Innovative ICT Solutions for Older Persons – A New Understanding

Proceedings of the AAL FORUM 09 Vienna

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ACKNOWLEDGEMENTS

What you are now holding in your hands are the proceedings of the first ever Forum event of the Ambient Assisted Living Joint Programme. The event was entitled Ambient Assisted Living Forum 09 and took place in Vienna from September 29th to October 1st, 2009.

We would like to take the opportunity to express our deep gratitude to everybody who contributed to the proceedings. First of all, we thank the FORUM Committee Members and the chair of the FORUM Committee, Reinhard Goebl, who were first responsible for shaping and organising the Forum and then for writing and collecting summaries and additional contributions. Thank you also to all the chairs of the sessions and to the speakers who depicted a manifold picture of the Ambient Assisted Living topical field. Finally, thank you to all the authors of the texts, be it session summaries, articles or annex compilations.

In particular, we have to thank Gerda Geyer very much for her excellent editing of this volume. We also have to thank Kerstin Zimmermann, Alexandra Kuhn and Eugen Muehlvenzl, Chair of the Organising Group, for their permanent commitment enabling the success of the AAL FORUM Vienna 09.

The proceedings contain five contributions of the opening and plenary of the Forum 09, fifteen summaries of sessions and workshops, nine extra articles and five annex contributions.

We hope you will appreciate the variety of information and insight which the proceedings offer.

Gerhard Finking, President, AAL Association, organiser of the AAL FORUM
Gerald Futschek, President, Austrian Computer Association, publisher

FOREWORD

In autumn 2009, the "AAL Forum Vienna 2009" took place in the Imperial Palace in the heart of Vienna. This was the first of a series of events of this type organised in cooperation with the Ambient Assisted Living Joint Programme (AAL JP) and a European Member State of the programme , in this case Austria.

The Ambient Assisted Living Joint Programme (AAL JP) was launched in 2008. It was the result of the common European vision combining innovative Information and Communication Technologies (ICT) and a new approach to cooperation based on Article 169 of the European Treaty which fosters close cooperation of national and regional initiatives. The Programme aims to enhance the quality of life of older persons utilising ICT and strengthening the industrial base in Europe. Technology is seen as one possibility for shaping our future in times of demographic change and living longer. It is seen as a possible means to keep ourselves healthy and active for even longer.

Through the exploration of the possibilities that technology offers us, Ambient Assisted Living (AAL) can contribute to extend the time we will be able to live in our preferred home environment and can assist us in our daily activities within our information society.

Technology is not a singular solution in shaping a society conducive to ageing. A "new understanding" of its potential is necessary to get closer to the users and to involve them directly in the development of this new technology.

The Forum was designed to outline in three different tracks what was felt to be crucial information and discussion for promoting the potential of the common initiative. The three tracks were 1) the Ambient Assisted Living Joint Programme itself, 2) some of the national and regional initiatives in the field as well as 3) the innovative and socio-economic aspects of AAL. In addition, workshops were held and there was a vast exhibition area; poster sessions gave insight into funded projects and social events facilitated new contacts and cooperation partners.

In short, the Forum aimed to offer a broad variety of opportunities to manifold information, to exchange views and to find potential partners for future cooperation.

As the final decision for publishing the proceedings was communicated when the Forum was almost completed, speakers and chairs could only be invited to contribute to the proceedings afterwards. Returning to normal routine, sometimes results in difficulty finding time to look back and summarise what had happened. The proceedings therefore do not include all the sessions and contributions. However, it does give a good overview of the contributions and discussions which made the Forum a most lively and informative event.

Following the basic outline of the Forum, additional articles written by various authors were collected in order to give more detailed information and to investigate crucial issues more fully.

Finally, compilations of funded projects in the First Call of the AAL JP and in the Austrian national Programme benefit will give a good overview on relevant topics and approaches. Short abstracts of the projects presented by the Young Researchers show a very promising profile of investigations in the vast AAL field.

Proceedings Contributions

Opening and Plenary

The opening speeches reflect the political relevance of the AAL Joint Programme (AAL JP). Due to the high level and important involvement of the European institutions, opening speeches were given by senior representatives of the member states, for the Vienna Forum, Austria, from the European Council represented by Sweden, holding the current presidency and from the European Commission. The speakers were respectively **Ingolf Schädler** (BMVIT), **Thomas Lagerwall** (SIAT) and **Mary Veronica Tovsak Pleterski** (EC).

The keynote speech of **Jeroen Wals** introduced "**An Industrial Vision of AAL**". What are the challenges, the competition structures? Does a European stronghold exist or is it just a global market?

Open questions regarding the "**AAL Market Developments – Barriers and Carriers**" were also the centre of the Industrial Round Table which was moderated by the Chair of the AAL Advisory Board, **Peter Saraga**. The composition of the participants in the Round Table discussion was designed to represent a vast experience in the field of R&D, technology developments, industry and market considerations, social innovations, and the financial reality in public procurement.

Sessions

Track 1: The Ambient Assisted Living Joint Programme

The First Call of AAL Joint Programme, entitled "ICT- based Solutions for the Prevention and Management of Chronic Conditions of Elderly People" was launched in 2008. **Michael Huch** and **Silas Olsson**, both staff members of the Central Management Unit of the AAL Association, chaired two sessions on "**AAL Projects**", in which 12 successful consortia could briefly present their projects.

The AAL Joint Programme is a new type of R&D funding programme in Europe. It is based on joining the activities of its partner states on the theme of Ambient Assisted Living which is supported by a financial contribution from the EC through Article 169 of the Treaty. As experience among the member countries in the AAL JP demonstrates, there is still much need to sort out the participation rules and basic requirements of projects in the AAL JP. The session on the "**AAL JP Participation Rules**" was dedicated to that topic and chaired by **Pekka Kahri** from the Finnish Funding Agency Tekes.

AAL Joint Programme has some characteristics that make it different to other European initiatives that are addressing the questions of demographic ageing:
1. AAL aims at launching R&D activities that have a 2-3 years period time to market. It tries to fill the gap between research activities and market introduction of new products, systems and services.

2. AAL emphasises the role of end-users and especially older persons as active participants in the projects.
3. AAL stresses the importance of market analysis and business model development in the projects in order to boost market introduction of new products and services and systems that are being developed.

The session focussed on the participation rules of the AAL Joint Programme and the specific requirements of business models and end-user involvement.

