December 29, 2009

Age-appropriate information technology on the advance

Putting paid to olden times

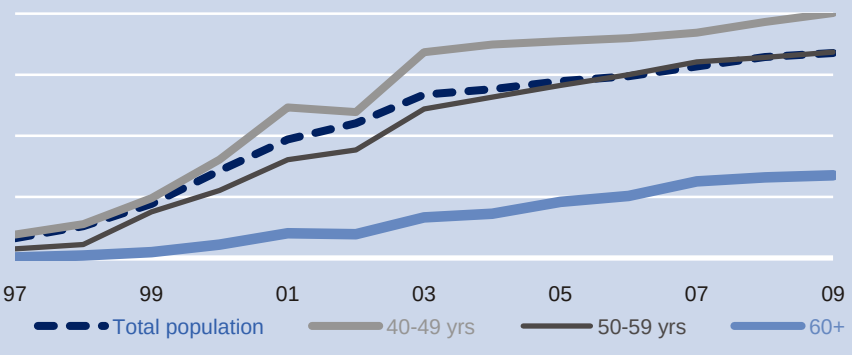
Ageing society opens up enormous economic potential. Whereas for a long time social interpretation homed in on the doomsday scenarios of demographic change, it is the economic potential that is now emerging with increasing clarity. Information and communication technologies stand a good chance of benefiting from this trend. Older people are not intrinsically technology refuseniks, as evidenced by the growing number of silver agers using the internet (see chart).

Successful products will be far removed from disenfranchisement and stigmatisation. The challenge to product developers and marketing strategists is to create age-appropriate offers that older people do not perceive as encroaching on their autonomy or pointing up their physical infirmities. Particularly promising are offers enabling barrier-free use without seeming like segregational solutions for specific age groups.

User friendliness, value systems and the legal framework are currently stymieing yet wider success. Technical fascination aside, the business potential hinges directly on regulations concerning data protection, teletreatment and cost reimbursement, on user friendliness and society's attitude towards the application of robotics in medicine and healthcare. The tasks involved are enormous. Product developers, marketing strategists, physicians, nurses and carers, politicians and older people in need of help themselves must be prepared to take the new routes.

Assistance systems, e-Health and health games benefit from demographic change. The range of offers is highly diversified. They extend from 'intelligent' tablet dispensers, emergency bio sensor technology in motor vehicles and motion sensor technology through tele-monitoring and online consultations to brain jogging and exercise games.

Seniors gradually catching up
Percentage of internet users in respective population group, Germany, %



Source: ARD/ ZDF online survey, 2009

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Technology expands potential for sales and working population

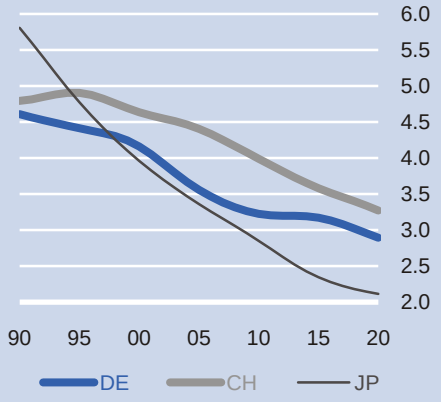
Demographic change is having a massive impact on society and the economy. Information and communication technology (ICT) will also have to attune itself more finely to our greying society. On the one hand this implies tailoring ICT features to the specific needs of older, often physically restricted people as a means of broadening sales potential in the private consumer segment. On the other, ICT technology can enable older people in the workplace to participate longer in working life under more flexible terms of employment. Creative involvement in the working process and the social integration this brings can boost the self-esteem of these healthy 'best agers'.

Rationale financial relief

Starting out from older people's well-being, technology additionally unlocks potential to lighten the load on pension, long-term care and health insurance systems. And this potential is enormous. Robert E. Litan from the New Millennium Research Council, for example, estimates the relief for social security funds and the additional revenue from wider labour force participation in the US alone at EUR 40 bn a year, equivalent to 4.1‰ of America's gross domestic product.

