particular were – amongst other issues – addressed in some detail. Adopting a pragmatic approach, i.e. focusing on applications that have reached a certain level of maturity already, the study highlighted that telecare equipment and services offer opportunities to react to hazardous events (e.g. a fall or a running bath tap left unattended) and also to prevent the further deterioration of a person's ability to care for themselves (e.g. by identifying changes in a person's daily habits) or their health (e.g. through vital signs monitoring).

In this context, the following classification of ICT enabled applications emerges:[57]

- **Information Health advice** - self-help groups and web-based information systems that can be accessed through a laptop computer or an interactive television.
- **Electronic assistive technology** - a variety of modern aids and adaptations for the home including, for instance, intelligent heating controls, automatic doors, stair-lifts, automatic beds, and electronic prompts/memory aids to ensure medication is taken correctly. A video-telephone may be included in this category.
- **Safety and security monitoring** - a collection of sensors that transmit signals to a central receiver hub using wireless technology. These monitor bath floods, gas leaks, unlocked doors, fire, carbon monoxide and various other basic safety indicators in the home environment. In the case of an emergency, an alarm signal rings in the home and is also immediately transmitted to a central alarm centre where the staff will alert the necessary reaction teams.
- **Personal monitoring** - these fall into three categories. At the basic level would be an automatic fall detector, which alerts the alarm centre in the case of a fall, or a 'wander' monitor, which checks that someone with dementia does not drift too far from the home. Systems with a higher level of inbuilt intelligence can also be fitted to detect 'abnormal' activity levels for such indicators as movement within the flat, toilet flushing, or overnight absence from a bed. A change in the normal pattern prompts an alarm signal to be sent to the call centre.
- **Vital signs monitoring** - as a third level of personal monitoring, these systems can regularly record information about weight, temperature, blood pressure and other physiological signs. The data can be accessed by medical professionals who are

[56] Wanless, D. (2006): Securing Good Care for Older People – Taking a long term view. Available at: http://www.kingsfund.org.uk/resources/publications/securing_good.html

[57] Poole, T. (2006): TELECARE AND OLDER PEOPLE, Background paper to the Wanless Social care Review. available at http://www.kingsfund.org.uk/resources/publications/securing_good.html

treating the older person for any ongoing medical condition and should alert them to any change in well-being. Automatic alerts can be programmed as an early warning system for any deterioration or sudden change in levels. The information could also potentially be relayed to a data storage centre where a health record would be built up. Such data would then be available at a future date if an elderly person's health deteriorated.

As illustrated by the brief review of recent approaches to structure the domain, it is clear that it comprises a heterogeneous field of technology applications ranging from quite simple devices such as intelligent medication dispensers to complex systems such as networked homes and interactive services. Some are relatively mature and others are still at the development stage.

4.3.2 Technologies already in use or ready for use

There are already a variety of ICT-based devices and applications that have reached a level of maturity, at least in technological regard, suggesting that wider deployment seems likely in the near future. However, although the focus here is on technological dimensions, it should be noted that actual deployment does not merely depend on technological maturity of a certain system or product but on non-technological market dynamics as well.

Personal Health Devices

To begin with, there are different kinds of personal health devices that are – at least in principle - available for being exploited in the independent living / care context. These range from technology components such as sensors to fully developed systems, as briefly discussed in the following.

Physical and biochemical sensors are for instance being used for electrical sensing of the central nervous system, as implantable devices for brain stimulation in cases of Parkinson, epilepsy and depression, and also for activity monitoring for elderly people. *Non-invasive sensors* for glucose monitoring and measurement of heart and respiratory rate include optical, acoustic, electrical sensors (wearable piezoelectric sensors embedded in textiles), radio-frequency sensors (measurement of chest movements; impedance measurements correlated to glucose levels). The need to monitor both mental and physical status - *multi-parameter monitoring* - will require the use of multiple sensors, data fusion and complex data analysis.

Portable/impenetrable systems can be seen as an important component in comprehensive home telecare services which facilitate high levels of self-care and self management. The *Telemedcare* system, for instance, requires less than 20 minutes a day of patient interaction and provides daily logs, questionnaire instruments, health education and medication management as well as clinical measurements.[58] For instance, *implantable monitors* have been used in the outpatient management of patients with congestive heart failure. The monitor transmits data via a modem to a centralized web space where health care providers can access detailed and summary data via a web site through a secure network connection.

[58] Branko Celler (2006) The Management of Chronic Disease in the Home, the Community and GP Offices. pHealth – international workshop in micro- and nanosystems for personalized health. Luzern/Switzerland, January 30-February 1. www.phealth-2006.com

Similarly, *MobiHealth* and *HealthService24* have developed a generic *Body Area Network (BAN)* for healthcare and a mobile health service platform.[59]

Progress in miniaturisation (in nanotechnology) and system integration has led to the development of *intelligent wearable personal sensors and systems*, enabling continuing health monitoring and feedback. Extremely miniaturized MEMS (Micro-Electro-Mechanical Systems) have been developed, which can replace larger and hence more cumbersome biomedical sensors and diagnostic tools.[60] MEMS can be combined with microelectronics and wireless devices to create so called Wireless Integrated MicroSystems (WIMS). With properly integrated home-based WIMS systems, patients could be monitored on a continuous basis and care professionals alerted automatically when events merit attention. Blood oximeters, heart rate monitors, and temperature sensors could all be components of WIMS; swallowable capsules for viewing the digestive tract are already in use[61].

Assistive technology devices

During the last decade, the nature and variety of assistive technologies has considerably changed, mainly due to accelerating developments in mainstream technologies. Since the early 1990s, many ICT-based assistive technology products have become available including speech synthesizers, Bliss communication devices, text telephones, Braille lines and communicators. Speech technology - including speech recognition, speech synthesis, speech coding and speech analysis - has been increasingly deployed in AT applications. Speech synthesis is used in aids for reading, writing, programming and general voice output communication, and speech recognition in aids for writing and programming and for controlling devices in the user's environment. Portable devices have been developed with the capability to detect lost objects like a key and in this way to support people with light to moderate (but not severe) memory loss. In the longer run, more powerful devices can be expected to become available, including robots designed to support dependent people in carrying out a variety of tasks without any human support.

More than 20,000 assistive technology products are currently available on the European market. However, although market data is not yet available to quantify actual usage levels of assistive technology devices in the European Union, uptake of assistive technology seems to be very unevenly spread across Member States[62].

[59] Herzog et al. (2006) Mobile Patient Monitoring – applications and value propositions for personal health. . pHealth – international workshop in micro- and nanosystems for personalized health. Luzern/Switzerland, January 30-February 1. www.phealth-2006.com

[60] Ferrante, Frank E. (2005) Evolving Telemedicine/eHealth Technology. Telemedicine and e-Health 11:3 371.

[61] see Fireman, Z. (2004) The light from the beginning to the end of the tunnel. Gastroenerology 126 (3): 914-919 as well as Pelletier, F. (2004) Wireless tech allies with low power gear. EE Times, August 16, 2004 and Pennazio et al., (2004) Outcomes of patients with obscure gastrointestinal bleeding after capsule endoscopy: report of 100 consecutive cases. Gastroenterology 126 (3): 643-653.

[62] BÜHLER, C. (2000): Assistive Technology Market and Research. Presentation in 2000.

http://www.acesso.umic.pcm.gov.pt/abril2000/CBuhler.ppt.

Social alarm services

Social alarm services are directed towards security-related needs of older people and are quite widely available in many countries[63]. Depending on the national context, they are known as 'community alarms', 'social alarms' or 'personal alarms'. A basic distinction can be made between active alarm systems and passive ones. In the case of 'active' systems an alarm call is triggered by the individual through activating a body worn "panic button" alerting an alarm centre - or in some cases a person living in the neighbourhood - over the telephone network. Usually, a speech connection is automatically established when the panic button is used. Also, a personal record can be automatically opened at the alarm centre providing staff with relevant information about the client, e.g. in relation to the place of living and prevailing health problems.

While 'active' alarm systems require the client to actively call for help when an emergency situation arises, 'passive' systems rely upon registration of the absence of a particular event. Although it is difficult to quantify current penetration levels due to a lack of data, such systems seem to be much less widespread than active alarm systems. The simplest passive alarm system consists of monitoring agreed regular telephone calls made by the individual to a service centre and triggering an alarm if a call is not made. More recent passive alarm systems have been automated and often combined with the monitoring of particular health parameters like blood pressure or temperature. Also, active and passive components of alarm systems are now being combined. The "PC Emergency Call System" being developed in Finland serves as an example here. In this system, emergency calls from the residents' rooms are directed to the care centre and additionally, a life style monitoring sensor detects abnormalities in behaviour of the resident and automatically initiates an alarm if appropriate[64].

Passive alarms have up to now been installed largely in experimental settings. However, some municipal care schemes are now emerging incorporating such technology as part of their day-to-day care practice.

Home monitoring systems

Although home monitoring services have not yet been widely deployed across the EU and elsewhere, a range of solutions have been successful piloted during recent yeas. Examples include for instance the Liverpool City Council Telecare Pilot and related research activities providing a monitoring service for vulnerable customers while they are in their home. This monitoring service will trigger an alarm to the call centre if the customer has not performed a normal daily task[65].

In Italy, Tesan, a private telematic service provider together with a local public authority providing social and healthcare services have deployed an innovative homecare telemedicine network on an experimental basis in the Veneto region. Various telemedicine

[63] Porteus, J. and S. Brownsell (2000): Using Telecare. Exploring Technologies for Independent Living for Older People. Brighton.

[64] Kenchiku Kikaku Sekkeisha (2005): Introducing New PC emergency Call Systems. Presentation at the IAHSA Symposium in Norway.

[65] http://www.liverpool.gov.uk/pdfs/IEG_statement_2.pdf

services - ranging from telecardiology to telemetry of clinical parameters - have been implemented on a regular basis to support both frail citizens.[66]

In Sweden, there are various projects in the area of telemonitoring for prevention, assistance and emergency. For instance the Old@Home initiative, one of the largest elderly home care projects in Sweden, is directed towards providing a seamless information and communication flow between primary carer, social services, elderly patients and their relatives. The services rely on a fully established fibre-optical network infrastructure connecting all test sites in the project, namely two primary care centres, one nursing home for the elderly and private homes.[67]

The CareMobil[68] is an example from Denmark involving a platform for integration of IT in homecare. It is run by the Danish local government with the aim to get mobile access for homecare nurses to patient data, medication information and logistical information.

Also, social alarm manufacturers in the UK have been engaged in a large number of trials with local authorities involving their current and emerging monitoring products. For example, Tunstall is a company providing a wide range of assisting technologies in order to provide timely support, raising an automatic call to a response centre in the event of a fall so that immediate assistance can be provided, minimising the impact of the injury and the trauma of the fall.[69]

Smart homes

For more than a decade, there have been considerable research efforts to exploit smart home technology for the benefit of older people and people with disabilities. Several European countries, with the Nordic countries being frontrunners, have been active over the last decade in implementing and testing pilot houses ranging from simple control applications to almost futuristic automated houses[70]. For example, in Sweden three projects were launched in order to test adequate technology solutions for older people. Another example is the Gloucester Smart House in the UK, demonstrating how this technology can assist people suffering from dementia in living independently. In the Netherlands the Smart Home Corporation has initiated the implementation of a number of test dwellings for evaluation purposes. Though some of the projects were completed some years ago, trial participants still live in the homes provided. Functions that have been evaluated include for instance safety/security, access control, intruder alarms, automatic lightening at night, automatic cooker switching, personal alarms, authorised access to the dwelling for care workers and automatic curtains[71]. Also, the Swedish Handicap Institute supports several projects with a

[66] See http://www.tesanonline.it/default.asp?id=15&mnu=15

[67] See the Final report at http://www.vinnova.se/upload/EPiStorePDF/vr-05-14.pdf

[68] http://e.gov.dk/offentlige_projekter/caremobil/index.html

[69] http://www.tunstall.co.uk/home.asp

[70] Fellbaum, K. and M. Hampicke (2002): Human-Computer Interaction in a Smart Home Environment. Symposium "Domotics and Networking", Miami, 11/19-12/02. Online available at: http://www.sentha.tuberlin. de/paper/fm_ha_miami.pdf (accessed August 2005).

[71] Van Berlo, A. (2005): Smart Houses and smart living for senior citizens: chances and markets. Presentation at the Silver Economy in Europe Conference on 16./17. February 2005 in Bonn, Germany.

focus on smart homes for visually, hearing or mobility impaired persons and/or persons with cognitive disabilities.[72]

Further to functions focusing on networking internal to the house, smart home technology offers the opportunity to inter-link the networked home infrastructure to external service domains such as tele-medicine and tele-care. Pilot dwellings with screens in the kitchens which remind the resident to take their daily medicine have been set up[73]. However, these so called "medical houses" or "health houses" have not spread beyond the pilot stage.