The ageing population poses a great challenge to Europe's economic and social development. As people are living longer and longer it is of paramount importance that costs for medical and social care will not explode and that individuals can enjoy their lives in good health for as long as possible. Not only does healthy ageing represent challenges to society and individuals – it also offers opportunities for economic growth based on new technologies, products and services. Challenges and opportunities in healthy ageing – was the subject addressed and discussed in the session "**Healthy Ageing**", chaired by **Uli Waibel**, managing director of the consulting firm Innovendo.

We live in an information society. Information and communication technologies (ICT) permeate almost every aspect of our lives. They can be powerful tools for bringing people together, for adding new values to life, creating new wealth, health and welfare, thus accounting for a richer and more rewarding professional and social life.

The other side of the coin is that in Europe (and elsewhere) millions of people cannot fully reap these benefits and a significant percentage is effectively cut off from them for a variety of reasons: geographical, social, economic, educational, cultural, physical or cognitive disabilities and age, etc. The potential for AAL solutions related to the topic of "**Active Ageing**" is high. The interesting discussion was chaired by **Antonio Mendes dos Santos** from UMIC, Portugal, and showed that some very interesting aspects could be defined.

Track 2: National and Regional Aspects

Countries with different backgrounds and objectives participate in AAL. For some countries an important driver is the economic opportunity for their national companies, others are especially interested in the possibilities of e-health and telecare. Some want to close the gap between digital development and older people, others expect ICT/technology to solve future workforce problems. The session "**Intelligent Solutions: How to Save Time and Costs**" was organised around the "labour-saving effects" of ICT innovation which is highly relevant when looking at an ageing population and decreasing numbers of young people to serve them or take care of them. Nevertheless, the labour-saving objective is quite a sensitive issue. The session was chaired by **Thomas Børner** from the Danish Ministry of Finance.

Some of the European countries have – parallel to the AAL Joint Programme – their own national programmes aimed at the development of innovative and smart ICT for older people. One such programme is the Austrian national R&D funding programme benefit which opened the Fifth Call for Proposals during the AAL Forum in Vienna. The "**Launch of the Fifth Call for Proposals**" was chaired by Programme Manager **Gerda Geyer**, FFG. The session was designed to give insight into the genesis, the implementation and the thematic background of programme benefit and its focus *on* "ICT-based Solutions for Advancement of Active Ageing". Similar to the WHO definition

of active ageing, the Austrian programme benefit defines "active ageing" as a process which enhances the quality of life of the individual by maximising access to participation / social integration, security and health.

The involvement of end-users is a major issue in the AAL JP - and for good reasons. The session "**End-user Involvement**", chaired by **Barbara von der Linden**, ZonMw, The Netherlands, was dedicated to different aspects of the topic. AAL solutions have to be 'wanted' by older people and their families and also by the carers or service providers that are supposed to work with the solutions or the organisations that have to provide or finance them. Although general studies on needs and wishes of older people can definitely give insights and directions, it is not sufficient. Only the real involvement of the different types of end-users can realise real solutions.

In the successive stages of the designing process, the role of end-users will differ; varying from expressing needs to testing usability and assessing usefulness of solutions. In all phases serious involvement of end-users can highly contribute to the quality of the solutions and the marketability and implementation of the products and services. In AAL technologies a lot of questions concerning ethical issues arose. As always, issues like safety and reliability of systems, privacy regarding entry to and exchange of data are at stake. Smart surroundings, constant monitoring of different body functions or activity levels can help to save people in emergency situations, but it also can keep people under constant surveillance. What does this mean for people and how does it affect their lives and relationships? What do telecare solutions mean for the quality of care, for personal contact and for the quality of work? What action is to be taken if people are not able to give informed consent? How can the dignity of older people be guaranteed?

How does the use of smart technology affect personal relations with family and friends? What is the effect of living in 'your own little hospital at home'?

The debate about these issues has hardly begun and was taken up at the AAL Forum in the Session on "**Ethical Issues in AAL**", chaired by **Antonio Mendes dos Santos**.

Track 3: Innovation and Economy

In Europe the environment of national health care and social security systems is rather heterogeneous. This hinders the development of common (European) business models and a common market for AAL solutions. Taking into consideration the importance and the potential of the topic, a session on "**Business Models**" was offered at the AAL Forum, which was chaired by **Juan Carlos Castrosin Gutierrez**, CEO of Platform of Investments and Powerful Inventions PI&PI and Member of the AAL Advisory Board. Currently, reimbursement schemes in most countries do not encourage the adoption of technological innovations in these systems and provide no clear perspective to link investments and revenues/savings for adopters. Investors and developers have to deal with a wide variety of welfare, healthcare and care systems in European countries. Each of these systems provides a complex legal and regulatory basis which restricts or encourages the use of AAL technology in the public healthcare and care services in specific ways. In both the more regulated markets of healthcare/care and the consumer-oriented private markets, the lack of visible value chains is obvious. The complex structure of the developing AAL markets and the lack of market information and visible value chains make it difficult for SME or entrepreneurs to develop possible business strategies and evaluate the future market potential in this sector. To foster the market entry and participation of (innovative) SME and start-up companies in these important (technology and service oriented) market segments, it is important to foster innovation and

deployment in the whole of the AAL ecosystem. The session aimed to describe possible business models, provide information on the "ageing market" and current successful examples from the SME sector.

Urs Guggenbühl, Director of the Innovation Centre of the University of Applied Sciences, St. Gallen chaired the session on **"AAL as a Chance for Innovation".** The convergence of an ageing population with today's availability of advanced technology is an opportunity to innovate and to think differently about how we live throughout our life span. The home is the primary platform for much of life's activities influencing health, wellness, well-being, independence and safety as we age. Sometimes though, technology seems an attractive option when we are faced with an improvement challenge. The AAL JP aims to catalyse innovation in exploiting technology to provide not only products but services that are needed, desired and financeable to enhance the lives of older people among member states. It recognises that technology is a tool that complements abilities and has the potential to allow our ageing population to do more and become more productive.

Standardisation is a prerequisite for a broad deployment and the use of ICT and will trigger and enable new business. This is particularly true in the context of AAL technology. There are many different subjects for AAL technology standards, for example, hardware, technologies, software, interfaces/architectures, processes, services, data, content, etc. Each may require a different approach, or involve different actors and methods. Establishing such standards economises on coordination costs, creates an integrated market with economy-of-scale advantages and helps to build trust in quality of devices and services where error-free functioning can be critical to the individual. Another approach to achieve the necessary interoperability is certification on product level. The session on "**Standards and Interoperability**" was chaired by **Jeroen Wals,** Vice President of Philips Research Healthcare Program and Member of the AAL Advisory Board.