Demographic change is not a localised phenomenon

Fewer young to old
Ratio of 15 to 64 year-olds to over 65 year-olds



Source: UN, 2009 **1**

The Federal Statistical Office predicts that the life expectancy of a newborn child in Germany will increase by another four years over the next two decades (the life expectancy of a newborn boy is presently 76 years, 82 years for a girl). As a result, the ratio of over 65 year-olds to the working age population will continue to rise, soaring from 31% today to more than 50% in 2035. Society and the welfare systems must be primed for the share of over 65 year-olds in the total population to increase by half during the next 20 years, with the proportion of over 80 year-olds fully doubling.

The ageing of society is not a phenomenon restricted to Germany alone, it is occurring in other highly industrialised nations too. In these developed countries the number of people of working age is shrinking steadily in relation to the number of over 65 year-olds (see chart). Worldwide the number of over 60 year-olds will escalate to 1.2 billion in the coming 15 years, doubling on the present figure.

Politicians and businesses the world over are grappling with the urgent issues raised by this demographic shift. Political and business initiatives already addressing the important part that ICT technology can play for an ageing population will be followed by yet more. Over the next three years, for example, the German Federal Ministry of Education and Research is spending altogether EUR 145 m in support of various initiatives.

Comprehensive impact research

Work in this area is directed essentially towards developing technologies to integrate senior citizens, with their specific needs and physical limitations, comfortably into everyday social life. Integrative drives of this kind normally follow a holistic, non-segregational approach. Depending on the particular focus, they therefore concentrate on physically restricted seniors in need of assistance or on healthy older employees still at work.

Of trade fairs, research initiatives and promotion programmes

Initiatives discover seniors

Examples of political and business initiatives addressing demographic change are legion. They range from trade fairs through research initiatives to economic promotion programmes.

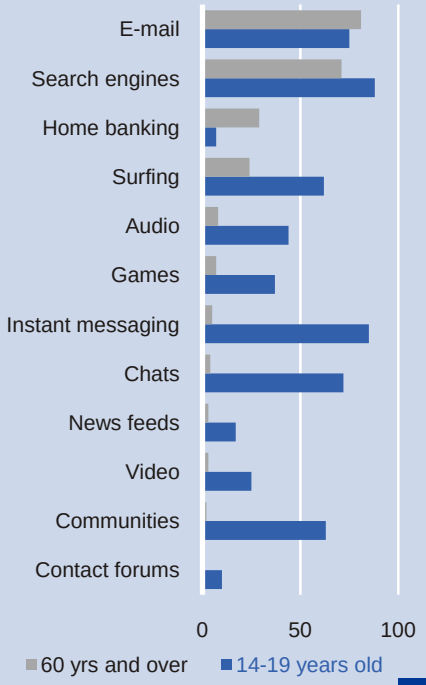
— Trade fairs on the subject include the Silver Summit at the International Consumer Electronics Show in Las Vegas, “66“ in Munich and “55plus” at changing locations in North Rhine-Westphalia.

— Examples of research initiatives are the DFG German Research Foundation’s priority programme “Age-differentiated work systems”, the research project “Smart Senior” by 29 research institutes (e.g. Technische Universität Berlin) and the research project “Moderne Technik und Alter” (Modern technology and old age) by the Charité university hospital in Berlin.

— Examples of economic promotion programmes include the European Commission’s AAL joint programme, the German Federal Ministry of Family Affairs, Senior Citizens, Women and Youth’s programme “Das intelligente Heim” (The intelligent home) or the Bavarian research project “Fit4Age”.

Seniors appreciate information

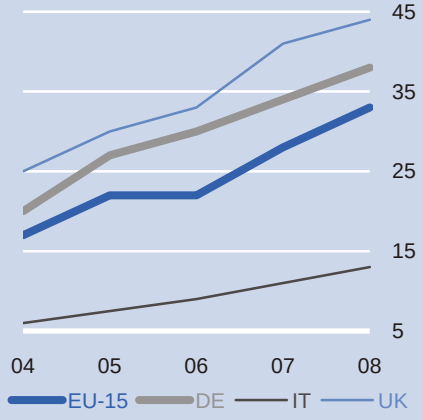
Share of German users making weekly use of these applications, %



Source: ARD/ ZDF online survey, 2008 **2**

Older people going online

55-74 year-olds using the internet regularly*, %



* Percentage of all internet users between 16 and 74 yrs

Source: Eurostat, 2009 **3**

Senior citizens are not technology refuseniks

It is a widely held misconception that senior citizens are fundamentally wary of or opposed to modern technology. On the contrary, these days we find more and more seniors spending a large part of their time each day using state of the art technology – all the more so when ICT is reasonably priced and delivers immediate benefits for the older person like, for example, the navigation aid that helps dementia patients suffering from disorientation to lead an independent life.