Tracking systems

With regard to tracking systems, people with various forms of dementia are a large potential target group[74]. These users are often unable to use a classical (home-based) social alarm function because they are not able to trigger the alarm buttons when they get lost outside their immediate living environment. Currently there are three different types of tracking systems available on the market:

- In-house tracking systems which use a locator to detect the lost person are available for quite some time.
- More recently tracking systems relying upon the Global System for Mobile Communications (GSM), like for example the Senior Track have become available.
- Another type of system relies upon the geographic positioning system (GPS). These are the most advanced tracking systems currently emerging on the market. The "Mobile Rescue Phone" developed already some years ago by the MORE project may serve as a good example: The phone is based on the Public Switched Telephone Network, a geographic information system (GIS) and GPS[75]. Another system, the so called MobilAlarm, which is currently being developed by Attendo Systems, combines an emergency alarm function with a tracking device via GPS[76].

In general, tracking systems are not yet widely implemented. In Japan this technology is used for locating pets rather than family members[77]. A reason for this might be ethical issues arising when people are being traced 24 hours a day. This is a problem particularly in the case of lost persons who do not voluntarily use such a system, e.g. people with dementia. In Germany, for instance, a court approval for constantly tracing people with dementia is required.

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[72] See interesting assistive technologies at http://www.hi.se/templates/Page____804.aspx

[73] Van Berlo, A. and K. Fellbaum (1999): Smart Home Technology: Useful Applications for older people. In: Buhler, C. and H. Knops: Assistive Technology on the Threshold of the New Millennium. Assistive technology Research Series 6, pp.508-512. Amsterdam.

[74] MOBILALARM (2005): Validating European Mobile Alarm Services for Inclusion and Independent Living. D 2.1 Market Analysis.

[75] Ekberg, J., Abascal, J., Fellbaum, K., Pereira, L. and P.R.W. Roe (2001):General Overview of Situation between 1989 and 2001. In: P.R.W. ROE: Bridging the Gap? Access to Telecommunications for all People, pp. 18-35. Lausanne.

[76] MOBILALARM (2005): Validating European Mobile Alarm Services for Inclusion and Independent Living. D 2.1 Market Analysis.

[77] ibid.

Mobility support systems

Another application types that can be assigned to the wider ambient intelligence domain are so called "mobility support" systems. Nowadays, travelling requires interaction with a variety of electronic and non-electronic systems (such as screens and keypads, gates, displays, buttons etc). In this context, ICT can be both a threat (if not designed with the needs of older people in mind) and an opportunity (if it helps older people to overcome barriers). For example, smart cards can instruct a machine to accommodate to the requirements of the user. For older people this may take the form of displaying larger characters and/or providing audible output to simplify choices and to give people more time for transactions[78].

Another example would be the transport of information to a blind person's mobile phone. Here, a user profile can be stored in a mobile phone and according to that, the phone can point out locations accessible for the user, e.g. public facilities or public transportation stops[79].

Navigation systems support people in finding their way from one place to another. Some EU funded projects have focused on developing travel aids for disabled and elderly people. Within the TIDE programme, the ASMONC project ("Autonomous System for Mobility Orientation, Navigation and Communication") designed an easy to use portable aid for blind, low vision and older people to enable them to find their way in unknown environments. A more recent project, ASK-IT ("Ambient Intelligence System of Agents for Knowledge-based and Integrated Services for Mobility Impaired users"- FP6, http://www.ask-it.org), has an even more ambitious approach. Coordinated by Siemens and with the participation of Nokia and Vodafone (among others) it aims to develop an extended ambient intelligence space for the integration of functions for elderly and disabled people across a variety of environments (car, bus, airplane, home, work, leisure, sport). To this end the project intends to develop a "multi-agent" device that will be tested in several European cities.

Tools to support integrated care

ICT offers a number of new possibilities that are particularly important for integrated care for older people[80]. These include:

- the ability to make particular parts of information available to specified individuals
- the possibility to monitor, receive alerts and work proactively
- the capacity to involve patients, clients, carers
- the facility to support co-ordination and case management better than paper files
- enabling the administrative and financial data of patients or clients to be easily combined
- enabling working with aggregated data for the purpose of accounting, assessing cost-effectiveness and quality, and macro-planning and research.

In many European countries, national experiments and developments in information management in integrated care are taking place. For example, In the UK, the NHS Information Authority's Electronic Record Development and Implementation Programme

[78] Gill, J. (2004): Access- Ability. Making Technology more usable by people with disabilities. London.

[79] Freitas et al. (1995): Mobile Telephony. In:. Roe, P.R.W (ed.): Telecommunications for All, pp.137-157. Brussels.

[80] CARMEN project: http://www.ehma.org/carmen/is_12.html

(ERDIP) has seen health communities across England carry out detailed work piloting different aspects of the development and use of electronic health records and information management. Some of the projects have direct bearing on integrated care for older people, such as those on developing information management in integrated pathways, integrated care record services, and electronic links sharing information between health and social care professionals.

In Finland, the government took a leading role in stimulating the integration of care and services and in developing supporting ICT applications. One major experimental environment was the Satakunta Macro Pilot project in western Finland. This was an extensive project involving the development of seamless care and service chains with the optimal use of ICT. The city of Pori (pop. 76,000), for example, had a specific sub-project on the care of older people. Further sub-projects developed new integrated service chains for specific sub-groups among older people, such as diabetes, dementia, COPD and rehabilitation. From 2004, the results are being implemented nationwide.

4.3.3 Technologies under development

Many technology applications of great promise are still at an experimental stage and, given the extent of the field and the frenetic pace of developments, it is difficult to provide a full picture. Some current research topics in some key areas of development with strong relevance for the independent living domain are exemplarily sketched in the following, centring mainly on bio-medical clothes, point-of-care systems, personal health assistants and health advocate avatars, effective management of chronic diseases, ambient intelligence, integration of in-house communication with consumer electronics, and robotics.

Biomedical clothes and smart textiles

This is a research field which holds considerable potential for the independent living / care domain. One of the leading projects in the field is MyHeart, funded by the European Commission and coordinated by Phillips, which aims to develop smart electronic and textile systems and services for the prevention and monitoring of cardiovascular diseases. Other projects are MERMOTH (Medical Remote Monitoring of Clothes) and SenSAVE (a novel intelligent sensor network and wireless real-time vital monitoring platform). The current state of the art in research of wearable textiles includes smart textiles with antimicrobials or microcapsules for drug-release.

The *symbiosis of textiles with wearable computing, augmented reality, human machine interfaces, media and interface design* and the collaboration between established electronics and textile industries will lead to a totally new class of large-area, flexible, conformable informative and interactive wearable systems.[81]

Point-of-Care (PoC) systems

Rapid advances in *nanotechnologies* will facilitate Point-of-Care (PoC) medicine through the growing use of nano-biosensors in the doctor's office (e.g., for blood or urine analysis in minutes), in hospitals (uses in cellular level optical imaging, sensor guided precision surgical tools) and at home, enabling simple patient administered diagnostic tests.

[81] Andreas Lymberis and Rainer Guenzler (2006) Wearing technology to enable personalized health. pHealth – international workshop in micro- and nanosystems for personalized health. Luzern/Switzerland, January 30-February 1. Opening Session. www.phealth-2006.com

Further advances in technology like biochips will make it possible to acquire, assess and process detailed patient information at molecular, genome, proteome and metabolome levels at the patient site. *Lab-on-a-Chip* technology can enable multiple tests to personalise medication. Also *in-vitro diagnostics* usually implying extraction of fluid or tissue samples from the body and in future molecular analysis to diagnose cancer, cardiovascular disease and infections, will become possible at doctors' offices or even at home, communicating the results to a hospital database.

Personal Health Assistant and Health Advocate Avatar

The aim to advance "from sensors to Personal Health Assistant (PHA device)" requires evolution of the PHA towards the provision of the "Ambient-intelligent PHA". Bio-inspired or self-organised systems can be influential in developing health assistants, which can adapt to changing context and environments, learn about the users and thus become a seamless part of their lives. Integration in textiles, cell phones and PDAs will make Health Assistants always available and in combination with enhanced user interfaces will improve their acceptance. The Institute for Alternative Futures (IAF), for example, has suggested the development of a personal coach, educator and health manager, the Health Advocate Avatar. A variety of developments and new technologies will be required to provide components for the Avatar, including natural language search engines, truly effective voice recognition, haptic devices and high resolution displays.

IT enabled management of chronic diseases

In this field, advances in biotechnology and IT are expected to play a major role[82]: biosensing and biomonitoring devices, pervasive computing (providing seamless integration of communications and data); pharmacogenomics (genetic profiles identify unique metabolic characteristics that guide the selection of the best drug and dosage for the individual), forecasting disease risk for chronic disease through genetic and behavioural assessment (permits life–style modifications and targeted interventions), targeted therapies (biomarkers identify abnormalities unique to a patient's disease so selected combinations of targeted therapy can safely cure or control it).

Ambient intelligence (AmI)

Ambient Intelligence (AmI) is a recent IT paradigm which models how citizens may become empowered through a digital environment that is aware of their presence, of environmental context conditions and constraints, as well as being sensitive, adaptive and responsive to the needs of people (including their being expressed via habits, gestures and emotions).[83]

Currently, most eHealth applications are used for discrete clinical activities, and AmI can therefore play an important role in connecting these existing but fragmented applications. Indeed, according to the vision provided by ISTAG[84], the European Commission's Information Society Technology Advisory Group, AmI will lead to a pervasive network of intelligent devices that will cooperatively gather, process and transport information. In

[82] The Institute for Alternative Futures (IAF): Scenarios for Exploring America's Healthcare Values, http://www.altfutures.com/pubs/SCENARIOS.pdf

[83] Riva, Giuseppe (2003) Ambient Intelligence in Health Care. CyberPsychology & Behaviour 6:3 295.

[84] Ducatel et.al (2000) Scenarios for ambient intelligence in 2010 (ISTAG 2001 final report). Seville IPTS.

managed care, for instance, this offers the opportunity of greater interactivity and better tailoring of information to individual needs.

Robotics

Many industrial processes now use robots of increasing sophistication and capability. However, due to lack of mobility requirements in their settings these are 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 in this field resides especially in independently mobile "service" robots that navigate their way in the environment, transport and manipulate objects and even interact with people - potentially, much as a personal assistant, nurse or doctor would. Also, an increased number of robotic manipulators at different scales and respective control strategies are likely to find their way into the healthcare system. For example, robots can be used for rehabilitation purposes, e.g. for patients who have suffered stroke, or to facilitate remote monitoring of patients and doctor-patient interaction through telepresence. *Microrobots* can be used for therapy and/or more invasive surgery. Such devices could be released inside the human body and guided to treat gastrointestinal diseases or cardiovascular disease, fight and destroy malignant organisms by both chemical and mechanical means.

A key component of a robot of any kind is the actuator, the component which exerts force and produces movement. Such actuators may be employed in devices which do not conform to the classic idea of a robot but are very relevant to improving independent living and care services. For example, a robotic suit has been designed at the University of Tsukuba to make it easier for elderly people with weak muscles and/or suffering from obesity to move around or for care-givers to lift them. The suit straps onto a person's arms, legs and back and is equipped with a computer and motors. Sensors detect the nerve signals transmitted by the brain when the wearer tries to move a limb, enabling the computer to drive the relevant motors and assist completion of the intended movement. These and related "exoskeletal" robot types are currently attracting interest across research communities.

Advanced sensors

Strong advances are currently being made in sensor research by taking advantage of miniaturisation of all components. There are today sensors to measure a range of real-world variables like pressure, temperature, humidity, heat, flow, force, acceleration, position, torque or strain. This information can be integrated in a sensor to generate more complex information such as vibration or shock; two-dimensional images can be captured; information can be sent on demand, regularly or continuously. One problem with applications of sensors in many settings to date is the need to provide wiring to obtain information from the sensor. This is the background to current strong interest in wireless sensors.

A wireless sensor module consists of some combination of sensor, controller, transceiver, battery, and antenna. Cell phones with microphone and camera can be seen as first generation wireless sensors, however, the focus of interest today is on much smaller scales. Research into micro wireless sensors is ongoing across the world. Terms such as "ambient", “invisible”, "smart dust" and "motes" are used to describe related visions, such as that of tiny, self-contained, battery-powered computers with radio links that enable self-organisation into networks and the exchange of data with one another. In this field, for example, Intel is seeking to create a new platform with a high level of integration, low-power operation and very small physical size, to be provided at low-cost using modular design and high volume production. Crossbow Technology has recently developed "smart dust" sensors that can detect light or vibration, and include computer chip, battery, and radio to pass information to

each other and send the information back to a main computer. For micro wireless, research challenges include cost-effective designs of sensor nodes, minimisation of power consumption and heat dissipation, modulation and demodulation schemes, transmission ranges, integrating RF transmissions on silicon, and communications protocols.