In recent years, the European Commission and European member states have made considerable investments in ICT and research into ageing in the Framework Programme, the AAL Joint Programme and national initiatives. Similar approaches have emerged in other geographical regions, e.g., Australia, Canada, Japan and the United States. Further research needs to build on these results and to be guided by a trends assessment and roadmaps which provide an extended look at the future of active ageing and ageing well in the information society. This requires interaction between various technology areas and innovative technology approaches. Information and knowledge about mid/long-term R&D perspectives will be crucial for defining future R&D steps on the way to Ambient Assisted Living.

Several ongoing and soon to be completed FP7 roadmapping projects – AALIANCE, CAPSIL, ePAL, and SENIOR – have addressed different and complementary perspectives of ICT and ageing. The session on "**Trends and Roadmapping in AAL**" presented their approaches towards a comprehensive vision and strategic roadmaps. The session was chaired by **Christian Wehrmann**, VDI/VDE-IT and AALIANCE Coordinator.

Workshops

"**The Young Researcher and PhD Workshop**" was held by **Ilse Kryspin Exner**, University of Vienna. The workshop offered the opportunity to meet other young researchers from Europe and to

learn more about the variety of projects dealing with the investigation of technical solutions for older adults. Young researchers had the opportunity to present ideas, designs and results of research studies, and to discuss the projects with other students and young investigators under senior scientists' supervision. The interdisciplinary approach within various disciplines (geriatrics, engineering, architecture, informatics, psychology, sociology, nursing sciences economics, etc.) was particularly highlighted.

Business models are the main success factor for new enterprises in the AAL area. The workshop on "**Business Plans**", which was held by **Urs Guggenbühl**, tried to promote guidelines to develop business models for AAL solutions. Experience shows that the focus in AAL projects is usually much more on technical development, rather than on marketing to the user. However it is the user who defines the success of the product. A business model looks at the needs of the market in respect of the user and puts forward a value proposition – uniquely offering the customer a value chain which defines the value of a product at each activity in the chain of development and a process how to earn money so that the company which produces and offers the product can sustain itself.

The workshop elaborated on the questions: why are business models necessary for AAL solutions, what concept is behind successful business models and how are our business models developed.

Articles

Austria was the country which co-organised the first Forum of the Ambient Assisted Living Joint Programme. Austria was also one of the founding members of the AAL Association. The national backbone programme for the Austrian participation in Article 169 Initiative Ambient Assisted Living Joint Programme (AAL JP) is called programme "benefit". Programme benefit is the first Austrian mission-oriented thematic programme in the field of ICT. The programme was set up in 2007. The initial phase of the programme was dominated by activities to build up the community and create a common understanding and common knowledge base. The first calls focussed on "ICT-based Solutions for the Advancement of Active Ageing". The paper "**Programme benefit: Public Funding in the Thematic Area of AAL in Austria** by **Gerda Geyer**, Programme Manager in charge of Programme benefit at the funding agency FFG and **Kerstin Zimmermann**, representative of the programme-owning Ministry BMVIT gives insight into the rationale of the first calls launched as well as into experiences made.

What is the living situation of older persons in Europe? Is it similar or does it differ greatly? **Isabella Buber-Ennser**, researcher at the Vienna Institute of Demography, elaborates in her paper under the title "**The Living Situation of Older People in Austria Compared to Other European Countries**" the similarities and differences. The paper is based on the "Survey of Health, Ageing and Retirement in Europe" (SHARE), a European dataset that includes accurate cross-national information on economic circumstances, health, and well-being, integration into family and social networks. Living conditions of older people in Austria compared to other European Countries are presented, including family status, children and housing. As a financial indicator, the subjective assessment of the economic situation of the household is presented for Austria as well as for the other 10 European countries included in SHARE. Another main aspect of ageing is health, focussing here on self perceived health and limitations in the "Activities of Daily Living" (ADL). Finally, different aspects of social participation of the population aged 50 and older are presented such as voluntary work or participation in a sport or other kinds of club activities.

The EC is known to have funded several projects in the "Ageing Well" focus. What is the strategy for the future? What is the background? Why is ICT for Ageing Well important? The paper by the **European Commission** outlines the serious pressure which demographic change will put on Europe's social models and public finances without a higher level of participation of elder population in employment and without better tailored and more effective health and social care services. Information and Communication Technologies can play an important role in helping Europe's societies to age well. ICT can help older individuals to improve their quality of life, stay healthier, live independently for longer, and counteract reduced capabilities which are more prevalent with age. ICT can enable them to remain active at work or in their community. The paper outlines the EU Action Plan for Ageing Well in the Information Society as well as The Future Policy Framework for ICT & Ageing.

Anna Elisabeth Pohlmeyer from the University of Technology in Berlin und **Lucienne Blessnig** from the University of Luxembourg elaborate in their paper on the "**Technology Adoption by Older Adults: Usability Plus X**". They are convinced that despite the prospect that technology can enable prolonged independent living and active ageing, this will only hold true if older adults accept the relevant technology and feel motivated to use it. The paper highlights the importance of user-centered design in the realm of gerontechnology in order to ensure technology adoption. It is being argued that simply addressing usability-related issues is not sufficient to evoke the user's interest and willingness to adopt a system.

In the AAL field, the barriers for technology adoption quite often are the *centre* of attention. **Claudia Oppenauer** and **Ilse Kryspin Exner**, both from the University of Vienna, Faculty for Psychology, investigate the topic in the paper named "**Ambient Assisted Living: Resources and Barriers**". They state that the growing population of older people in industrial countries and changing family structures demand affordable solutions in order to encourage old people in their social participation and to satisfy their need to age in situ. Technology can be a significant resource for older people if the users perceive a device or system as helpful and not stigmatising or too complex. Technology acceptance not only depends on the needs and attitudes of older people but also on age, gender, level of education and health, social and cultural conditions. Contrary to stereotypes, old people are willing to use new technologies but acceptance and use are only achieved if adequate training is provided and if the end-users experience subjective benefit from the technology.

Rahel Tschopp describes in her paper entitled "**CompiSternly – Kids Teaching Elderly People**" a Swiss project that shows very well one method by which older adults can become familiar with computer usage. "CompiSternli" are children who offer computer and mobile phone courses to elderly people. One child introduces the basics to one elderly person. The pace of the course is determined by the elderly person. At the time of Rahel Tschopp writing the article, the project had been running throughout Switzerland for one year.

A completely different view in the field of AAL comes from **Ger van den Broek** who works for Philips Research Europe and is also a member in the AALIANCE project. The paper "**The Need for Interoperability and Standards in AAL**" states that Ambient Assisted Living (AAL) is a very broad application domain with the intention of allowing persons to live longer independently, taking their chronic diseases, impairments and abilities into account, and giving them adequate support while maintaining their privacy and dignity. The AAL domain concentrates on innovative utilisation of ICT, new ways of user interaction or new types of value chains for independent-living services. He identifies the need along two lines: the person needing support (elder or disabled

person) and persons delivering care (informal and professional care givers). Van den Broek argues that different kinds of interoperability and standards are necessary to be able to develop collaborative integrated services.