Even today, older people still use the internet less often than younger people. Nonetheless, over time the number of ‘senior surfers’ has risen considerably. In Germany, one in every three 60 to 79 year-olds is now online – and in most cases via a fast DSL connection. An online survey conducted by public broadcasters ARD/ZDF shows seniors using the web mainly to find information (e.g. product information with price comparisons) and to send and receive e-mails (see chart).

Modern ICT technology is poised to play an increasingly important part in seniors’ day-to-day life. A growing number of older people have acquired at least basic knowledge of how to handle modern ICT from their jobs. Building on this, they can develop their skills and quite quickly find their way around related areas of technology. Consequently, the percentage of over 55 year-old internet users in the total internet community is climbing steadily (see chart). As the proximity to technology increases, so the threshold to the use of further modern ICT will be lowered.

Healthy employees can stay on longer

The Federal Statistical Office predicts that the working age population in Germany will shrink up to 2060 from at present 50 million to roughly 33 million. Given such a massive social shift, modern ICT can make a major contribution to securing our prosperity and well-being. For one thing, technology has the effect of boosting workers’ productivity. For another, as the retirement age is raised ICT helps adjust workplaces better to older employees’ needs. With the aid of technology the size of the labour force in the economy therefore shrinks less rapidly.

Modern ICT can be put to many different uses. These range from robotics that make strenuous manufacturing tasks easier, through computer screens with age-appropriate content presentation at office workplaces to information technology making teleworking

Benefits to businesses and employees

possible. In competition for labour, companies with flexible working methods that better adapt the practicalities of the job to employees' individual preferences will win out. In the course of massive demographic change more and more companies will depart from rigidly defined traditional 'normal' working regimes and take recourse to the new possibilities unleashed by information and communication technology. In this context telework, with workplaces alternating between the company and home, will become increasingly important, particularly for experienced older employees – provided, of course, that the nature of their job and the way their individual work is organised are basically suited to the teleworking model and company structure.[1]

Motivational technology

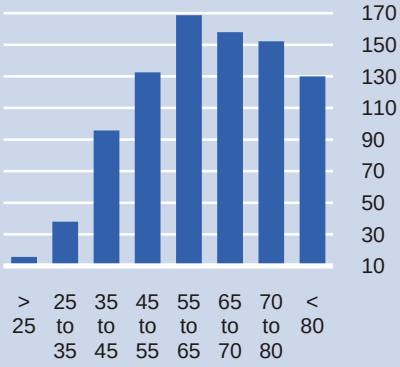
Alternating teleworking has advantages for companies and employees alike. The time saved commuting alone and the greater personal freedom in organising their own activities should constitute an added incentive for employees. This motivation ought to convince many older workers whose health still permits to play a creative role in working life for longer in a flexibly organised form of employment.

Life enrichment

With its wide spectrum of facilities for office and manufacturing work, ICT thus enables healthy 'best agers' to remain a part of the workforce for longer in more flexible working conditions. These active 'young elderly' workers can benefit from the creative challenges of working life and integration into a social environment.

Senior citizens relevant as consumers

Older people are wealthier
German households' assets* by age of household head, EUR '000



* Average total net assets of a household as of 1.1.2008

Source: Federal Statistical Office, 2009 **4**

Their increasing group size, quite high net worth and available purchasing power make senior citizens an interesting target group – not least for the ICT sector itself (see chart). Consumer spending by the over 60 year-olds currently totals upwards of EUR 300 bn, a third of total consumption in Germany. In individual categories of goods such as food, clothing and travel the group of over 50 year-olds already accounts for half of all consumer spending. By 2030 this ever more rapidly expanding age group is expected to generate fully three-fifths of total consumption.