As distributed sensor devices, and mobile robots, are given more and more sophisticated communication abilities, wired and wireless networks for carrying the signals in specialist and home environments grow in importance. It is well understood that using separate networks to provide each function is not usually a cost-effective approach, therefore networks and platforms capable of integrating audiovisual streams for information and entertainment have now become topics for research.

Integration of in-home communication and automation with consumer electronics

Finally, integration of in-home communication and automation with entertainment provided in standard formats such as MPEG 4 through Digital Video Broadcasting and Multi-media Home Platform (MHP) is another research field of particular relevance here. A new area of focus is on providing interactive real-time video over wireless networks in the home, e.g. using the IEEE.802.11b.g series of standards. Complementary issues are techniques of distribution of video streams to the home, including provision of video streams and/or video on demand using the Internet infrastructure. Topics include not just network transport but also new displays e.g. based on image projection or providing high definition, image projection at home, sophisticated set-top boxes which can become home communication and control centres - a smart home topic. Residential Gateways provide and manage a communication channel into and out of the home. Standards such as the Open Standards Gateway Initiative (OSGi) focus on providing remote access to home automation.

Use of sophisticated communications in care settings raises issues of security, and here there is still work ongoing on how to - useably - secure information flows on wired and wireless networks. The leading technologies - asymmetric keys and public key infrastructure - are not new in principle but have proved difficult to deploy in practice.

4.4 Summary and main conclusions for policy

Data on chronic diseases and care needs confirm the high demand potential stated in the first Seniorwatch survey and by other sources. The 2007 survey has found that nearly all households in all the age groups observed are affected by care needs in one form or another. This may be either in form of a need for medical care due to chronic diseases, or as being in need of support of daily living activities, or as being a family carer.

When it comes to actually receiving care, the situation has improved compared with 2001. While the number of people needing support with activities of daily living is slightly lower for the 2007 sample of countries, the share of people receiving care has increased from 5.4 to 6.7%. Although the gap for the over 80 year olds has narrowed (20% receiving care compared to 15 in 2001, while in need of care rate remained about constant at 29%).

Health related and care supporting ICT are found to be used to a varying extent. Five in a hundred older people have a social alarm at home, with the share of users being much higher only for the over 80 year olds. We only find a slight increase across age groups compared to 2001. A good quarter of today's users already use social alarms that are not homebound but can be used outside the home.

Interest in advanced services is high but actual usage is low. Most users of social alarms would greet the supply of a more advanced social alarm service. They would imagine alarms to be highly beneficial if they provided security or additional health features.

We also find very low internet usage for interaction with care personnel.

At the same time, the Internet is becoming a key source of information for those actively searching for health related information. A majority of the ICT using respondents uses the internet to inform themselves about health matters, whether to obtain information on a specific health matter, disease or medication or to get information on healthy lifestyles, or to follow up on a diagnosis or treatment by a doctor.

It is established knowledge that certain chronic diseases are more likely to affect under-privileged socio-economic groups. These groups are statistically the same groups which are also negatively affected by the digital divide in the older age group. It is thus safe to assume that the socially selective access to health information and other ICT services which support the self-management of chronic diseases/due to the digital divide) are likely to reinforce a socio-economic health divide.

Given the functional restrictions and/or special usability needs it is further necessary to stress the relevance of accessibility and design for all themes as can be inferred from the picture of the older ICT users in the mainstream ICT chapter.

Older people continue to play a major role as carer. The longevity of the parents has the consequence that significant shares of the older population are care givers, many even into their eighties. This is also made possible by the fact that the majority of older people still live in proximity to their children.

Family carers are almost as likely to be ICT users as the average: 40% of them are computer users (34 %internet), and 25% on a daily basis (20% internet). Almost half have internet access, which is broadband for a majority.

Again, this also means that more than half do not have access to web based information about social and medical care. The digital divide is so carried forward into the care supply.

A range of existing ICT solutions are still waiting for their wider deployment. Technologies and application concepts that have been around for many years have yet to become mainstreamed within the home care and independent living sector

A final section has looked at technological developments - both already in use and technologies under development, many of which appear to be of great promise but still at an experimental stage. All this makes it difficult to provide a full picture.

Promising topics with strong relevance for the independent living domain include bio-medical clothes, point-of-care systems, personal health assistants and health advocate avatars, effective management of chronic diseases, ambient intelligence, integration of in-house communication with consumer electronics, and robotics.

A number of lines of intervention to support initial market development have been identified.

- pump-prime funding for service providers
- preparation supports for service providers
- funding for innovation by relevant ICT and/or care sector of industries
- public-private collaboration in research / RTD funding
- public procurement.

In general, it seems that efforts in these areas are still relatively under-developed. However, various examples from the more forerunner countries have been identified that can provide pointers to good practice for others.

As regards ongoing funding mechanisms once ICT-based care and independent living services become mainstream, it seems that the approaches adopted vary with the more general characteristics of the social, healthcare and housing systems in the different countries. Key issue determining funding include whether or not the item or service is included for reimbursement under insurance-based systems. In taxation-based systems, funding support for end-users may depend on income level, assessed level of need or a combination of both. Demarcation boundaries between social, health and housing systems may pose barriers to funding in many national systems because telecare often spans all three. Other barriers arise because some systems focus funding on already identified needs and not on preventative interventions where telecare can often play a key role.

4.4.1 Main conclusions for policy

As in the case of the 2002 survey, the current data set confirms a considerable demand for care and support among the 50+ population, particularly among the older age bands. Also, the gap between the section of the 50+ population being in need of support and the share actually receiving some sort of support has remained considerable. This suggests that efforts directed towards tackling the ‘care gap’ need to receive reinforced attention.

More exploitation of ICT to reduce the ‘care gap’

•The evidence suggests that the extent of exploitation of ICT in the provision of care for older people has not much improved since 2002. Actual usage levels of basic ICT-enabled home care services have remained more or less stable, overall at a rather low level of utilisation. This outcome indicates the need for reinforced efforts directed towards improving take up of solutions that already exist today.

Better supply channels and more affordability

Lack of clear supply channels seems to be one important barrier - nearly one in three say that they would not know where to get a basic social alarm services. Cost considerations seem to play a role for many as well - about one in six say that they could not afford such a service. Both these aspects need attention in policy and by providers of care services.

Untapped demand for enhanced ICT-based services

Among those who have gained experience with basic social alarm services, the majority state an interest in more advanced solutions. This indicates that there is much room for the development of solutions that are capable of meeting a wider spectrum of user needs and/or of meeting currently addressed needs in a more adequate manner. This aspect merits further attention both by the care industry (e.g. when it comes to the incorporation of ICT in existing service delivery processes with a view to prevention) and by the ICT industry (e.g. when it comes to harnessing emerging technologies for the development of new solutions).

Varying responses across the Member States

Overall, our analysis suggests that the emergence of a well-functioning market place for ICT in the support of independent living and care has been slower than might have been expected. In view of the particular characteristics of the domain (e.g. strong influence of public provision and/or reimbursement of services, disconnection of investment and benefits), this situation seems to have triggered a range of comparatively recent interventional approaches directed towards market development in the field (e.g. pump-prime funding of service providers, funding of innovation, public-private partnership in RTD funding). However, there seems to be a concentration of activities in some countries, with little happening in others. In addition, there seems to be only limited exchange of good practice experiences up to now.

Whilst respect for subsidiarity must be maintained and national-level activity has a central role and legitimacy in many aspects of market development in this domain, there is also an important role for EU level action, for instance when it comes to the identification of generic market barriers (e.g. through a systematic examination of national approaches) and the development of common strategies directed towards further market maturing (e.g. by means of bringing together relevant stake holder groupings and stimulating/enabling knowledge sharing and bench learning). Studies and dissemination activities would be useful in these regards.

More attention to informal carers

Informal carers continue to play an important role in meeting needs of older Europeans who require care. When it comes to the utilisation of ICT they show the same access and usage patterns when compared with the overall 50+ population and are affected in the same ways by the digital divides. Special attention should thus be paid to this group in efforts to counteract both access and usage divides, with a view to awareness raising about the potential of ICT in relation to care and building the ICT-related capacities of carers.

RTD

A wide range of technologies emerging on the horizon hold potential to benefit older people in need of support and those who provide care to them, including formal and informal carers. A focused effort should be made to establish the independent living and care domain as an important field of technological innovation (e.g. in basic research, applied research, technology watch and technology transfer).

Innovative public procurement and public-private-partnerships

When it comes to applied RTD in particular, the nature of the domain suggests a need for shared risk-taking (given the 'chicken-and-egg' characteristics of the demand-supply interaction). Innovative approaches are needed that enable close cooperation between the demand and supply sides, including mutual learning between ICT procurers, users and suppliers, joint implementation of large-scale clinical and other trials, ensuring standardisation and interoperability, and so on.

Annex A: Methodological notes

Country composition of the sample

The data used in this report was surveyed in five European countries: Germany, the UK, France, Italy and Poland. It is representative with regard to the older population's distribution in these countries according to Gender, age and region. Data called "EU-5 total" reflects this sample whereby all countries are weighted equally, i.e. each country contributes 20% to the total. It was refrained from having a population proportional weighting because "EU-5" is not meant to be a measure of the total of these five countries but to represent the EU in 2007 as a total. The five countries make up 60% of the EU27 population.

Data of the Seniorwatch surveys in 2001 come from the survey then conducted in the old EU15. Because Seniorwatch 2001 was carried out in all countries, with very diverse population size from Luxembourg to Germany, the EU15 results also were weighted according to population size.

Representativeness and accuracy

Sampling

In order to ensure the representativeness of the data and therefore to allow the generalization of the results to the universe of this study, a representative sample for each country was drawn. The sources for the telephone numbers were the ADM-Telefonstichprobe for Germany and SSI for the other countries.

For all countries, we applied a stratified random sampling approach by grouping according to region (Germany, France, Great Britain, Italy and Poland: NUTS 2).

Afterwards, sampling points were drawn and new telephone numbers created by replacing and generating the last two numbers. Those resulting new telephone numbers were cleaned, e.g. business numbers –if evident - were excluded from the data base. Thus, also telephone number that are not listed in the directories – were included in the sample frame. Afterwards the selection of target households was done randomly.

The selection of target person, within a household that qualify for the survey (i.e. with at least one member being aged 50+) was executed at random (“next birthday method”) as well:

In order to obtain an interview with the target person, households were contacted up to 55 times.

Data collection

The fieldwork was centrally executed by the IPSOS affiliated company Trend Test GmbH using the identical CATI-programme and questionnaire script for each country. In order to ensure a consistent high quality of the data the following processes are mandatory for Ipsos/trendtest:

- Only interviewers who have passed through our multi-stage training programme and have extensive practical experience in interviewing this target group.
- Exclusively mother-tongue interviewers are permitted to be deployed in this survey and international free-lance supervisors to hire, train and manage native speaking interviewers

- Every interviewer will be personally briefed and receive written instruction on the project by the project management (survey background, questionnaire flow, target group, peculiarities etc.).
- All interviewers are examined and assessed on a continual basis. If required, extra training or immediate retraining is provided.
- Full-time monitoring supervisors for quality assurance.
- During fieldwork: real time monitoring of at least 5% of the interviews of every survey.
- During fieldwork: continual feedback processes between fieldwork management and interviewers take place.

Of course, one criteria of the quality of the sample and its representativeness for the universe is the response rate. In the interim report (D2_ex) we outlined a response rate calculation that includes a systematic distortion, based on the fact that our universe is persons aged 50+.

When calculating the response rate, all refusals were counted, although non-membership of the universe should have been excluded from the calculation (because they are usually summarized under neutral drop outs of the gross sample). However we cannot ascertain that those who refused belonged to the universe - simply due to the fact that persons contacted and refusing to participate did not inform us – before refusing – about the age of members of the household. Therefore our response rate is not comparable to response rates of studies conducted among general population 16+.

Sample size

500 interviews were carried out per country, 2500 in total. The confidence interval for EU5 total weighted data is +/-2.4% at maximum. Per country data is max +/- 6% for Germany and +/- 5% for the other countries[85].

Weighting

Data used in this report is weighted to be conformant with universe distribution with regard to the variables age, sex, region and educational attainment.