What is the potential economic impact of AAL in the care sector? **Clemens Buchinger** and **Ulrike Schneider**, both from the Vienna University of Economics and Business, discuss in their paper "**Projections of Future Long-Term Care Expenditure in Austria (2008-2030) with Special Consideration of Assistive Technologies**" findings from cost projections for long-term care (LTC) in Austria based on a macro simulation model, spanning the years 2008 to 2030. They also present estimates for the cost-saving potential of assistive technologies (AT) in home care. Previous international studies reveal that AT's potential to substitute or supplement personal care is highly task-specific and also depends on the characteristics of the specific devices. Accordingly, findings on the economic benefit of AT are mixed. There is some indication but no clear evidence that AT will be both efficient and cost-effective.

Last but not least among the articles, an excerpt from the **AALIANCE Ambient Assisted Living Roadmap** focussing on "**Active Ageing in the Community – AAL and Mobility**" takes up two important issues for high quality of life in old age. The article states that social participation decreases with age, fundamentally because of three factors: intrapersonal, interpersonal and structural factors. Despite all these factors, participation levels can be significantly increased with adequate **motivation and support**. Thus, elderly people can be supported in finding and carrying out work, establishing and maintaining contacts with other people, and, in general, can be helped to spend time participating in different leisure activities. The excerpt mentions different ways by which technologies in the AAL field can assist and support the individual physical mobility of older persons.

Gerda Geyer
Reinhard Goebl
Kerstin Zimmermann

Vienna, March 2010

THE AMBIENT ASSISTED LIVING JOINT PROGRAMME MEMBER STATES ADDRESSING THE COMMON PROBLEM OF THE AGEING SOCIETY

The demographic development and the ageing of the European population will lead to a growing number of older people living alone and sometimes in need of intensive care, to a decreasing and ageing workforce in general, and an increase in budgets for health and social care. The number of people with physical and mental disabilities and particularly with chronic conditions will grow rapidly. The problems of care and assistance to these people are becoming more and more important from both the social and economic points of view.

They will bring dramatic challenges for healthcare and care systems, state pension schemes and employers alike. All these trends and challenges are now amplified by the effects of the economic and financial crisis, especially on the public budgets.

The challenges of demographic change cannot be approached with traditional policies and concepts. By the year 2020 a first major impact of the demographic trend will be imposed on most societies in Europe. The needs for immediate actions are even greater because many regions in Europe, both urban and rural , will feel that impact earlier and harder. With regard to the decreasing workforce for care and cure in particular, new technologies and new innovative systems solutions are necessary, especially in the field of innovative ICT-enabled assisted living or “ambient assisted living” (AAL) solutions. Europe has a high scientific, technological and industrial potential in these technologies and systems.

From the many projects already carried out on national and European levels, it is well known that AAL assistive technologies can help older individuals to improve their quality of life, to stay healthier and to live longer in their preferred living environment, thus extending the active and creative participation of individuals in the community.

The implementation and dissemination of new AAL solutions cannot be realised without close interaction between the national systems, especially in the fields of healthcare, social care and institutions supporting senior citizens and/or having high importance. Due to these strong interrelations with national and regional actors and also because of the great similarities of problems across all European countries, a new approach for a funding programme for innovations has been applied. The AAL Joint Programme is a member state driven programme of 23 member states according to Article 169 of the European Treaty. The Ambient Assisted Living (AAL) Joint Programme (AAL JP) was set up in 2008 with budget support from the European Commission of 25 million euros and a total budget in the order of 55-60 million euros per year (2008 – 2013).

OPENING AND PLENARY

WELCOME NOTE BY THE AUSTRIAN HOST OF THE AAL FORUM

Ingolf Schädler[1]

Dear ladies and gentlemen, representatives of the host ministry and the AAL Joint Programme, we are pleased to welcome you to the "AAL FORUM Vienna 2009".

The AAL Joint Programme (AAL JP) has been established based on an Article 169 co-decision process. In the meantime, two calls have been published. The first call is already in operation, the second is soon to be decided at the next general assembly. Our first experiences show promising results giving us clear indications that the European Union will become a leading force on this subject. Furthermore, we appreciate this form of international cooperation by learning more of the approaches of the cooperating countries towards the demanding subject of innovative ICT development in the context of an ageing society.

In our view, the Joint Programme has two strong elements: the topic of innovative ICT for elderly people and the new way of European cooperation based on Article 169 which allows a very disseminated approach. Both subjects should be seriously discussed and further developed in the AAL community in order to improve the quality and scope of the Programme.

Austria, as one of the funding members of the AAL Programme is highly committed to the transnational calls with 2.5 million euros per year. During the life time of the programme from 2008 to 2013, Austria will spend nearly 50 million euros on this topic including contributions in kind from industry. Technology will contribute to face demographic change. Life expectancy and the numbers of older people are increasing continuously. In 2000, 16% of the Austrian population was older than 65. This proportion will double by 2050. On the other hand, the work force will decline from a ratio of 1:2 to 1:4. Smart production technologies are considered to play a major role in compensating the above-mentioned gap.

ICT as a generic technology diffuses through many fields. By having a strong focus on end-user involvement, ambient-assisted technology can create cost efficiency for the social system of the ageing society, mainly in the care sector.

Austria has strong expertise in the following three domains

- Social inclusion: communication
- Activities at home and outdoor: fitness
- Comfort & safety: smart homes, monitoring

and a strong background in research, development and system integration with a clear focus on usability, telecommunication and visual detection. This raises a number of high-potential SMEs that

[1] Mag. Ingolf Schädler, Austrian Federal Ministry of Transport, Innovation and Technology.

are part of the successful results of the first AAL call: in one third of all projects, Austrian partners are represented and two are even coordinated by Austrian participants.

The national programme benefit started as early as 2007 in order to lay the ground work for the AAL initiative. As co-founder and vice-president, Austria had a strong bond in the bi-lateral setting up of the AAL Joint Programme.

I hope you feel inspired by this traditional location and make the first forum a huge success!

INNOVATIVE ICT SOLUTIONS FOR OLDER PERSONS – A NEW UNDERSTANDING

Tomas Lagerwall[1]

Europe faces many challenges such as the financial recession, the environment and the fast demographic change. A generation of baby-boomers born in the 40s and early 50s will soon retire. Not only is this a large group – many more people were for example born in Sweden between 1940 and 1949 than between 1930 and 1939 – they are well educated and their life style has been very different from that of their parents'. Beatles and 1968 formed their youth!