Vendors must adjust to the new situation

Older people differ markedly in their consumer behaviour from the younger consumers who have so far formed the main target group for the ICT sector. Older people are less interested in digital entertainment products, but for that they focus more on health and safety products and aids to assist them with day to day tasks. Technology providers will therefore increasingly ask themselves how they can better customise their offers to the special needs and physical limitations of this group of consumers. The results of a survey by management consultants Capgemini reveal that so far only 14% of electronics, hi-tech and software companies offer age-appropriate products, compared to 53% of banks and fully 72% of insurers.

The huge challenge currently facing product developers and marketing strategists is to create age-specific offers that senior citizens do not perceive as robbing them of their autonomy or stigmatising them by stressing their physical infirmities. Mathias Knigge and his team of researchers state that "older people refuse

[1] See Heng, Stefan (2002). Technology and work – the 21st century and its challenges. Deutsche Bank Research. E-conomics 27. Frankfurt am Main.

Products must not stigmatise

to acknowledge their own impairments by the act of consumption"[2]. The different offers, often under such labels as "Universal Design" or "Design for All", take up the challenge constructively. Essentially these approaches are all about enabling barrier-free use that is not perceived as a special segregational solution for specific age groups with physical frailties (e.g. a single barrier-free entrance with a large automatic door in preference to a separate lift for the disabled at the rear entrance).

Well positioned in the demographic shift

Demographic change between menace and opportunity

For a long time attention focused on the downsides of demographic change, but today the emphasis is swinging increasingly towards the economic potential inherent in this change. In the ICT sector opportunities centre on the segments Ambient Assisted Living systems, e-Health and health games.

Ambient Assisted Living Systems preserve independence

People in need of help must decide for themselves

ICT-based Ambient Assisted Living (AAL) systems address the spheres of communication, entertainment, safety, food and healthcare. The systems are designed to make it easier for people to cope with everyday tasks, permitting seniors to lead a more independent life in their familiar home environment.[3] The main purpose of AAL systems is to compensate for age-related limitations – in contrast to, say, Human Enhanced Technology projects in which technology sets out to elevate human performance to superhuman levels.[4]

The art lies in moderation

This objective is predicated on potential automation ending wherever it encroaches unnecessarily on the autonomy of those in need of assistance. A good illustration of this is electronically controlled blinds. In consistently thought-through AAL designs the blinds are deliberately not automatically controlled by brightness sensors but manually by pressing a button. The rationale behind this constraint is that it is the only way for people in need of help to remain in personal control of how light their rooms are.

Other examples of promising AAL systems are:

— 'intelligent' tablet dispensers helping to ensure that patients take their long-term medication on time,

— smart wheelchairs able to avoid obstacles autonomously and helping the user to navigate,

From tablet dispenser through wheelchair to motion sensor

— emergency bio sensor technology in motor vehicles that sends out an emergency call in the event of the driver's suffering a stroke and safely brings the vehicle to a halt,

— motion sensor technology that automatically alerts the medical emergency centre when people in need of assistance depart

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2 Knigge, Mathias et al. (2003). The silver test – Ageing customers challenge companies at every level. Deutsche Bank Research. Current Issues. Frankfurt am Main.

3 For more on older 'innosumers' and Smart Home technologies see Rollwagen, Ingo and Alexander Peine (to be published shortly). Schlaues Heim – Glück allein im Jahre 2020 – Erlebbare Innovationen durch Kunden im demografischen Wandel. Deutsche Bank Research. Frankfurt am Main.

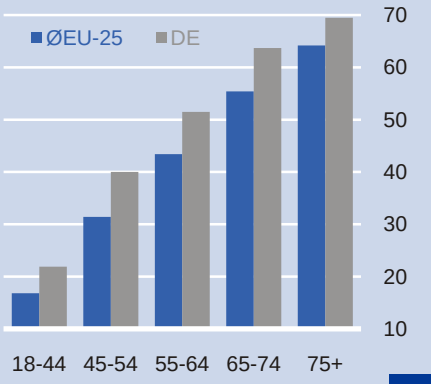
4 Examples of such HET projects are exoskeletons, technical augmentations for legs, the torso and arms enabling people to carry heavier loads, deep brain stimulation involving the implantation of brain pacemakers to influence mood electronically, and retinal implants between the retina and choroid membrane in the eye that make even infrared contours visible.

noticeably from their typical behavioural patterns in the home, for example in the event of a serious fall.