Comparability and comparison with Eurostat ICT household surveys

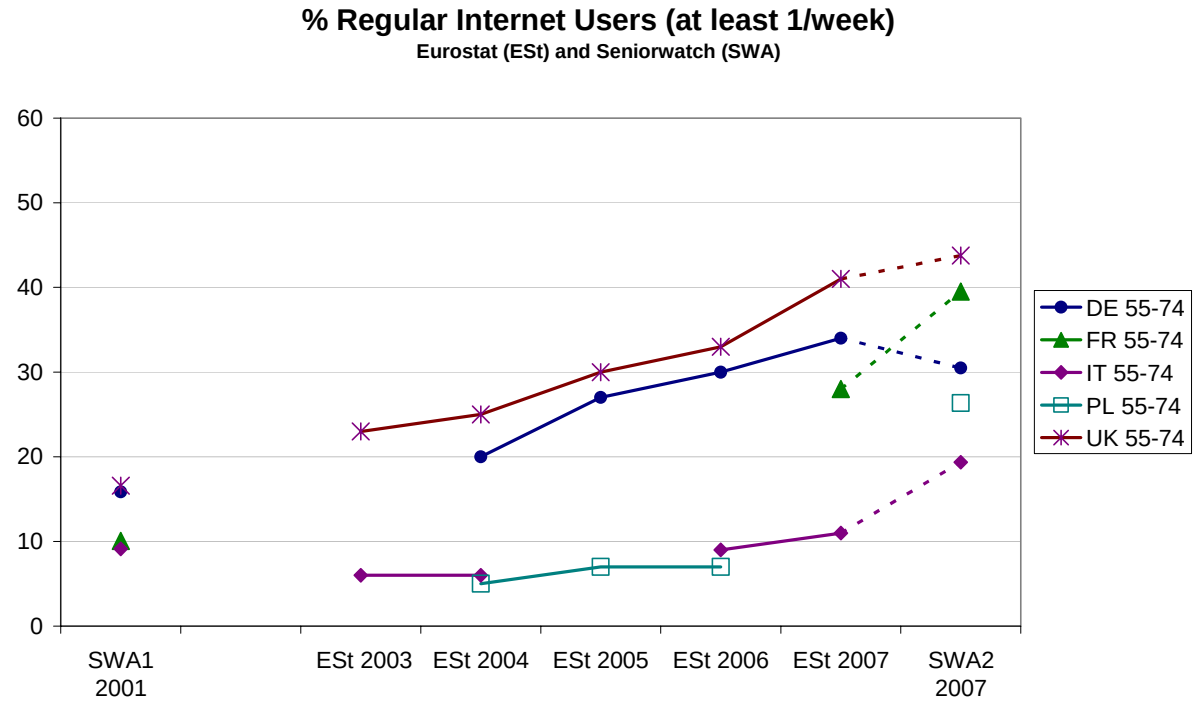
The prime source of statistical data about ICT usage in the European Union is the respective Eurostat surveys. Compared with Seniorwatch one difference is that Eurostat does not cover respondents aged 75 and older. Also, published data that is broken down by age covers the age brackets of 55-74, or the brackets 55-64 and 65-74 (micro data so as to be able to define individual age breakdowns are not available).

Some of the Seniorwatch data can be analysed so as to assess its representativeness. To do so, we have restricted the analysis to the above mentioned age bracket and compared it with published Eurostat data.

The analysis reveals some differences in the share of ICT users between Eurostat data and Seniorwatch data. The following exhibit shows the difference between the two data sources - the two data points refer top basically the same time (Eurostat usually at the beginning of the second quarter, while Seniorwatch field work took place in July and August 2007).

[85] At 95% level. Confidence intervals refer to weighted data and maximum intervals with p=50%. Unweighted data would have a confidence interval of +/- 2% for EU5 and 4% for single countries.

Exhibit A-1: Share of internet users among 55-74 year olds according to Eurostat and Seniorwatch1 and 2



Source: Eurostat database, Seniorwatch 2001 and 2007. Seniorwatch samples filtered to match Eurostat age bracket.

Especially in France and Italy, the Seniorwatch data seems to overestimate the share of ICT users. The question hence arises, whether this is a methodological effect. While the Seniorwatch data collection methodology was CATI across all countries, the methodologies applied to the data collection of the Eurostat reference studies vary between countries.

Exhibit A-2: Methods used in Eurostat ICT household surveys 2007

Country	Method
DE	Mail, Self-administered. Either Access panel or other address data base
FR	Telephone; white pages directory
IT	PAPI & f2f & self-administered
PL	Face to face, partly CAPI, partly self-administered
UK	Face-to-face

Source: SDDS meta data tables: http://europa.eu.int/estatref/info/sdds/en/isoc/isoc_ci_sm.htm

There is no doubt that the choice of interview method influences the results.

The following influential factors of certain methodological differences between different approaches may affect consumers‘ response patterns.

- sample quality
- respondent psycho-structures
- interview situation

- interview execution

Sample quality

Telephone interviews have the potential to enhance the quality of the data compiled in comparison to face-to-face interviews, in particular by

- • improving regional coverage (CATI) by avoiding the clustering effect dictated by the economics of face-to-face interviews
- • enabling inexpensive realisation of multiple contact attempts.

This, in conjunction with the aspects mentioned above, results in an improved level of general reachability in some target groups, with a higher likeability of reaching highly educated people in senior positions agreeing to take part in CATI interviews.

Respondents whose jobs and training have given them added confidence and experience are more likely to agree to participate in telephone interviews. Conversely, it can be assumed that less self-confident people are more likely to refuse telephone interviews, and these tend to be older, less well educated and further down the job hierarchy.

Respondent psycho-structures

Slightly different psycho-structures empirically come up in the populations interviewed face-to face and by telephone, respectively. The more technical and anonymous the interview situation, the stronger the selective effect on the respondents recruited. The more the emphasis in the interview situation shifts from a „man-to-man“ to a „man-to-machine-to-man“ relationship, the greater the likelihood that less self-confident members of the population will be under-represented.

People who are socially insecure or less technically-minded feel less confident about taking part in laptop or telephone interviews and refuse to participate. Experience shows this lack of security to be more prevalent among the less well educated members of society and older respondents.

Where this sampling effect also creates a socio-demographic imbalance within the sample, as has been shown to be the case with CATI interviews, samples can be weighted to provide formal compensation for the fact. However, this alone does nothing to remedy the underlying causal psycho-structural sample deficits.

Remedial measures:

Remedial measures can only be directed at achieving more psycho-structurally representative samples. Respondents' initial distrust can be overcome by interviewer training, more subtle introductions to interviews and an increase in the number of follow-up contacts, but this will still not solve the basic problem. There will always be some people who can be persuaded to "talk" to a friendly, skilful interviewer on a face-to-face basis, but not to take part in a telephone interview. A face-to-face situation has more inherent persuasive potential than a telephone call.

On the other hand, the opposite trend is also to be found among members of the higher educational and occupational classes, and this also affects samples. As we know from B-to-B research, highly mobile, busy, „senior executives“ are often only prepared to give telephone interviews due to their heavy workloads or other reasons, and would not even consider letting a face-to-face interviewer into the house.

Interview Situation

The psychological situation varies strongly from one interview method to another on two dimensions

- technical involvement
- interviewer involvement.

Technical involvement:

Telephone interviews are marked by a certain distance between interviewer and respondents and are thus the most anonymous and least socially binding variety. On the other hand, respondents communicating by purely auditory channels are more concentrated and less prone to distraction.

The opposite pole is a paper-assisted, personal, oral interview - the method which comes closest to being a personal conversation, with all its desirable and undesirable consequences this entails.

The CAPI technique - using a computer instead of a conventional questionnaire - is no longer a person-to-person dialogue, but an inter-relationship between two humans and a machine. Here, the initiative tends to shift from the interviewer to the computer, potentially creating a sense of anonymity and distance. At the same time, respondents are able to follow the process of compilation on the computer screen. Although this process eventually takes place in all the methods, this is the first time that it has been directly visible to respondents, and thus also controllable.

Interviewer involvement:

The physical presence of the interviewer during an interview leads to interaction processes between the respondent and the interviewer which has an influence on the results.

However, the presence of an interviewer allows conducting surveys covering difficult topics including complex routings in the questionnaire, whereas self-administered interviews have to be simple and self-explaining as there is no help or further explanation available during the process of answering the questionnaire by the respondent.

Interview Execution

Computer-assisted personal interviews (CAPI) have certain technical advantages for the interviewer (automatic filtering, rotation, consistency checks, etc.), but they also change the psychology of the interview situation.

Computer-assisted telephone interviews (CATI) have all the same technical advantages and leave the least scope for distraction and interviewer effects; on the other hand, they also lack the motivational and stimulative potential of personal interviews, and this may result in less responsiveness, poor comprehension and communication problems.

Representation of people with disabilities or poor health

The sample of the Seniorwatch surveys was set up as a simple random sample of the older population (50+) living in households with telephone access (neglecting by that way the institutional population, especially those living in care homes and other health institutions).

As such, it is meant to be representative, and any systematic differences in response behaviour are meant to be remedied by the introduction of a corrective weighting, that accounts for the universe distribution according to age, gender and region.

Nevertheless, it can be expected that general population survey methodologies, including telephone surveys, will always and systematically miss certain parts of the older population, especially those with severe health problems. People who are unable to answer the phone, including many hearing and speech impaired persons, people with cognitive or mental impairments and also people of poor health are less likely to be included in the sample for several reasons.

The sampling process foresees that a random sample is drawn not only at the generation of random phone numbers, but also at the household level. For this, first it is asked of the contact person (the contact person is the person answering the phone in the first contact by the pollster) how many people eligible (i.e. 50 years and older) live in the household. Then from this list of legible people, one person is drawn at random. A common method is the birthday key, by which the contact person should name that eligible person in the household whose birthday was the last (or is next).

By this method, a random sample is drawn. It will only be corrected for the inclusion probability stemming from the different numbers of eligible persons in the different households.

However, some control over this procedure lies with the contact person, which introduces some source of bias in the selection process. If the target person selected through the random process in the household is somebody of poor health or someone for whom a telephone interview might be cumbersome, the contact person might be likely to refuse to hand over to that person, or conceal this person from the interviewer completely and answer himself or name somebody else. These processes will be very hard to control by the polling organisation.

For these reasons, the survey results that relate to the share of people with impairments should not be taken as an estimate of prevalence in the older population. Also, it should be borne in mind that results that relate to people with disabilities it is very likely that people with mild impairments are overrepresented in the group of older people with disabilities in the sample.

Annex B: The Employment Situation of Seniorwatch Respondents

Official statistics with regard to employment of older people are cited above, finding that 47.5 % of Europeans aged 55-65 are in gainful employment. In the Seniorwatch sample (with its broader age bracket, starting at 50 and the oldest respondent being 95), 28% are working in gainful employment, while 63% are retired. The 50-59 age bracket finds the highest shares of economically active people, ranging from 50% in Poland to 73% in Germany.

Exhibit B-1: Employment status

		Working (employed or self employed)	Unemployed	Retired	House-keeping	Other
Germany	50-59	69.2	4.4	11.9	10.1	4.4
	60-69	9.8	1.6	84.2	4.4	
	70-79	5.8		92.6	1.7	
	80 +			89.2	10.8	
	Total	27.0	2.0	63.6	6.0	1.4
France	50-59	71.3	4.5	19.7	1.7	2.8
	60-69	7.5		92.5		
	70-79	0.9	0.9	93.6	3.7	0.9
	80 +	2.0		98.0		
	Total	28.3	1.8	67.3	1.4	1.2
Italy	50-59	55.9	2.9	20.0	20.0	1.2
	60-69	10.8	1.3	70.7	15.9	1.3
	70-79	1.7		79.7	14.4	4.2
	80 +			96.4	3.6	
	Total	22.8	1.4	58.5	15.6	1.8
Poland	50-59	49.8	4.8	41.4	3.1	0.9
	60-69	9.4		89.1	1.4	
	70-79	2.7		94.6	2.7	
	80 +			100.0		
	Total	25.6	2.2	69.4	2.4	0.4
UK	50-59	59.3	6.0	21.0	7.8	3.6
	60-69	22.3	2.5	71.3	1.3	2.5
	70-79	5.9		93.3	0.7	
	80 +			100.0		
	Total	28.5	2.8	62.7	3.2	2.0
EU5	50-59	60.3	4.5	24.0	8.1	2.2
	60-69	12.0	1.0	81.7	4.5	0.8
	70-79	3.5	0.3	90.5	4.7	1.0
	80 +	0.5		96.7	2.8	
	Total	26.4	2.0	64.2	5.7	1.3

Source: Seniorwatch 2007 surveys. F13: Are you currently working, or are you retired, unemployed, mainly doing housework or anything else?
Base: all

Annex C: Indicators – Other Sources of Data and Existing Indicators

ICT access and usage of older people

Access / ownership

Eurostat has results of the ICT household survey broken down for the age group 55-74, which is different from the Seniorwatch age threshold (50 years). An age cut-off is implemented so that no data for the older old population (75 years and older) is available. Also, no micro data are available. Eurostat has the following data:

- Household access to TV, cable, digital and satellite TV
- Telephone, mobile phone, internet enabled mobile phone
- Game console
- Desktop computer, portable computer, handheld computer
- Home internet access
- Type of access (modem, DSL, other broadband)

Seniorwatch (2001) has the following data:

- Computer access
- Internet access
- Owning mobile phone

TV and other technology:

- TV access
- CaTV access
- Teletext usage
- Digital TV access
- DVD (TV) access
- Answering machine access
- Fax access

eUser asked about the following items

- having a mobile phone for your own personal use
- internet access at home
- mobile phone internet access
- type of internet access (DSL, other broadband connection (e.g. cable, UMTS), mobile phone over narrowband (WAP, GPRS, etc.), modem with dial-up access over normal telephone line or ISDN, satellite (only in Hungary)

Usage

Eurostat

- Current usage of computer (Within the last 3 months, Between 3 months and a year ago, More than 1 year ago, Never used one)
- Frequency of computer usage

- Current internet usage (Within the last 3 months, Between 3 months and a year ago, More than 1 year ago, Never used one)
- Frequency of internet usage
- Location of usage: (At home, At place of work (other than home), At place of education, At another person's home, Other (e.g. hotel, airport, internet café, etc.)) both for computer and internet
- Mobile phone usage
- use of personal e-mail address

Seniorwatch (2001)

- Regular computer user (frequency)
- Regular internet user (frequency)
- Used mobile
- SMS usage

eUser

- Ever used computer / used in last three months
- Ever used internet / used in last three months / last 12 months
- Frequency of internet usage

Service adoption

Eurostat

- Communication
- a) Sending / receiving e-mails ...
- b) Telephoning over the Internet / videoconferencing ...
- c) Other (use of chat sites, etc.)...
- Information search and on-line services
- d) Finding information about goods or services ...
- e) Using services related to travel and accommodation ...
- f) Listening to web radios / watching web television ...
- g) Playing or downloading games, images or music ...
- h) Downloading software ...
- i) Reading or downloading online newspapers / news magazines
- j) Looking for a job or sending a job application ...
- k) Seeking health-related information (e.g. injury, disease, nutrition, improving health, etc)
- l) Other information search or on-line service
- Selling of goods or services, banking
- m) Internet Banking ...
- n) Selling goods or services (e.g. via auctions) ...
- Training and education
- o) Formalised educational activities (school, university etc.)
- p) Post educational courses ...
- q) Other educational activities related specifically to employment opportunities
- Several questions about e-government use

- Several questions about internet commerce use

Seniorwatch (2001)

Activities on the internet

- E-mail
- Product information
- Travel information
- Educational material
- Health information
- On-line banking
- Purchased online
- On-line chat

eUser

- used e-mail (can also be interpreted as skills)
- registered on a website by giving name and address (can also be interpreted as skills)
- given your credit card or bank account number in order to pay for something (can also be interpreted as skills)
- downloaded a document for printing it out later (can also be interpreted as skills)
- comprehensive module of e-learning
- comprehensive module of e-health
- comprehensive module of e-government

e-skills

Eurostat

- Participation in computer training courses (by time elapsed since)
- Computer related activities: Copying or moving a file or folder.
- Computer related activities: Using copy and paste tools to duplicate or move information within a document
- Computer related activities: Using basic arithmetic formulas in a spreadsheet
- Computer related activities: Compressing files
- Computer related activities: Connecting and installing new devices, e.g. a printer or a modem
- Computer related activities: Writing a computer program using a specialised programming language
- Computer related activities: Compound indicator of computer skills
- Internet related activities: Using a search engine to find information
- Internet related activities: Sending e-mails with attached files (documents, pictures, etc.)
- Internet related activities: Posting messages to chatrooms, newsgroups or an online discussion forum
- Internet related activities: Using the Internet to make telephone calls
- Internet related activities: Using peer-to-peer file sharing for exchanging movies, music, etc.
- Internet related activities: Creating a web page
- Internet related activities: Compound indicator of internet skills

- Source of internet and computer skills: Formalised educational institution (school, college, university), Training courses in adult education centre (but not on the initiative of your employer), Vocational training courses (on the demand of the employer), Self-study using books, cd-roms, etc., Self-study in the sense of learning-by-doing, Informal assistance from colleagues, relatives, friends, Some other way

Seniorwatch (2001)

- Self assessment of computer skills (professional, advanced, beginner, "virtually have no clue"
- ICT experience and involvement typology (experienced frontrunners, old age beginners, technologically open minded, digitally challenged)
- Usage experience (years since first internet)

eUser

- Usage experience (years since first internet)
- Self-reported confidence using a search engine to find information on the Internet
- Self-reported confidence using e-mail to communicate with others
- Self-reported confidence downloading and installing software onto a computer
- Self-reported confidence identifying the cause for computer problems
- Self-reported confidence understanding text written in English
-

Attitudes and Barriers

Eurostat

- Reasons for not having access to the Internet at home -- Have access to Internet elsewhere
- Reasons for not having access to the Internet at home -- Don't want Internet (because content harmful, etc)
- Reasons for not having access to the Internet at home -- Don't need Internet (because not useful, not interesting, etc)
- Reasons for not having access to the Internet at home -- Equipment costs too high
- Reasons for not having access to the Internet at home -- Access costs too high (telephone, etc)
- Reasons for not having access to the Internet at home -- Lack of skills
- Reasons for not having access to the Internet at home -- Physical disability
- Reasons for not having access to the Internet at home -- Privacy or security concerns
- Reasons for not having access to the Internet at home -- None of the above, but other

Seniorwatch (2001)

- Degree of agreement with "I'm too old to familiarise myself with computers" –
- Degree of agreement with "All in all, I feel sufficiently informed about computers and their applications."
- Degree of agreement with "I am very keen on learning about technological advances and developments."
- Degree of agreement with "Manufacturers do not consider the interests of older people in designing computers and other information technology."

- Degree of agreement with "In the media, these technologies are nearly always connected with young people."
- Degree of agreement with "Information technology makes me feel uncertain."
- "Would you like to improve your skills at using a computer?"

Barriers with regard to functional impairments: see above under "Health Status"

- Is it likely or unlikely that you will use the internet over the next 1 or 2 years? (Likely/Unlikely). IF unlikely: "Can you tell me why it is unlikely? Which of these four fits best: 1. "The Internet is too complex for me", 2. "It is too expensive", 3. "I have too little time", 4. "I'm too ill"

eUser

- Degree of (dis-)agreement with "I am interested in new technologies"
- Degree of (dis-)agreement with "Computers are intimidating to use"
- Degree of (dis-)agreement with "Keeping up with computer developments takes very much time"
- Degree of (dis-)agreement with "One should not use the Internet for everything because of the security threats involved"
- Degree of (dis-)agreement with "I enjoy using the mobile phone"
- Degree of (dis-)agreement with "I enjoy using the Internet "
- Degree of (dis-)agreement with "The Internet is very useful for my work"
- Degree of (dis-)agreement with "The Internet is very useful to me in private life"
- Reason for not having home internet access -- Access to the Internet elsewhere is sufficient
- Reason for not having home internet access -- Internet is not interesting or useful enough to you
- Reason for not having home internet access -- Costs are too high
- Reason for not having home internet access -- Internet is too complex to use
- Reason for not having home internet access -- Privacy or security concerns
- Reason for not having home internet access -- You have a physical impairment

Usage of ICT for work

There are a number of sources to measure ICT use at work, however, none is known to the authors so far that explicitly is dedicated to ICT for older workers.

The SIBIS project, which gathered Information Society indicators, was structured by domains. One of these was the domain "Work, employment and skills". Indicators developed and gathered covered issues related to ICT-enabled new ways of working, such as the acquisition of work-related skills, the organisation of work at the workplace level, and structure and outcomes of IT-related employment and flexible ways of working.

Indicators developed/used in **SIBIS** (selection)

- Participation in work-related training (Base: Labour force)
- Use of e-learning (Base: Labour force)
- Workforce which has access to ICT at their working place
- Adaptability of working times to individual preferences and schedules (inside of working contracts with a given number of working hours per week).
- Telework (home-based, mobile, permanent, alternating, supplementary)

- Tele-co-operation

Community Labour Force Survey

- Share of part-time workers
- Voluntary part-time work

Work related variables as breakdown criteria

Eurostat offers as employment breakdown the following classification:

- Retired and other inactive
- Employee and self-employed (incl. family worker)
- Employee
- Self-employed (incl. family worker)
- Student
- Unemployed

Employed (presumably including self-employed) persons were differentiated by occupation, namely:

- ICT professionals
- Non-ICT professionals

and

- Non-manual workers (including armed forces)
- Manual workers

eUser offered these breakdowns:

- active (employed or self-employed, any age)
- unemployed (aged 18-64)
- other not working (aged 18-64)
- early retired, permanent invalidity (aged 18-64)
- retired or 65+ and not working (aged 65+)

Occupation was further differentiated:

- Employed General Management, responsible for 6+ employees
- Self-employed Professional
- Employed Professional
- Employed General Management, responsible for up to 5 employees
- Employed Middle Management, responsible for 6+ employees
- Employed Middle Management, responsible for up to 5 employees
- Self-employed Business/Shop/Company owner, 6+ employees
- Employed other Non-manual, mainly in an office
- Self-employed Business/ Shop/ Company owner, -5 employees
- Non-active: still studying
- Employed other Non-manual, not mainly in an office
- Self-employed Farmer, Fisherman
- Non-active; responsible for looking after the home, housewife

- Employed Manual Worker: Supervisor or Skilled Manual Worker
- Employed other (Unskilled) Manual Worker
- Non-active: retired, unable to work, unemployed, temporarily
- These were later condensed into (using education as additional indicator)
- Poorly educated unskilled workers
- Very poorly educated skilled workers
- Poorly educated skilled workers
- Better educated manual workers, poorly educated non-manual employees
- Better educated skilled workers, moderately well educated non-manual employees
- Well educated non-man. employees, skilled workers & business owners
- Middle managers
- Well educated managers and professionals

and then further condensed into

- Unskilled manual workers & other less well educated
- Skilled workers & non-manual employees
- Well educated non-manual & skilled workers
- Managers & professionals

Health status

There are numerous sources of health related statistics and indicators. The Seniorwatch 1 study offers some indicators that may be used again, but also the SHARE study has an extensive data base of comparable health status data for some European countries.

Illness/Diseases

Seniorwatch (2001) measured chronic diseases via a question about being medically treated for any of a list of diseases.

- Share of individuals being treated for high blood pressure
- Share of individuals being treated for joint/bone/muscle diseases
- Share of individuals being treated for heart disease
- Share of individuals being treated for diabetes
- Share of individuals being treated for chronic respiratory disease
- Share of individuals being treated for any other long term condition
- Frequency visiting a doctor

The SHARE project also offers quantitative estimates of the prevalence of age-related health problems in Western Europe. According to SHARE's findings, among the elderly, around 40 % have some degree of activity limitation due to health problems, and almost 50 % report that they have some long-term health problems, around 40 % of respondents rate their health as less than ´good`, and 10 % even rate their health as ´poor` or ´very poor`, but there is substantial variation within and between populations that suggests a potential for health

gains in the future. Although almost all physical health problems are strongly age-related, also some variations by gender and countries have been found[86].

SHARE health indicators include:

- Prevalence of ... Pain
- Prevalence of ... Heart problems
- Prevalence of ... Breathing problems
- Prevalence of ... Coughing
- Prevalence of ... Swollen legs
- Prevalence of ... Sleeping problems
- Prevalence of ... Falling down
- Prevalence of ... Fear of falling
- Prevalence of ... Dizziness
- Prevalence of ... Stomach problems
- Prevalence of ... Incontinence
- Number of contacts with physicians over past 12 months

Impairment/Disabilities

Health and disabilities are closely related, and disability rates are also declining across the industrial world. An OECD study found that severe disability had declined in nine of its member countries between 1990 and 1994[87].

While the disability rates are declining, the total number of disabled persons will rise because of the demographic shift in the coming half century. The OECD found that the number of elderly living in institutions would grow by 2020 by the following percentages: Germany, 26%; France, 29%; the U.K., 18%; Sweden, 27%. The number of disabled living at home is said to grow even faster. For example, a forecast[88] sees a 38% rise in Germany, 54% in France, and 29% in Sweden.

The **Seniorwatch** (2001) project surveyed several functional restrictions, which can tentatively be interpreted as an approximation to the actual prevalence of disability. Among these restrictions were

- mobility impairments (Q: Do you find it easy, somewhat difficult or very difficult to move around - I mean, for example, walking longer distances, getting onto a train, climbing stairs?)