About 17% of Sweden's population have reached retirement age and figures are similar in some other European countries. These figures are expected to increase in coming years and we may soon say that one out of five Europeans is a retired person. The growing number of older people should not only be seen as a problem – it is the concrete result of positive socio-economic development and public health actions.

Previous generations have cared for their parents at home. The new generation of retired people will not be cared for by their children! They want to be independent and live at home as long as possible. How to solve this will be a real challenge for Europe and in many other parts of the world, not the least in Japan and North America. Technology can play an important role in ensuring high quality of life for the aging population. However, technology can't solve everything but can be an important tool. Personal care and interaction with other persons is crucial for us as human beings!

85% of Swedes today use computers and internet on a regular basis. It means that the technology is in almost everybody's hands and increasing. But let us not forget the 15% who do not use computers and internet and let us not forget those who are old today – born in the 20s or earlier. They may not accept or understand new technical equipment such as mobile phones, computerized kitchen equipment, mobility and behaviour monitoring and alarms. Here is an ample possibility for European industry together with older people, their organisations, relatives, national, regional and local governments and other stakeholders to develop advanced but easy to use ICT based solutions.

Four out of five people who are 61 or older in Sweden have a mobile phone. These phones are not always designed to meet the needs of older people; complicated to use, small and not so user friendly buttons and displays difficult to read.

More contacts between industry and older consumers are needed as well as with researchers to design accessible products. The society, national governments, regions, countries and municipalities as well as the European Union could play an active role in promoting higher accessibility which will make life easier and open new possibilities for large groups of older users.

[1] Senior Adviser, The Swedish Institute of Assistive Technology (SIAT), E-mail: tomas.lagerwall@hi.se.

Many European countries including Sweden welcome the Ambient Assisted Living initiative and this conference. We need to work together. Technical developments are too costly and complex to be solved by individual countries. Europe with a population 500 million can take a lead and the European industry is a crucial actor in this process.

The Swedish Institute of Assistive Technology, (SIAT), where I come from, wants to be an actor in this process. The Institute is a national body in the field of technology for persons with disabilities and older persons owned by the national government, represented by the Ministry of Health and Social Welfare, and The Swedish Association of Local Authorities and Regions (SALAR).

I would like to conclude by congratulating the organizers, the Austrian Federal Ministry of Transport, Innovation and Technology, the AAL Forum Committee and the AAL Secretariat in Brussels and wish you all success in our important mission to enhance high quality of life for older persons in Europe!

AGEING WELL IN THE INFORMATION SOCIETY

Mary Veronica Tovsak Pleterski

Dear Ladies and Gentlemen,

I would like to thank the Austrian Ministry for Transport, Innovation and Technology and the AAL Association for inviting the European Commission to this first AAL conference since the launch of AAL in 2008.

This is an excellent and timely initiative to gather the stakeholders to discuss the progress of the programme and ICT for Ageing Well.

Let me begin by recalling the importance of this dealing with demographic change and how this AAL programme came about.

Why is Demographic Change important?

Thanks to progress in science and improved living standards, Europe's citizens are living ever longer, in better health and wealth. Average life expectancy has increased from 55 in 1920 towards 80 today. This is a tremendous achievement!

However, as we all know, demographic ageing poses significant financial sustainability challenges. Today in Europe there are still for every retired person, 4 others in employment. By 2025 this will drop to 3 to 1 and by 2050 to only 2 to 1!

The cost of pensions and care, especially for the growing group over 80's, is rising rapidly. This is estimated to bring additional costs of up to 8% of GDP between now and 2050. It will be a common challenge for the European countries to even maintain the present quality of life for elderly people and their carers.

One example to illustrate this: the annual costs associated with Alzheimer's disease was already more than 125 billion Euros in 2005. And that cost will rise further, as Alzheimer will become increasingly prevalent with the growth of the over 80 population.

Our approach must be to make the promise of Information and Communication Technologies become a reality. Namely, that ICT can play a significant role in addressing these challenges and turn them into opportunities to improve the quality of life, reduce cost of health and social care, facilitate ageing at work and open up major new opportunities and markets for our industry and in particular for SMEs.

Already now, we see the potential of savings and improved quality of life that can be achieved with ICT. I recently read the example of Herefordshire in the UK using social alarms and telecare, and realising annual savings of 1000 euros per older person concerned with very positive perceptions of both the elderly and their carers.

Another example is from the West Lothian authorities in Scotland who have used smart technology in existing and newly built housing to join up their health and social care services. In doing so, they have achieved a reduction in hospital stays, from 57 days to 9 days, and have reduced costs by a factor of 3. Older people and their families like it because it gives them more independence. And it costs less, too! We need to stimulate others to seek out similar benefits.

How did the AAL JP come about?

The AAL Joint Programme has a long history. Seven Member States under the lead of Germany started working together in 2004 in an EC-funded project to define the focus and key organisational and operational principles for a new joint R&D programme.

The European Commission then tabled in 2007 a proposal for financial support to the AAL Joint Programme based on Article 169 of the Treaty, which was then adopted by the Council of Ministers and the European Parliament in July 2008.

This joint research programme is a good example of pursuing the European Research Area policy which aims to increase investment in research in Europe, amongst others by better coordination of national research funding.

In this way AAL was established and could start in 2008.

Where do we stand today

It is quite remarkable that the AAL Joint Programme has managed to get operational in a rather short timeframe, despite a very challenging political, financial and organisational set-up.

It is also encouraging to see that several of the basic principles of the programme appear to be working.

I refer here to the scientific integration through the joint work programme, to the transparent selection of proposals for funding based on excellence and to the financial commitments by the participating countries. Even better, the participating countries have been increasing their financial contribution well beyond the initially expected levels, which is a very encouraging sign in these times of financial hardship.

The constituency has also reacted positively to the new programme, with more than 100 proposals in each of the two first calls. I am particularly pleased to see an SME participation of more than 40% in the selected proposals of the second call for proposals.

This clearly demonstrates the interest and relevance of the programme and that the efforts invested have been worthwhile.

Nevertheless, there is neither room nor time for complacency. The time to contract needs to be reduced and is a point of concern. Further efforts need to be made to improve the awareness about the opportunities of the programme across all participating countries.

Wider context

Let me now focus on the wider context of the AAL Joint Programme. After all, the Programme does not exist in isolation. It is linked to other research and innovation programmes and it fits in a larger policy context. Let me briefly explain.