E-Health intensifies doctor-patient relationship

Demographic change will weigh even more heavily in Germany because the rates of chronic illness among Germans are higher than the average of their European neighbours (see chart) – and treating these illnesses is particularly expensive.[5] ICT therefore has an important part to play in medical treatment and nursing. The use of modern ICT facilities in healthcare (e-Health) extends well beyond the much-debated electronic health card and conventional narrowly defined biomedical technology (such as ECG machines, ultrasound and MRI scanners). Patients, doctors and health insurers alike can benefit from new technological solutions to help support medical treatment.[6]

Germans ail more than their neighbours
Chronically ill, % of respondents, 2006



Source: Eurostat, 2009 **5**

As the following examples in the field of tele-monitoring and online consultation show, e-Health is not a utopian vision of a distant future but is already being applied today.

An eye on state of health

— Tele-monitoring is still a fledgling aspect of telemedicine. It involves doctors monitoring their patients remotely. For this, patients record their own vital signs (e.g. blood pressure, cardiac rhythm and blood glucose) with a special device at home. The device automatically transmits this data to the patient's doctor in digital form. That way, critical developments in a patient's health can be detected and averted. Particularly promising are tele-monitoring devices guaranteeing extremely convenient portability, intuitive handling and proven robustness under changing conditions of use.

Improve quality of care

— Online consultations complement the traditional visit to the doctor without aiming to replace it entirely. Measurement and communication devices help the doctor in charge of treatment to obtain the fullest possible picture of the patient's current state of health by remote means. If necessary, an additional specialist can be brought into the online consultation in an advisory capacity. Without needing to be present, the two doctors can discuss the necessary therapy online on the basis of the patient's digital medical records. Online consultations improve the quality of medical care as well as saving patients from having to make arduous journeys to the doctor's surgery and then having to wait a long time to be seen.

Use in chronic illness very important

The two examples tele-monitoring and online consultations illustrate how e-Health can intensify the relationship between doctor and patient by adding another communication channel to it. Cost-intensive stays in hospital can be shortened and the intervals between the required regular examinations extended. E-Health is proving particularly successful in treatment of the chronically ill and those requiring long-term care. The European Commission calculates that in Germany e-Health could reduce the costs of hospital stays alone by around EUR 1.5 bn per year. The German Association for Electrical, Electronic & Information Technologies (VDE) estimates that e-Health initiatives could cut the costs of

[5] See Perlitz, Uwe (to be published shortly). Telemedizin im Spannungsfeld von Innovation und Akzeptanz. Deutsche Bank Research. Aktuelle Themen. Frankfurt am Main.

[6] See Heng, Stefan and Elisabeth Wieland (2009). E-Health: New medical and nursing options help doctors, health insurers and patients. Deutsche Bank Research. Talking Point. Frankfurt am Main.

treating chronic cardiac insufficiency by one-third. The German Institute of Medical Documentation and Information (DIMDI)[7] even reckons that the optimised patient management achievable with e-Health would halve the costs of treating chronic heart disease.

Health games: Seniors entering new realms

New controls heighten emotionality

In addition to the AAL systems and e-Health facilities on offer, a growing number of silver agers are also showing interest in the health games segment.[8] The emotionality of the game experience is growing with new age-specific control features and will be intensified further in future as specially networked platforms for seniors open up fresh vistas. Console games in particular are focusing more on motion-sensitive controllers: games are no longer played using keys, buttons or a joystick, instead it is the e-gamers themselves who have to make the appropriate physical movements (e.g. by swinging their arms as with a golf club). With the more advanced types of motion control, which are often described as motion capturing, e-gamers control their figure simply by moving their hands and legs and by the use of their voice and gestures. This new control feature draws the players into the game, which enhances the emotional game experience enormously.