[86] SHARE notes that age and gender variation is probably even underestimated due to the exclusion of the over proportionally very old aged institutionalised population. Further, SHARE rightly observes that the so-called age-gradient actually mixes age and cohort effects due to the differential gender proportions per age.

[87] Jacobzone, S. and E. Cambois, E. Chaplain, J. M. Robine (1998), "The Health of Older Persons in OECD Countries: Is It Improving Fast Enough To Compensate For Population Ageing?" Labour Market and Social Policy – Occasional Papers No 37. Paris: Organisation for Economic Cooperation and Development.

[88] England, Robert S. (2001): The Fiscal Challenge of an Aging Industrial World. - A White Paper on Demo-graphics and Medical Technology. Washington, DC: Center for Strategic and International Studies - Global Aging Initiative, p. 73.

- vision impairments (Q: "Some people have problems with seeing fine detail. (With your glasses/ contact lenses,) do you find it easy, quite difficult or very difficult to read small print in newspapers, forms or instructions?")
- hearing impairments (Q: "Which of the following statements best describes your hearing?" I have no trouble hearing, I have a little trouble hearing, I have a lot of trouble hearing)
- tactile impairments (Q: "on some machines you have to touch what you want on a screen. Do you find using touch-screens easy, somewhat difficult or very difficult - or have you not tried?" and "What about using your fingers to use a credit card or similar using a cash point, make a phone call or pay for goods? easy, somewhat difficult or very difficult - or have you not tried?" and "...and typing, say, your name, on a keyboard?", again easy, somewhat difficult or very difficult)

Cognitive functions

According to the SHARE project, the prevalence of cognitive impairment increases sharply with increasing age, across all of Europe. Some of the variation in cognitive performance, particularly at younger ages, may relate to how intelligence and other cognitive abilities are acquired in early life, in particular the benefits of education, social and socio-economic advantage. Cognitive ability is strongly associated with education – the higher educated are more cognitively able than the lower educated. Cross-country differences between cognitive impairment rates seem quite well in line with cross-country differences in education level. Much of the between-country differences in cognitive performance in SHARE are explained by differences in educational experience. The Mediterranean countries, with the highest prevalence of relative cognitive impairment also have the lowest prevailing levels of education. But although differences in the provision of education account for some of the North-South gradient they do not completely explain it.

The SHARE project has also found a strong and fairly consistent association between cognitive impairment and impaired functioning (limitations in ADL and IADL (instrumental ADL)), poor self-reported health, and changes in the dynamic of giving and receiving support.

Further, relative cognitive impairment is more robustly associated in Northern Europe with reduced functioning, and more robustly associated in Southern Europe with receiving support. The obvious inference is that kin and non-kin social networks may be more intact in Southern Europe, hence allowing older people with cognitive decline to function at a higher level.

Mental health

Depression is a key issue in older people's health status. Some have forecast depression to be the second most burdensome condition globally, which takes into account the associated disability risks and the high mortality rates associated with depression (cf. SHARE p108). SHARE findings suggest that, consistent with previous observations, depression is more prevalent among women, in older people, among those who are not married, and those who live alone. These associations are broadly consistent across the continent of Europe, with the exception that the female gender excess may be more prominent in southern European countries. There is a North-South gradient with higher prevalence of old age depression in Southern countries.

The SHARE schedules "include the EURO-D scale which has been validated in an earlier cross-European study of depression prevalence, EURODEP …For the purposes of this contribution we defined clinically significant depression as a EURO-D score greater than 3."

The EURO-D scale comprises 12 items: depressive affect, pessimism, wishing death, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment and tearfulness (0=`not present'; 1=`present', range 0-12).

General physical condition

Seniorwatch (2001) asked about these indicators:

- Assessment of own health compared to other people of same age (worse than average,: the same as average,: better than average)
- Fallen because of dizziness during past 12 months

Care needs

The **Seniorwatch** (2001) project surveyed several restrictions in activities of daily living, which were representing care needs. These were

- Having any difficulty with daily activities such as... going shopping
- Having any difficulty with daily activities such as... baths or showers
- Having any difficulty with daily activities such as... getting dressed or undressed

These three defined individual care needs, whereby SeniorWatch defined a narrow care need if either of the first two were mentioned and a wider support need if either three was mentioned. Among these people, the following indicators were gathered:

- Actually receiving care (Q: Does anyone regularly help you in any of these activities?)
- Help through family carer
- Help through professional carer

ICT / Assistive Technology usage

Seniorwatch (2001):

- Share of people using a personal alarm system

eUser:

- Use of screen reading software, text enlargement, or Braille output

Family carers' situation

Seniorwatch (2001) indicators include:

- Share of people caring for another adult
- Share of people caring for another adult living in the same household

and demographic as well as ICT related comparison of carers with the general older population.

SHARE:

- caring for grandchildren
- residential patterns of parents and children
- Proportion of older people living alone who receive non-family help

ICT / Assistive Technology usage by family carers

Seniorwatch (2001):

- Share of people having a personal alarm system in their household for another adult
- IST involvement of family carers
-

Annex D: Survey questionnaire

ICT use of older people	Work and retirement
A1 Access / ownership to/of ICT	B1 ICT for work usage
A2 Usage	B2 Work related variables as breakdown characteristics
A3 Service adoption	B3 ICT for lifelong learning and employability
A4 E-skills	
A5 Attitudes and barriers	
A6 Planned use	
Health and impairment	**Care**
C1 Health status / Illness / diseases	D1 Care needs
C2 Impairment /disabilities	D2 Care practice
C3 ICT use for health	D3 Family carer's situation
C4 Assistive technology usage	D4 ICT usage in care or by family carers
C5 Accessibility and AT needs	
Community & Social life	**Demographic**
E1 Social uses of ICT	F1 demographic variables as breakdown characteristics

Introduction

	Topic	Filter	Question	Answer options	Source
0		All	[ADAPT AS NECESSARY) Hello, my name is …, I am calling from … We are currently conducting a survey on behalf of the European Commission. The goal of this study is to help adapt technical products to the needs of consumers aged 50 plus and to look into how people use technology to deal with health issues. Therefore we are interested in your opinion. Your answers will be held strictly confidential and will be used only for scientific purposes. I would like to talk to the person in your household, that is at least 50 years old and whose birthday is up next. The interview will last about 20 minutes. Your participation is important to us, because you have been selected through a statistical procedure that will result in a typical selection of people in [COUNTRY].		
1_1	F1	All PROG: < 50 Jahre -> INTERVIEWENDE PROG: >= 50 Jahre -> Weiter	Would you first please tell me how old you are?		
1_2		If 1_1verweigert	Could you tell me instead to what age group you belong?	50-54 years 55-59 years 60-64 years 65-74 years 75 years and older	
112		Alle	Gender (coded by interviewer)	(1) Male (2) Female	
Qb1			How many persons live in your household, including yourself? Please also include all children that might live in your household.	[DO NOT READ] 1: one persons 2: two persons 3: three persons 4: four persons 5: five persons 6: six persons 7: seven persons 8: eight persons 9: nine persons (or more)	
Qc1			And how many of these persons are 50 or older?	[DO NOT READ] 1: one persons 2: two persons 3: three persons 4: four persons 5: five persons 6: six persons 7: seven persons 8: eight persons 9: nine persons (or more)	

Computer and internet use

2	A2	All	Have you ever used a computer?	Y / N	SWA1*
3	A2	All	Have you ever used internet?	Y / N	SWA1
4	A1	All	Do you or anyone in your household have access to a computer at home?	Y / N	Eurostat
5	A1	All	Do you or anyone in your household have access to the internet at home?	Y / N / DK	Eurostat

6	A1	if internet home access Q5=1	What types of internet connection are used at home? [INT: Read list. Multiple answers possible.]	1: Modem 2: DSL 3: Other broadband 4: Mobile phone over narrowband 5: Mobile phone over broadband 6: DK	Eurostat
7	A6	if no computer at home Q4=2	Is it likely or unlikely that there will be a computer in your household in the next 1 or 2 years?	1: Likely 2: Unlikely 3: DK	SWA1
8	A6	if no internet home access Q5=2	Is it likely or unlikely that there will be internet access in your household in the next 1 or 2 years?	1: Likely 2: Unlikely 3: DK	SWA1
9	A2	if ever used computer Q2=1	When did you most recently use a computer, within the last three months, in the last 12 months or more than a year ago?	1: within the last 3 months 2: between 3 months and a year ago 3: more than a year ago 4: don't know	Eurostat
10	A2	if computer last 3 months Q9=1	How often on average have you used a computer in the last three months, almost every day, at least once a week or less than once a week?	1: every day or almost every day 2: at least once a week 3: less than once a week 4: don't know	Eurostat*
11	A2	if ever used internet Q3=1	When did you most recently use the internet, within the last three months, in the last 12 months or more than a year ago?	1: within the last 3 months 2: between 3 months and a year ago 3: more than a year ago 4: don't know	Eurostat
12	A2	if internet last 3 months Q11=1	How often on average have you used the internet in the last three months, almost every day, at least once a week or less than once a week?	1: every day or almost every day 2: at least once a week 3: less than once a week 4: don't know	Eurostat*
13	B2	all	Are you currently working, or are you retired, unemployed, mainly doing housework or anything else? [INT: Read if necessary. Only ONE answer.]	1: working (employed or self employed) 2: currently unemployed 3: retired 4: doing housework, looking after children or other persons 5: permanently not working due to illness or invalidity 6: on parental leave 7: a student or in full time education 8: doing unpaid work in a family enterprise. 9: DK 10. refused	standard
14	B2	if not working (13>1)	When, if ever, have you last been in gainful employment? [INT: Note year, e.g. 2001]	_ _ _ _ (year) 1: never worked 2: DK 3: Refused	
15	B1	if working or ever worked (13=1 OR 14 <>1)	If 13=1= Do you use a computer at work? If 14 <>1= Did you use a computer at work?	1: yes, regularly 2: yes, occasionally 3: no 4: dk 5: Refused	SWA1**
16	B1	If 15=1 OR 2 and 14>1990 (but not 1) OR If 15=1 OR 2 AND 13 = 1	If 13=1= Do you use the internet at work? If 14 <>1= Did you use the internet at work?	1: yes, regularly 2: yes, occasionally 3: no 4: dk 5: Refused	SWA1**
17	A5	if ever used internet and not use almost every day q12=2,3	Would you like to use the internet more if you could?	1: yes 2: no 3: DK 4: Refused	Eurostat

18	A5	if 17=1	I am going to read a number of reasons for you to not use the internet as much as you would like. Please tell me which of these reasons apply to you. [INT: Read list. Multiple answers possible.]	a) You do not have enough time. b) It is too expensive. c) Web sites are not user friendly or too complicated d) You are lacking the skills or knowledge e) You are concerned about your security or privacy [progr.: f) if no internet access at home] f) You do not have an internet access at home. g) You are experiencing any physical impairment that makes using computers and/or the internet inconvenient or difficult for you [INT: Do not read. Spontaneous.] h) Other reasons. DK Refused	Eurostat**
19	A5	if 17=no or never used internet or using internet almost every day (i.e. everyone not running into 18) 3=2 ODER 12=1 ODER 17=2	Does any physical impairment happen to make using computers and/or the internet inconvenient or difficult for you?	1: yes 2: no 3: DK 4: Refused	Eurostat**

Physical impairments and impact on ICT use

20	C4/C2	All	Some people find using standard computer equipment and its default settings or other technologies such as mobile phones inconvenient for various reasons. We would like to ask some questions about the functioning of your eyes, ears and hands and whether you use any supportive devices when using computers and other technology. Do you, if at times only, wear a hearing aid?	1: yes 2: no 3: DK 4: Refused	SWA1*
21	C2/C5	All	(IF 20=1: With your hearing aid,) Which of the following best describes your hearing? [IF 20=1: INT This is about hearing capability WHEN WEARING the hearing aid.]	1: I have no trouble hearing 2: I have a little trouble hearing 3: I have a lot of trouble hearing 4: DK 5: Refused	SWA1*
22	C4	If hearing aid (20 = 1)	Do you ever encounter interference problems when you wear the hearing aid and want to use different types of telephones? [INT: If yes: With what kind of telephones.] [INT: Multiple answers possible.]	with mobile phones with cordless phones Other types of phones DK Refused	new
23	C4/C2	If hearing aid (20 = 1)	Do you have a particular mobile phone model that reduces interference problems?	1: yes 2: no 3: DK 4: Refused	SWA1