In terms of research and innovation, AAL is complementing both the EU's 7th Framework Programme, or FP7, as well as the ICT Policy Support Programme part of the Competitiveness and Innovation Programme, that is the CIP. This complementarity is in terms of time-to-market as well as in terms of types of research and innovation.

AAL with its 2 to 3 years time-to-market sits in between the longer-term research in FP7 and the market deployment work in the CIP.

In terms of type of research and innovation the FP7 addresses advanced research such as service robotics. Clearly, this has a longer time perspective. AAL on its turn aims at practical, market-oriented research. And the CIP supports no research but only deployment and validation work.

More specifically, in the CIP already 10 larger scale pilot projects have been launched, involving more than 30 regions in Europe. These deployment projects demonstrate the impact from existing ICT solutions for prolonging independent living of elderly people with multiple chronic diseases and early dementia. These CIP projects currently collect comprehensive socio-economic evidence to support the case for investment.

Together, the AAL Joint Programme, the FP7 and the CIP will leverage research and innovation for more than one billion Euros between 2008 and 2013 in the ICT & Ageing field together with public and private stakeholders. This provides strong opportunities for the European ICT industry to make Europe the hub for new global markets in this emerging field.

We also have a common technological strategy for these three programmes. I refer to the work by the AALIANCE innovation platform. This is a promising initiative of 35 key stakeholders which have developed a common vision and roadmap for R&D in the field of ICT for Ageing Well. This will be very useful to help guide the future efforts in the Framework Programme, the AAL Joint Programme, and the CIP Programme.

In policy terms, the AAL Joint Programme is part of the wider policy initiative on ICT for Ageing, namely the Action Plan on Ageing Well in the Information Society, under the i2010 Information Society Policy. The Action Plan aims to increase awareness about existing solutions for ageing well with the help of ICT, promote the exchange of good practice and stakeholder coordination, identify market conditions and barriers across Europe, stimulate uptake of proven solutions and invest in research and innovation for the future solutions.

The Action Plan on its turn is closely linked to the European Commission's e-health strategy and even more widely, to Europe's social and economic policies that address the challenges of the ageing population.

All together these policies and activities provide a significant push to accelerate the uptake of solutions and creation of innovation and markets in the independent living and care sector.

Next Steps

So what are the next steps?

We will launch the mandatory mid-term review of the AAL programme by the end of the year. This review will look into the performance of the programme against the political expectations set out in the AAL decision and will report back to Council and the European Parliament at the end of 2010. Indicators such as Member States financial commitments, SME participation and time to contract are amongst the elements which will be measured.

We expect that the operation of the programme will be further streamlined in the coming time and that procedures are optimised to ensure the maximum performance of the programme.

We should also soon see the first concrete results from the AAL projects. The actual impact on the market should start to become visible as well. Such results will help to attract further investments for commercialisation of project results through other sources of funding such as private capital, the European Investment Bank, regional funding etc.

The AAL Joint Programme will also play a role as a case study for similar initiatives in other fields as part of the ongoing preparation for the 8th Framework Programme. The ageing area is also well in the picture of the ongoing development of the post-i2010 Information Society Policy of the Commission.

Conclusions

I would like at this point to thank all the representatives from the Member States for their exceptional personal commitment, in particular the first members of the AAL executive board headed by Dr. Gerhard Finking formerly BMBF Germany and the people working in the Central Management Unit without whom this initiative would not have been possible.

It is clear that demographic ageing is a major challenge for Europe but it is also a key opportunity to create new markets for related products and services. Through initiatives like the AAL Joint Programme it is possible to stimulate innovation and create markets, while helping Europe tackle the demographic ageing challenge.

In the policy guidelines for the next Commission, European Commission President Barroso has identified demographic ageing as a priority area. This forms a good basis for development of further policies and initiatives in this field.

The AAL Joint Programme is an excellent example of a European initiative with high potential impact, combining social innovation with business and employment benefits, and building on true European collaboration.

I encourage everyone to continue the active support and good progress and can ensure you that the European Commission remains committed to support the future endeavours in this field.

I wish you a successful conference in the coming days here in this beautiful city.

Thank you for your attention.

BUILDING A BRIDGE BETWEEN HOSPITAL AND HOME THROUGH TECHNOLOGY

Jeroen Wals[1]

The future of our healthcare system is a very important issue, not only in Europe, but all over the world. By empowering patients with chronic disease to take an active role in the management of their disease, home healthcare technologies have the potential to change the way we deliver care and to allow people to live independently for as long as possible.

The challenge to keep our healthcare systems sustainable, cost effective and of high quality, is a real puzzle. With many stakeholders involved – from patients and care providers to insurance companies and governments – effective solutions will demand innovation, determination and a willingness to embrace change. Every year, new treatments and medical technologies offer new hope to patients and those who care for them, but rising healthcare costs and an increasing shortage of professional care providers are already stretching many healthcare systems to their limits.

The underlying problem is the 'graying' of the world's population. The demographic shift to older age groups is taking healthcare systems into new territory, where many things are still unknown. What we do know, however, is the size of the challenge. In the year 2000, 600 million people in the world were over the age of 60. By 2006, it had risen to more than 700 million. By 2050 it is forecast that around 2 billion people will be over 60. Unfortunately for most of these people the prospect will not be a healthy old age. The majority of them will be suffering from some form of chronic illness. More frighteningly still, it has been projected that by 2050 half of the developed world's population will be chronically ill[2].

1. Cultural and political shifts

Today's changing lifestyles and eating habits have significant consequences, both good and bad. Many more people, for example, now choose to eat a diet that is low in saturated fats. However, bad habits such as smoking are extremely persistent, while some beneficial lifestyle changes, such as regular exercise, are often hard to accomplish. Especially significant for the elderly, traditional structures that provided support for parents and grandparents, such as nearness to close family members, are breaking down, making the elderly increasingly dependent on other forms of support. Due to the fact that they live longer, elderly women are more likely to live alone and more prone to social isolation and

[1] Vice President Philips Research.

[2] UN Report, "World Population Ageing, 2007," Department of Economic and Social Affairs, Population Division.

economic deprivation. In addition, the elderly often have multiple and complex care needs, putting more pressure on healthcare systems because chronic and terminal care services are very expensive.

New technologies and novel ways to deliver home-based healthcare may be able to alleviate the costs in both areas by reducing the cost of chronic and terminal care services while also helping to prevent the need for hospitalization. Home-based healthcare could serve as a bridge between the hospital and the home, enabling continued quality of care, better quality of life, longer independent living and more cost-effective healthcare systems.