Physically and mentally fit

Sports and motion games, in particular those of the medical therapeutic variety, are concentrating more on emotionalisation through their control technology. These features make it especially easy for older people to train body and mind. Brain-jogging games, for example, are used to treat Alzheimer sufferers. In addition, physiotherapists use exergames (exercise games) featuring innovative motion-sensing control technology to build muscle and for yoga or balance exercises. In practice, games of this kind often produce amazing therapeutic success, partly because patients feel less daunted by off-putting physiotherapy exercises if the corrections come from a machine rather than face-to-face from a physiotherapist.

Many obstacles ahead of business success

Legal framework as determinant

Technical fascination aside, the business success of products from the segments AAL systems, e-Health and health games hinges directly on the legal framework. In addition to statutory provisions on data protection and the reliability of therapeutic teletreatment, a comprehensive body of rules is also in place on cost reimbursement by health insurers and long-term care insurers. It is particularly worth noting that the German health system classifies many AAL, e-Health and health games offers as preventive prophylactic healthcare. Normally, however, preventive healthcare is not covered by the German health insurers' schedule of benefits – even if these measures are highly likely to enable an elderly person to live longer in their home environment without any serious medical complaints.

Preventive care not usually covered

Classification as preventive healthcare therefore poses a significant obstacle to the more rapid spread of these offers. Normally health insurers decline to reimburse the cost of, say, purchasing an exergame for private use, just as they dismiss applications for reimbursement of investment on the technical infrastructure for private premises (e.g. retrofitting private premises with motion

[7] Heinen-Kammerer, T., W. Wiosna, S. Nelles and R. Rychlik (2006). Monitoring heart functions using telemetry. DIMDI. Cologne.

[8] See Heng, Stefan (2009). The PC, console and mobile gaming sector: A serious business with plenty to play for. Deutsche Bank Research. E-conomics 72. Frankfurt am Main.

sensors or with the telemedia devices required to make use of online consultation facilities).

Plethora of regulations to observe

Therapists must be familiar with extensive regulatory framework

Physicians integrating e-Health facilities into their everyday work must observe a plethora of legal provisions, notably on data protection and the reliability of therapeutic teletreatments. Examples:

- The German penal code (§ 203,1 StGB) defines the special requirements for physicians to safeguard person-related data;
- The Federal Data Protection Act (§ 28,7 BDSG) stipulates special protection when saving and transmitting person-related health data;
- The professional rules for physicians (Musterberufsordnung für Ärzte, § 10 MBO-Ä) describe the special responsibility incurred when saving and passing on in digital form information on a person's state of health;
- The professional rules for physicians (Musterberufsordnung für Ärzte, § 7,3 MBO-Ä) determine the preconditions for teletreatment. These specify, for example, that the doctors in charge of treatment must examine in each specific case whether they are justified in continuing the treatment in remote form and whether, in shared treatment of the patient, they can trust in the diagnoses by the physicians that have previously attended;
- The Federal Medical Practitioners' Act (Bundesärzteordnung, § 2 BÄO) governs the admission of a treating physician to practise in a certain geographic area. In the World Wide Web this geographic restriction can quickly lead to conflict;
- Volume V of the German Social Security Code (§140 a-d SGB V) defines integrated healthcare between the local physician, specialist and hospital. The overarching networking targeted is intended to improve medical care and make it more affordable.

The use of modern globally networked communication technology and the ease with which digital data can be replicated also pose challenges in the field of medicine. Since these issues are beyond the realm of those normally confronting this sector, all the people involved – from physicians through nursing staff and carers to IT service providers – need especially intensive education and counselling.

User friendliness and value system crucial

Learning systems age-appropriately designed

On the demand side a product's economic success hinges crucially on the social value system and the user friendliness of the end-user device. User friendliness is determined first and foremost by the two partial aspects age-appropriate ergonomic design and intelligent learning systems behaviour. Intelligent learning behaviour exists where the system adjusts to the user over time and increasingly reacts as the user intends even if his or her input is inconsistent or wrong. We speak of ergonomic design on the other hand when the input and output features are adapted to the physical limitations of the person in need of assistance. By this token language-based products for the visually impaired, for example, or products with large pressure-sensitive control pads for people with motor dysfunctions stand a good chance of success.