24	C4/C2	If no particular mobile phone (23= no)	Why do you not have a mobile phone that reduces interference problems with your hearing aid? I am going to read a number of possible reasons. Please tell me which of these apply to you. [INT: Read list. Multiple answers possible.]	a) You don't know about it, nobody told you. b) You don't use the hearing aid much. c) You don't use the mobile phone much. d) It is not available. e) It is too expensive. f) You don't know where to get one [INT: Do not read/ spontaneous:] g) Other reason h) DK i) Refused	SWA1
25	C4/C2	All	Do you use glasses or contact lenses?	1: yes 2: no 3: DK 4: Refused	SWA1
26	C2/C5	All	(If 25=1: With your glasses/contact lenses,) Which of the following best describes your sight? [If 25=1: INT: This is about sight WHEN WEARING glasses or contact lenses.]	1: I have no limitations seeing 2: I have some limitations seeing 3: I have major limitations seeing 4: I am legally blind	SWA2**
27		all	The next few questions are only about your sight (If 25=1: with your glasses/contact lenses on) and how it influences your use of technology and not about any other potential difficulties.	--	new
32_1	C4	If 9=1,2 AND If 26=2,3,4	Using a computer, do you regularly change the preset standard zoom or font size of documents or websites?	1: yes 2: no 3: DK 4: Refused	new
32_2		If 32_1=no	Why do you not do this? Please tell me which of the following reasons apply to you. [INT: Read list. Multiple answers possible.]	a) You don't need it b) You don't use computers much c) You don't know about it, nobody told you d) You don't know how to do it e) It is not possible on your computer [INT: Do not read. Spontaneous.] f) Other reasons g) DK h) Refused	
28	C4	If ever used computer 9=1,2 and 26=4	Do you use a special keyboard, printer or other device that turns text into Braille output?	1: yes 2: no 3: DK 4: Refused	new
29	B1	if 28= 1 (option "at workplace" only if working)	Do you use that device (If 13=1) at your workplace at home elsewhere	each 1: yes 2: no 3: DK 4: Refused	new
30	C4	IF 9=1,2 AND If 26=3,4	Do you use a special programme that turns text into voice output?	1: yes 2: no 3: DK 4: Refused	new

31	B1	if 30=1 ("at workplace" only if working)	Do you use that device (If 13=1) at your workplace at home elsewhere	Each 1: yes 2: no 3: DK 4: Refused	new
33	C4	If 9=1,2 AND If 26=2,3 OR If 9=1,2 AND if 26=4 and 28=2	Do you use a special programme or appliance that much enlarges what is displayed on screen. [INT: if unclear: this means not just increasing the text size through the standard adjustment possible on any computer]	1: yes 2: no 3: DK 4: Refused	new
34	B1	if 33=1 ("at workplace" only if working)	Do you use that device (If 13=1) at your workplace at home elsewhere	1: yes 2: no 3: DK 4: Refused	new
35		If 26=2,3,4 except when using any of (28,30,33)	Why do you not use any special computer device to compensate for poor sight? I am going to read a number of possible reasons. Please tell me which of the following reasons apply to you. [INT: Read list. Multiple answers possible.]	a) You don't need it b) You don't use computers much c) You don't know about it, nobody told you d) It is not available e) It is too expensive [INT: Do not read. Spontaneous.] f) Other reason g) DK h) Refused	
36	C2/C5	If 26=2,3,4	Because of your vision, do you usually have any trouble reading the menus, or text messages and numbers on a mobile phone display? (if respondent say they are not mobile phones users: Or do you have difficulties reading menus, text messages and numbers on other types of displays?)	1: yes 2: no 3: DK 4: Refused	new
37	C4/C2	If 36=1	Do you have a special mobile phone model that can help solve the problem?	1: yes 2: no 3: DK 4: Refused	SWA1
38	C4/C2	If 37=no	Why do you not have such a mobile phone? I am going to read a number of possible reasons. Please tell me which of the following reasons apply to you. [INT: Read list. Multiple answers possible.]	a) You don't know about it, nobody told you b) You don't use a mobile phone much c) It is not available d) It is too expensive f) You don't know where to get one g) You don't need it [INT: Do not read. Spontaneous.] h) Other reason i) DK j) Refused	SWA1
39	C4	If 26 =3,4	Do you ever watch TV or video with audio-description turned on so that you can better follow the programme? [INT: If unclear: That is a special sound channel where a voice describes what is happening on the screen]	1: yes 2: no 3: DK 4: Refused	new

40	C4	If 39=no	Why do you not use this service? I am going to read a number of possible reasons. Please tell me which of the following reasons apply to you. [INT: Read list. Multiple answers possible.]	a) You don't know about it, nobody told you b) That service is not available at all c) There are too few programmes available. The respective programmes are not interesting. d) Your TV set is not ready for it e) You are not interested in TV f) It is not useful [INT: Do not read. Spontaneous.] h) Other reason i) DK j) Refused	new
41	C2	All	Do you have any lasting impairment in the mobility or strength of your hands or fingers?	1: yes 2: no 3: DK 4: Refused	new
42	C2/C5	9=1,2	The next few questions are about using your hands and fingers to handle appliances, please do not consider or take into account other difficulties you may have with appliances. Do you find typing on a computer keyboard easy, somewhat difficult, very difficult or impossible?	1 easy 2 somewhat difficult 3 very difficult 4 impossible DK Refused	SWA1**
43	C2/C5	if 42 = 3,4	Do you use any specifically adapted alternative keyboard when you use a computer?	1: Yes, regularly 2: Yes, occasionally 3: no 4: DK 5: Refused	new
44	B1	if 43=yes 1,2 ("at workplace" only if working)	Do you use that device (If 13=1) at your workplace at home elsewhere	Each 1: yes 2: no 3: DK 4: Refused	new
45	C2/C5	if 42 = 3,4	Do you use any voice recognition product when you use a computer?	1: Yes, regularly 2: Yes, occasionally 3: no 4: DK 5: Refused	new
46	B1	if 45=yes 1,2 ("at workplace" only if working)	Do you use that product (If 13=1) at your workplace at home elsewhere	Each 1: Yes, regularly 2: Yes, occasionally 3: no 4: DK 5: Refused	new
47	C2/C5	Alle	Do you find using a touch-screen like those used in some ATM or ticket vending machines easy, somewhat difficult, very difficult or impossible? INT: ATM = automated teller machine	1: easy 2: somewhat difficult 3: very difficult 4: impossible 5: DK 6: Refused	SWA1**
48	C2/C5	Alle	Do you find using a keypad as used in mobile phones or on some remote control panels easy, somewhat difficult, very difficult or impossible?	1: easy 2: somewhat difficult 3: very difficult 4: impossible 5: DK 6: Refused	new

49	C2/C5	Wenn jemals ein Computer benutzt wurde 9=1,2	Do you find using a mouse to point and click on things on a computer screen easy, somewhat difficult, very difficult or impossible?	1: easy 2: somewhat difficult 3: very difficult 4: impossible 5: DK 6: Refused	new
50	C2/C5	if 49 sehr schwierig oder unmöglich und Computernutzer if 49=3,4	Do you use any alternative device instead of a mouse when you use a computer?	1: Yes, regularly 2: Yes, occasionally 3: no 4: DK 5: Refused	new
51		If (42=3,4 or 49=3,4) except when using any of (43,45,50) If 43=3 AND 45=3 AND 50 =3	Why do you not use any special computer device to compensate problems with hands or fingers? I am going to read a number of possible reasons. Please tell me which of the following reasons apply to you. [INT: Read list. Multiple answers possible.]	multiple: a) You don't need it b) You don't use computers much c) You don't know about it d) It is not available e) It is too expensive [INT: Do not read. Spontaneous.] f) Other reason g) DK h) Refused	
52		If use any of 28, 30, 33, 43, 45, 50 IF 28=1 OR 30 = 1 OR 33 = 1 OR 43 =1,2 OR 45 =1,2 OR 50 =1,2 only 9=1,2	Regarding any alternative product you use to make computer use more convenient, who has paid for any of these: yourself, your employer, any public authority or anybody else? [INT: Multiple answers possible.]	1 respondent 2 employer 3 public authority 4 somebody else DK Refused	new
53		If 52=1	Do you know how much you yourself have spent on this kind of equipment, in the last three years?	_ _ _ _ Euro DK Refused	new
54		If use any of 28, 30, 33, 43, 45, 50 IF 28=1 OR 30 = 1 OR 33 = 1 OR 43 =1,2 OR 45 =1,2 OR 50 =1,2 only 9=1,2	And have you ever considered using more of such products?	1: yes 2: no 3: DK 4: Refused	new
55		All except those who ran in previous question (and except non-computer users) IF 28, 30, 33 >1 OR 43,45,50 >2 AND 9=1,2	Regarding alternative products to make using computers more convenient, such as a special keyboard, mouse, printer, any screen tool, a voice recognition or voice output software, have you ever considered using such products or have you never considered doing that.	1 Yes, you have considered it 2 No, you have not considered it DK Refused	new

56		If 54 = 1 or 55=1 (considered)	What has kept you from purchasing such a product? Which of the following apply? I am going to read a number of possible reasons. Please tell me which of the following reasons apply to you. [INT: Read list. Multiple answers possible.]	a) It is not available b) You don't know about it, nobody told you c) It is too expensive d) You don't use a computer much e) Existing products do not meet your requirements f) You don't know where to get one [INT: Do not read. Spontaneous.] g) Other reason h) DK i) Refused	new
57		If 54 = 1 or 55=1 (considered)	How much would you be willing to spend on this kind of equipment, in the next 12 months?	_ _ _ _ Euro DK Refused	new

IT-related skills and experience

58	A2 / A4	If ever used internet 3=1	In which year did you use the Internet for the first time?	1: 2000 or before 2: between 2001 and 2003 3: between 2004 and 2005 4: or between 2006 and 2007 5: DK 6: Refused	SWA1* / eUser
59	A4	If ever used computer 2=1	How knowledgeable are you about computers? Would you say you are a professional user, an advanced user or a beginner - or would you say that you virtually don't have a clue?	1: professional 2: advanced 3: beginner 4: virtually don't have a clue 5: DK 6: Refused	SWA1
60	A4/A5	If ever used computer 2=1	Would you like to improve your skills at using a computer	1: yes 2: no 3: DK 4: Refused	SWA1
61	A1	Alle	And do you have any of the following at home: a Fax machine a DVD player a PC a laptop computer a mobile phone a Blackberry, Palm or other PDA (personal digital assistant) an iPod or other MP3 player a digital camera a video camera	Each 1: yes 2: no 3: DK 4: Refused	PEW Internet (USA)
62	A2	If mobile phone 61=5	Do you send text messages on your mobile phone	Yes regularly Yes occasionally No DK Refused	SWA1**
63	A2	all	Do you ever take your own digital photos or do you not do this	1: yes 2: no 3: DK 4: Refused	PEW Internet (USA)
64	A2	if ever takes digital photos 63=1	What do you use to take digital photos, a digital camera, a mobile phone or something else? [INT: multiple answers possible]	A digital camera A mobile phone Something else DK Refused	PEW Internet (USA)

65	A3	if ever takes digital photos 63=1	Do you ever share your digital photos through e-mail send your digital photos by mobile phone post your digital photos on the internet copy your digital photos onto CDs	Each 1: yes 2: no 3: DK 4: Refused	PEW Internet (USA)
66	A3 (E1, B2)	if used internet last 3 months 11=1	For which of the following activities did you use the internet in the last 3 months: sending or receiving e-mails going online for no particular reason, just for fun or to pass the time finding information about goods or services listening to radio or watching TV sending instant messages to someone who is online at the same time looking for news and current information making phone calls via the internet downloading music or video files onto your computer so you can play them at any time you want maintaining a personal website or blog looking for a job buying products or services	Each 1: yes 2: no 3: DK 4: Refused	Partly Eurostat, partly SWA1, partly PEW Internet (USA)
67	E1	If 66a = 1	Do you use e-mail to stay in touch with your family a lot, sometimes, rarely or do you not do this?	1: a lot 2: sometimes 3: rarely 4: do not do this 5: don't know 6: Refused	new
68	C3	if ever used internet within last 12 months 11=1,2	Have you ever used the Internet to: (a) get information on healthy lifestyles, such as fitness, diet or similar? (b) to obtain information on a specific health matter, disease or medication? (c) to find information about health services, e.g. what services are available, your entitlements for treatment and so on ?	Each 1: yes 2: no 3: DK 4: Refused	eUser
69	C3	if ever used internet within last 12 months 11=1,2	Have you ever looked for information on the Internet about health matters in the following situations: (a) to prepare yourself before visiting a doctor (b) to follow up on a diagnosis or treatment recommendation by a doctor	1: yes 2: no 3: DK 4: Refused	eUser
70	C3	if ever used internet within last 12 months 11=1,2	Have you ever used e-mail or the internet to communicate about health matters with your doctor or another physician, I mean consulting about medical things, not just making an appointment?	1: yes 2: no 3: DK 4: Refused	eUser
71	A3	all	Do you ever play video games, whether on a computer or the internet or on a game console like Playstation, Xbox or Wii.	Y/N/DK	PEW Internet (USA)
72	E1	all	Do you happen to belong to any groups that relate to your hobbies or personal or professional interests, such as a club or association?	1: yes 2: no 3: DK 4: Refused	PEW Internet (USA)