Technology may be one of the key enablers to improving the healthcare environment but technology isn't everything. Choosing the right applications and implementations are also key to success. We need to take into account how people actually live and how they react to innovation. Change always leads to an emotional response, particularly with respect to healthcare, because healthcare touches our ultimate personal space – our bodies – as well as how we choose to live. In many cases, it even affects how we choose to die. Getting public support for change can also be difficult. The majority of the population does not yet have a problem, and as a result they are often against the change that is so urgently needed. Later on in life, it's a decision they may well regret.

2. Empowerment through education

The greatest challenge is to apply technology in such a way that it helps patients to help themselves. If patients feel that they are in control and not simply people for whom or to whom things are done, it opens the door to improving care at greater affordability and making more effective use of scarce nursing and medical resources. Empowering patients to take control of their care is a product of environment and psyche, in which education is key. When it comes to healthcare, empowered patients are educated patients. The first step on the road towards home care and prolonged independent living is therefore to get patients to believe in their ability to care for themselves, making them proactive in looking after themselves and focused on preventing crises.

Enabled by technology, home healthcare systems will be able to provide many different services to patients. However, it is extremely important that patients do not feel abandoned to these systems. Physicians must play an instrumental part, not only in educating patients and including them in the decision making process, but also by reassuring them that the traditional safety net will still be there when it's needed. One excellent way of successfully empowering older patients is to also empower their family. These informal caregivers are equally in need of education to help them understand what technology is available to help their loved ones and need to be trained on the type of equipment used.

Last but not least, doctors and nurses need to be educated about new innovations in home healthcare so that they can recognize the benefits in improving patient outcomes, lessening workloads and increasing productivity. If these healthcare professionals accept that technology can take over many of the routine tasks that they currently perform, they will be able to spend more time on providing personalized high-value care – more time dealing with the patient as a person and less time as a machine.

Education is often a key driver of broad cultural transformation and healthcare change is no different. In addition to the patients, caregivers and clinicians who are directly involved in the care cycle,

political leaders and government officials who decide on healthcare policies must also be empowered with knowledge. They are the ones who must be convinced that the traditional paradigm of hospital-based care must be reformed to reflect the new economic and demographic realities and that healthcare systems of the future will need to focus on prevention, screening and early diagnosis as much as they do on late-stage intervention and aftercare. Of course, hospital care will continue to be the setting for addressing serious clinical situations that require complex medical diagnosis and intervention, but routine care, such as that provided by ongoing home-based health monitoring, will be preferable for patients and probably more cost effective in the long term.

3. First steps on the road

So how far are we down the road to home healthcare today? One of the most obvious examples is typified by Philips Lifeline – an easy to use medical alert service that can connect an elderly person in distress with immediate help, call medical assistance and contact a neighbor or family as well. Getting assistance via Lifeline is no more complicated than pushing a button on a wristband or pendant. Within seconds, a trained responder answers the distress call, determines the patient's needs and contacts the necessary people for help. Lifeline and similar services make a significant difference to the ability of older people to remain independent and in their own homes at relatively low cost. And for family members who worry about their elderly relatives living alone, they provide welcome reassurance that help is literally a touch of a button away.

While services such as Lifeline are designed to address crisis situations, Home Telehealth is pro-active technology that empowers patients to prevent crisis situations. It also illustrates how home telemonitoring technology can improve patient outcomes and be cost effective at the same time – a win-win situation for both patients and clinicians. In a study of heart failure patients done by Tufts Medical Center in the USA, researchers found a 72% reduction in hospital heart failure re-admissions when using telemonitoring and 63% fewer cardiac re-admissions[3]. Another study carried out in three European locations was equally positive, showing a 29% improvement in the survival rate of heart patients when using telemonitoring. While these numbers are in themselves persuasive for medical practitioners, the ease of use of this new technology will be critical to its acceptance by patients.

Also targeting heart failure patients, the MyHeart project and its successor project HeartCycle (both European Framework projects involving large pan-European consortia from academia and industry) are developing systems that monitor patients day and night and directly link to physicians using wireless technology and modern communication infrastructures. Special focus is placed on the user-friendliness of the entire solution. In particular, the HeartCycle project is focused on closing the loop between patient and clinician by looking into the effects of each individual patient's medication regime and adherence to therapy.

4. Remaining patient-focused

At Philips, we believe in a holistic, patient-centered approach to healthcare that focuses on the entire care cycle from disease prevention and screening through to diagnosis and treatment, therapy

[3] SPAN-CHF II study conducted by Tufts-New England Medical Center, presented at the AHA, 2005.

monitoring and health management. Driving our healthcare solutions is a commitment to developing and implementing new technologies that will empower both patients and providers alike.

For research in this field, we strongly believe in a comprehensive approach. We start by gaining user insights, followed by the development of appropriate technology to solve the identified problems and implementation in real-life scenarios to test the service propositions. Every step of the way, we interact with the different stakeholders in order to improve the proposition.

In Home Healthcare, this cannot be done without also addressing innovations in service and business models that will lead to new ways of delivering care as well as new and improved reimbursement models. If we want to go beyond the pilot studies that address clinical and technical needs, viable business models must exist.

All of us have a personal stake in building a healthcare bridge to the future by empowering patients and clinicians with the technology of change. Demonstrating that technology can enable change is only one part of the challenge. The greater challenge is to convince all stakeholders, from patients and clinicians through to healthcare providers, policy makers and politicians, that change is necessary. Effective education will undoubtedly be the key to ensuring that the right decisions are made.

Acknowledgement: Thanks go to Dr. Eric Silfen, Chief Medical Officer, Philips Healthcare, for preparing much of the material contained in this article.

AAL MARKET DEVELOPMENT – BARRIERS AND CARRIERS

Harald Jagos[1]

Chair of session: Peter Saraga, AAL Advisory Board

Introduction

The major current issues of AAL in general are how to transform the many good ideas and research into products and services. One big task for every institution working in this area is to develop sustainable business models.

Speakers - Short presentations

Volker Adams – Robert Bosch Healthcare

Volker Adams categorised telemedicine in three groups: "Doc-to-Doc" technologies/solutions, "Doc-to-Patient" technologies/solutions and "Social care, telecare". This is in line with their target market (for future years): people with chronic diseases. Therefore, the guiding principle of Robert Bosch Healthcare is: "We enhance the quality of life for people with chronic conditions." and "We are the preferred partner for telemedical solutions."

Robert Bosch Healthcare wants to achieve an improvement in therapy management and the availability of care and they also see a high potential for an overall cost reduction in the healthcare sector. This could be done if 1. acute events/hospitalisations were reduced, 2. the number of high risk patients were reduced and 3. the limited resources were utilised more efficiently.