Acceptance of nursing robots lower in Germany than in Japan

Above and beyond user friendliness, another key factor from a business perspective is the value that society assigns to robotics in medicine and long-term care. The Japanese, for instance, embrace robotics with a much more open mind than the Germans. This is due partly to the scant supply of suitable labour from the low-wage sector, which in turn is the upshot of Japan's restrictive immigration regulations. This example suggests that German society's reluctance to accept robotics in medicine and long-term care is not written in stone either and will – at least in the long term – also respond to the coming economic and social necessities.

Learning from mistakes

User friendliness is a pivotal but ambitious requirement. Developments in the mobile phone segment indicate where the many pitfalls lie. For a long time many mobile operators put the development of age-specific technology low on their list of priorities. Consequently keypads and displays got smaller and smaller and complex technology made mobiles ever more difficult to use. As a result, only one in every 20 mobile phones sold today in Germany is a senior-friendly device designed to cater for the special needs and physical limitations of older people. Very few products, for example, court custom with large keypads, easy handling, emergency buttons, GPS positioning, hearing aid compatible loudspeakers or display colours adapted for use by people with cataracts. It is not therefore surprising that at present only one in every three of the 16 million over 65 year-olds in Germany uses a mobile phone.

Age-appropriate mobile phones still the exception

Backup services improve success outlook

Recognise concerns and break down barriers

When developing age-appropriate ICT technology, over-the-top automation of the gadgetry offered has a counterproductive effect. Rather, seniors will appreciate products of practical use in their specific life situation but which do not give them a sense of stigmatisation or threaten to overwhelm them with technology. The barriers and uncertainties here are very clear. From the “QVC-Elektronik-Service-Studie 60+” by the GfK Group, a German market research company, it emerged that the majority of seniors do not feel comfortable with the advice given them when purchasing modern ICT products in specialist electronics retail markets. This impression, coupled with the fear of not being able to cope, restricts the sales potential for modern technology in this age group. One in every three older consumers admits to ultimately not having purchased a product for fear of technological overdrive; indeed, one in seven has already done this on several occasions, especially in rural areas.

Age-appropriate technical support in demand

Given the task in hand, products that counter the danger of technology overload head-on with backup services appear particularly promising. Technical support services for installation and operation and age-specific training courses for modern technology are also called for here. Some illustrations of backup services of this kind are:

— the seniors hotline (a specialist is available to older people on the phone to answer questions on the use of ICT devices),

— the seniors-help-seniors network (trained older people help their contemporaries with problems handling the technology),

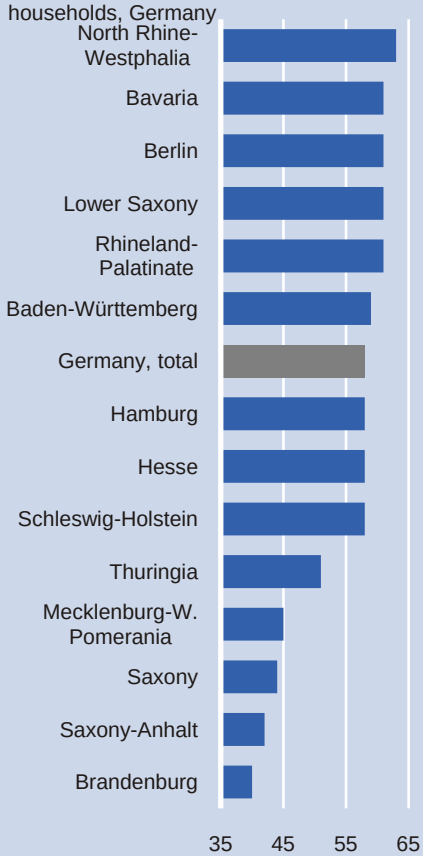
— a service DVD for the ‘silver PC’ (DVD delivered regularly with updates for the older user’s PC),

— the seniors’ homepage (solutions for frequently occurring problems with the use of PC and internet),

— an avatar on the website (graphically animated figure to take seniors through the product and explain the features to them).