73	E1	if 72=1	Thinking about the group in which you are most active, how do you keep in touch with group members or keep track of group activities? Do you ever keep in touch with this group through…? face-to-face meetings phone calls e-mail text messaging (SMS) instant messaging Mailinglists and group e-mails a group website or blog	Each 1: yes 2: no 3: DK 4: Refused	PEW Internet (USA)
74		ALL	On a different topic. I am going to read out a list of activities that you may or may not do and ask how often you do them. How often do you… go to a restaurant, café or pub go to a cinema, theatre, concert or the opera go to a museum or exhibition read books watch TV engage in creative work such as painting, making music, writing, or handicraft work in the garden or engage in DIY activities engage in sporting activities engage in volunteer work visit somebody or have somebody visit you	Each 1: Often 2: Sometimes 3: Never 4: DK 5: Refused	new/SWA1
75	A5 (E1, A4..)	ALL	Do you agree or disagree with the following statements about new technologies ... I am very keen on learning about technological advances and developments It is stressful to own and manage all of the different electronic devices I have When I get a new electronic device, I usually need some else to set it up or show me how to use it I'm too old to familiarise myself with computers and new technologies all in all, I feel poorly informed about computers and new technologies manufacturers do not consider the interests of people of my age in designing information and communication technology products	1: Agree strongly 2: Agree somewhat 3: Disagree somewhat 4: Disagree strongly 5: DK 6: Refuses	Partly SWA1, partly PEW Internet (USA)
76	A5	ALL	Thinking about ALL of the information and communication devices we've talked about… Overall, would you say these devices make your life EASIER or make your life more COMPLICATED?	Make my life easier Make my life more complicated [INT: Do not read. Spontaneously.] Both equally DK Refused	PEW Internet (USA)

77	A5 (E1)	All	How much, if at all, have these communication and information technologies and devices improved … [PROG: Display question on every screen.] the way you pursue your hobbies or interests your ability to learn new things your ability to keep in touch with friends and family your ability to share your ideas and creations with others your ability to work with others in your community or in groups you belong to.	Each 1 Improved a lot 2 Improved some 3 Improved not at all DK Refused	PEW Internet (USA)
78	B3	all	Have you, during the last 12 months, participated in a training course on any aspect of computer use?	1: yes 2: no 3: DK 4: Refused	Eurostat**
79	B3	if working or unemployed 13=1,2	Have you, during the last 12 months, participated in any training activity related to your current or possible future work?	1: yes 2: no 3: DK 4: Refused	eUser
80	B3	if working 13=1 AND 79=1	Was the training (if more than 1: any) supported or provided by your employer?	1: yes 2: no 3: DK 4: Refused	
81	B3	if ever used internet if ever used internet within last 12 months 11=1,2	Have you, in the last 12 months, used the internet to Look for information about training offers and courses Do research as part of a training course or your education Exchange messages with other learners Download learning content which was provided online do an online course over the Internet	Each 1: yes 2: no 3: DK 4: Refused	eUser

Mobility restrictions and ICT use

82	C2/D1	ALL	The following questions are about any restrictions in mobility you may have or not have. Do you find walking a distance of 100 m easy, somewhat difficult, very difficult or impossible?	1 easy 2 somewhat difficult 3 very difficult 4 impossible 5 DK 6 Refused	new
83	C2/D1	if very difficult or impossible 82=3,4	Do you, if temporarily, use a wheelchair? a walking frame?	Each 1: yes 2: no 3: DK 4: Refused	new
84	C2/C5	if wheelchair 83=1	When you think of your local bank, is using an ATM of your local bank easy, somewhat difficult, very difficult or impossible when you are in your wheelchair? INT: ATM = automated teller machine	1 easy 2 somewhat difficult 3 very difficult 4 impossible 5 DK 6 Refused	new
85	C2/C5	if wheelchair 83=1	When you think of a public phone near your home, is using it easy, somewhat difficult, very difficult or impossible when you are in your wheelchair?	1 easy 2 somewhat difficult 3 very difficult 4 impossible 5 DK 6 Refused	new

86	C2/D1	ALL	Do you find standing for a longer time easy, somewhat difficult, very difficult or impossible?	1 easy 2 somewhat difficult 3 very difficult 4 impossible 5 DK 6 Refused	new
87	C2/D1	ALL	Do you find climbing stairs easy, somewhat difficult, very difficult or impossible?	1 easy 2 somewhat difficult 3 very difficult 4 impossible 5 DK 6 Refused	new
88	C2/D1	ALL	Have you, in the last 12 months, fallen because of dizziness?	1: yes 2: no 3: DK 4: Refused	SWA1
90	C1	ALL	Currently and compared to other people of your age, would you say your health is …?	1 worse than average 2 the same as average 3 better than average 4 DK 5 Refused	SWA1
91	C1	ALL	Are you currently receiving treatment or medication for ... high blood pressure? ... for heart disease of any kind? ... any chronic respiratory disease? ... diabetes? ... joint, bone or muscle diseases? ... or for any other long term condition?	Each 1: yes 2: no 3: DK 4: Refused	SWA1
92	D1	ALL	Do you currently have any difficulty with daily activities such as… a) with baths or showers? b) with getting dressed or undressed? c) with going shopping	Each 1: yes 2: no 3: DK 4: Refused	SWA1

Giving and receiving care

95	D2	if yes baths /showers or getting dressed /undressed 92 a or b=1	Does anyone regularly help you with these activities?	1: yes 2: no 3: DK 4: Refused	SWA1
96	D2/D3	if care 95=1	Who helps you, is it .. A family member or other non-professional carer?	1: yes 2: no 3: DK 4: Refused	SWA1
97	D2/D3	if care 95=1	A professional carer?	1: yes 2: no 3: DK 4: Refused	SWA1

98	D2/D3	if care by family 96=1	Who is or are the non-professional carers? I mean what family or other relation do you have to them and are you living with them? If there is more than one person, please name the others, too.	[INT: Do not read answers.] 1: Spouse or partner 2: Child, daughter/son-in-law living with you 3: Child, daughter/son-in-law not living with you 4: Other family member/relative living with you 5: Other family member/relative not living with you 6: Non-family member, e.g., neighbour, friend 7: Someone from a voluntary care organisation/charity group 8: Non-family member but living with you Other DK Refused [PROG: hide "living with you" when one-person-household.]	SWA1*
99	D3	all	Do you yourself regularly provide care to another adult person in need of care, whether in your family or not?	1: yes 2: no 3: DK 4: Refused	SWA1
100	D3	if carer 99=1 AND HH>1	Does this person live in your household?	1: yes 2: no 3: DK 4: Refused [PROG: automatically code "No" if one-person-household.]	SWA1
101	D3	HH>1	If 99=1 AND 100= 1: Is there one more adult person in your household regularly receiving care? If 99<>1 OR 99=1 and 100<>1 Is there another adult person in your household regularly receiving care?	1: yes 2: no 3: DK 4: Refused [PROG: automatically code "No" if one-person-household.]	SWA1
102	D2/D3	if care to other person in household 101=1	Is that care provided by a professional or community care organisation or is it family care or both?	1 professional or community care organisation 2 family care 3 both 4 DK 5 Refused	new
103	D4	all	Do you or anyone in your household have a social alarm that can be used to call help in case of a medical emergency such as call a care service provider or a doctor? [INT: if respondent hesitates: "These are typically connected by phone to an alarm centre which will notify an appropriate person, such as a care provider, doctor or family carer, if an alarm call comes."]	1: yes 2: no 3: DK 4: Refused	SWA1*
104		if 103 = 1	Is it for use inside your home only, or also when you are away from home?	1: Only inside home 2: Also away from home 3: DK 4: Refused	new

105	D4	if 103 = 1	Is the social alarm for use by you or by somebody else in your household?	1: Me / Respondent 2: Other person in household 3: Both (respondent and other person) 4: DK 5: Refused	SWA1
105_1		If 100=2	And does the person you care for outside your household have a social alarm?	1: yes 2: no 3: DK 4: Refused	
106_1		if 103 = 1 or 105_1 = 1	There are nowadays additional security features to some social alarm systems, for instance to automatically detect a fire or gas leak. Would you think that such features would be beneficial to you or the person using the social alarm?	1: yes 2: no 3: DK 4: Refused	
106_2		if 103 = 1 or 105_1 = 1	There are also additional health related features, for instance to automatically detect when a person has fallen or some other medical crisis occurs. Would you think that such features would be beneficial to you or the person using the social alarm?	1: yes 2: no 3: DK 4: Refused	
107		if 103 = 2	Do you think that a social alarm would be beneficial for you or for a person living in your household?	Yes No Spontaneous: Don't know what social alarm is DK Refused	
108		If 107 = 1	What are the reasons for not having a social alarm? I am going to read a number of possible reasons. Please tell me which of the following reasons apply to you. [INT: Read list. Multiple answers possible.]	You do not know where to get it from. It is too expensive. It is too complicated to use. It intrudes too much into the private sphere. DK Refused	
109	D4	if computer user: family carers and care recipients 9=1,2 AND 99=1 OR 9=1,2 AND 95=1	Do you ever use e-mail or internet to get in contact with care organisations?	yes, regularly yes, occasionally No DK Refused	new

Demography

110	F1/D3	Alle	Do you live with a spouse or partner?	1: yes 2: no 3: DK 4: Refused	SWA1
111	F1/D3	HH>1	Who else lives in your household? (Person 1) ___ (Person 2) ___ (Person 3) ___ (Person 4) ___ (Person 5) ___ (Person 6) ___	1: Daughter / in law 2: Son / in law 3: Mother / in law 4: Father / in law 5: Other relative, 6: Non relative, 7: Refuses/DK blank: none further	SWA1*
112	F1	All	Sex (coded by interviewer)	(1) male (2) female	standard
113	F1	All	Educational attainment Operationalisation according to national standards	Pre-primary, Primary education, or none Lower secondary education Upper secondary education Tertiary education	standard

114	F1	All	What is your household's monthly net income? Is it less or more than <income1>, <income2> or <income3>? [INT: Read slowly!] I mean the income of all household members, regardless of source, less taxation and compulsory insurance.	1: less than <income1> 2: between <income1> and <income2> 3: between <income2> and <income3> 4: more than <income3> 5: DK 6: Refuses	SWA1
115		if DK / refused 114=5 or 6	Which of the following statements best describes your current financial situation (READ LIST a-e)?	1: a) Very comfortable 2: b) Comfortable 3: c) I have to be careful but I get by 4: d) I have trouble making ends meet 5: e) Things are very difficult 6: DK 7: Refuses	SWA1
116		13=1 Or 14<>1	What kind of work do you /did you do last?	1: proprietor of bigger business; employer; large scale manufacturer 2: free lancer (lawyer, doctor) / self-employed academics 3: self-employed master (craftsman/small tradesman/shopkeeper) 4: self-employed farmer, fisherman 5: in the higher grade of the civil service 6: in the lower, middle, upper grade of the civil service 7: executive / managerial employee 8: other employee 9: skilled worker/not self-employed master craftsman 10: unskilled/ semi-skilled manual worker DK Refused	
122		if management 116=5 ,7	And which of the following best describes your position?	1: General management, director or top management [INT: Add if necessary: managing directors, director general, other director] 2: Middle management [INT: Add if necessary: department head, junior manager] 3: Other management function 4: DK 5: Refused	
120		116= 1, 2, 5, 6, 7 OR 8	What kind of work do you /did you do? Are/were you …	(1) working mainly at a desk or in an office, (2) travelling, e.g. as a salesperson, or a driver (3) working in a service job , in a shop, restaurant, or similar (4) doing some other kind of work	

118		116=1,2,3 OR 4	How many employees do you/did you have?	|__|__|__|__|__|__| None DK Refused	
123		116= 5,6,7,8 OR 9	How many employees are you /were you responsible for?	|__|__|__|__|__|__| None DK Refused	
119		if working 13=1 or 14 NOT 1	[In your main job,] Are you working full-time or part-time?	(1) full-time (2) part-time DK Refused	
			Before concluding the study, I have one more question in regard to your telephone connection at home. Under how many fixed/ landline numbers are you reachable at home? **INT:** IF THE TERMS FIXED/ LANDLINE ARE UNCLREAR: we mean a normal/standard telephone line/ network, which is usually installed by a telecommunications company such as BT, for instance.	/_/ Numbers DK Refused	
125			Region	Nuts 2	
126			Size of locality	Densely populated Intermediate Thinly populated	