Clear east-west divide

Broadband connections* per 100 households, Germany



* DSL, TV cable and other broadband technologies, December 2008

Source: Bitkom/Eurostat, 2009

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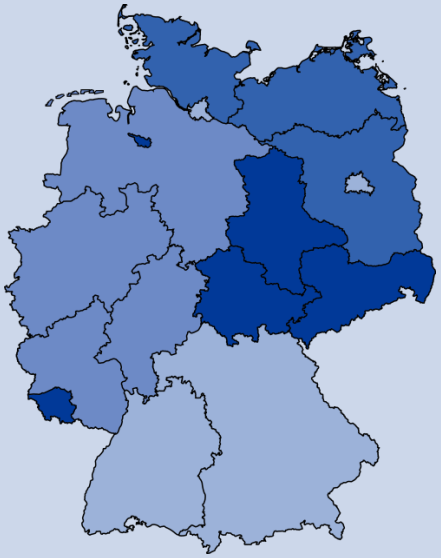
Support building increasingly on broadband internet

Already, many PC-related support services are conditional on broadband internet access. How broadband supply develops is therefore extremely important in structural policy terms – especially in rural areas with an above-average proportion of seniors.[9] Despite this awareness of the structural significance of broadband access, a

[9] See Heng, Stefan (2009). Broadband expansion in Germany: those at the local level need to show some initiative instead of waiting for Godot! Deutsche Bank Research. Talking Point. Frankfurt am Main.

Many seniors live in the new German states

Quartiles of share of over 60 year-olds in population of resp. German state, %



Source: Federal Statistical Office, 2009 **7**

yawning gap nevertheless exists in Germany between the vision and reality. There is no mistaking the east-west divide in broadband access between Germany's federal states (see chart).

Today five million Germans still have only very limited internet access – mainly in rural areas with large senior populations (see chart). These people cannot be provided with a telecom line offering a data rate of at least 1 MBit/s – the minimum speed for user-friendly access to modern broadband internet services. Seismic demographic shift poses some very pressing tasks for politicians and telecommunications companies in this respect.

Conclusion: Demographic change putting paid to olden times

In Germany the share of over 65 year-olds in the population will increase by half during the next 20 years, while the proportion of over 80 year-olds will fully double. Information and communication technology, too, is gearing up to demographic change. For a long time public perception focused on the downsides to an ageing society, but now people are increasingly recognising the economic potential.

Information and communication technology has an important part to play in coping with demographic change. It is introducing more and more age-appropriate products (e.g. in the segments AAL systems, e-Health and health games) that address the special needs of older people, many of whom have restricted physical ability, and this is increasing the sector's sales potential among private consumers. ICT technology also enables older employees to remain at work voluntarily for longer under more flexible working conditions. Such creative involvement in working life and the social integration it brings have a positive impact on the self-esteem of the healthy 'young elderly'. So starting out from older people's well-being, technology can additionally unlock potential to lighten the load on pension, long-term care and health insurance systems.

Avoid disenfranchisement and stigmatisation

The huge challenge to product developers and marketing strategists is to create age-appropriate offers that seniors do not perceive as encroaching on their autonomy or as stigmatising them by highlighting their physical infirmities. Promising "Universal Design" and "Design for All" approaches provide barrier-free use without seeming like segregational solutions for specific age groups with physical infirmities.

AAL systems, e-Health and health games most promising

The three segments offering the greatest potential within the broad spectrum of information and communication technology are Ambient Assisted Living systems, e-Health and health games, where there is an extremely wide range of facilities. They extend from 'intelligent' tablet dispensers, emergency bio sensor technology in motor vehicles and motion sensor technology through tele-monitoring and online consultations to brain jogging and exercise games.

Many obstacles ahead of success

Technical fascination aside, the business potential of this technology hinges directly on demand-side acceptance and the legal framework. Rapid business success is being checked at present not only by the extensive regulation of data protection, teletreatment and cost reimbursement, but equally by often still inadequate user friendliness and, most importantly, by widespread social reluctance to embrace the technical solutions.

Ultimately, technology is edging inexorably closer to the human sphere, to people's activities and sensibilities. Its advance is stoking doomsday scenarios. But in stark contrast to this is the sober

Technology edging closer to people

realisation that faced with the looming decline in the working population, the only way to secure our prosperity is through the use of technology. In this situation product developers, marketing strategists, doctors, nurses and carers, politicians and the elderly themselves who are in need of assistance must be prepared to tread new paths. After all, demographic change is putting paid once and for all to the olden days.

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