They are currently focussing their work on clinician and patient interfaces and clinical content as well as data acquisition and analysis.

Alexander Kollreider – Tyromotion, AT

Alexander Kollreider is managing director of Tyromotion, Austria, which is a rather young enterprise that was only founded in 2007. They now employ 13 people. Their formula for success is to cooperate with and involve medical partners from an early stage.

[1] CEIT RALTEC, Institute of Rehabilitation and Assisted Living Technologies, Schwechat, Austria.

However, one big problem is the high production costs and the resulting high prices (10.000 to 300.000 euros) of their products. In order to find customers who could afford their developments, they chose a rather small but promising market, namely rehabilitation clinics in particular. After a while on the market, the intention is also to reach therapists and ultimately the home market.

They offer two systems and a third is almost ready for the market: 1. “Amadeo” which is designed for hand rehabilitation (e.g. for stroke patients), 2. “Pablo” can be used for rehabilitation purposes as well as for measurements. 3. a gait training system which is being developed.

Irina Odnoletkova – Independent Health Insurance Fund, BE

Irina Odnoletkova started with a simply true/fundamental and thought-provoking statement. On the one hand, there is a constantly ageing society and, on the other hand, there is the budget deficit. This is common for most European countries. Even though this is a rather simple dilemma, the solution is obviously not as simple because apparently no government is dealing with this drawback properly. The fact is there is insufficient use of ICT in care and insufficient use of ICT in measurement of (health) data. The necessary technology is already, available on the market and inside the laboratories. Furthermore, we are not focussing on the issue of prevention of, for instance, the so-called society diseases. Also, providing sufficient information to the public about health standards is a task which is not covered satisfactorily.

For the future, Irina Odnoletkova suggested developing new models of care delivery and also innovating changes to the financing system. Resources have to be redirected and new partnerships have to be formed. All these basic innovations should lead to an overall disease management framework.

Jan Muehlfeit – Microsoft Europe

The heart beating inside Europe is a divided one: there is the healthcare and social heart on one side and then there is also the economic / productive side. Thus split, the heart faces an ageing population, an increasingly expanding part of the population with chronic diseases and a skilled labour shortage as well as an increase in expectations of the citizens towards their governments concerning medicare and healthcare. He also described the demographic situation as a ticking time bomb.

Microsoft wants to contribute to a shift away from reactive healthcare (which we are facing now) towards proactive health and wellness. One concrete idea, for instance, was to provide joggers with information about pollution in the cities. Another aim is to identify high risk populations in order to provide targeted programmes. This can be achieved by using programmes or systems for fitness management, which collect data about the health status of a person. Also, in order to lower the costs in the healthcare system, incidents and the severity of illnesses have to be reduced.

The main barrier to adapting the healthcare system to the new (demographic) situation is that there is a lack of government programmes in the area of ICT-based solutions supporting healthcare.

A major problem is also that, as yet, there are no connections between government, developers, caregivers, etc. Sustainable business models need to be developed. Most of the technology which is

needed to carry out the first steps in improving healthcare, is already available. We only have to take it, assemble it and adjust it to the particular specifications.

Henning Seiding – Odense Municipality, DK

Odense is the third largest city in DK and it is situated at the centre of the Island of Funen. It has 187.000 inhabitants.

The big challenges in the current situation are a decreasing labour force and an increasing number of elderly people. Nowadays, clients are more demanding and, as a result, new technological opportunities arise. At the same time, governments everywhere are practising a policy arguing that money is tight, which leaves little space for innovations in a new and mostly undiscovered sector.

The vision of Odense is: "to create an International Centre of Excellence within welfare technologies (development, implementation and dissemination of technologies in social and health care)." The municipality also wants to focus on supporting innovations, in both the public and private sector. They want to achieve financial growth and to advance the co-operation between public and private sectors as well as co-operation across municipalities. Also, the municipality of Odense already has a strategic action plan. From 2009 to 2012 the city council has agreed on a funding total of three million euros for projects in the area of welfare technology. The entire region of southern Denmark will provide funding to the amount of 7.5 million euros from 2010 to 2013. In Odense, a new Centre of Welfare Technologies will be founded under the project name "Welfare Tech Region". Future goals of Odense will be establishing living labs which means involving end-users systematically in the development of new technological solutions. Also, there needs to be a holistic view on welfare technologies which means (among other things) that stronger national and international co-operation is necessary. The public sector is going to be the future customer for well-being technologies.

Discussion

"What would you like to have done in order to remove barriers?"

One big barrier is financing and the other is acceptance among end-users but also many companies are not aware of the changing situation, or from an economic point of view, of this market that is opening up. However, it should be made clear that all this is not about technology but about finding solutions to support and help *people*.

If you are developing a niche product, and that is what healthcare and welfare technologies have been until now, especially in a small country, it is extremely hard to survive with your ideas and products. With the market being very small, products are often tailor-made for a specific purpose and the support from companies is poor.

Another major barrier lies in politics and the fact that politicians do not explain the challenge that the generation gap will present to the voters. Currently, it is still of no political use to them because we do not face or feel any serious effects on our daily lives. However, this lack of urgency has to be overcome in politics before it is too late because the politicians can contribute massively in creating an awareness

of how urgent it is to make the change in direction. We already have visions and also some strategies so now implementation measures also have to be taken. They can only be taken if there is (ideally) support from the government and substantial support from industry. More political courage is the basic need to improve the situation. For instance, could the current crises also be taken as an opportunity to make some changes? Cuts will have to be made anyway. The governments should make them in the right areas and re-direct money where it can save costs when the change in direction eventually happens.

Experiences have to be shared and not bunkered. Companies and research institutions have to cooperate and not be rivals. It should be clear that we are all working for and aiming towards the same goal. Nevertheless, we have to be aware that almost every country has a different healthcare system and different financing principles. We must not make the mistake of merely "copying and pasting" the different solutions from country to country. That would be counterproductive. Every institution should also develop suitable business models, relative to its country's needs and preconditions.

We, who are working, researching and developing in this growing sector of AAL, have to continue to build up networks where we can join forces, exchange experiences and work together on new solutions to improve the quality of life for an ageing society, our society.

SESSIONS

AAL PROJECTS I

Iris Kaiser[1], Claudia Oppenauer[2]

Chair of session: Silas Olsson, Central Management Unit of the AAL Association

Speakers:

1. Dimitrios Tzovaras, Informatics and Telematics Institute (ITI), Centre of Research and Technology – Hellas (CERTH), GR and Jesús Salazar, Siemens, ES: *Remote health and social care for independent living of the isolated elderly with chronic conditions (REMOTE)*
2. Paul J.M. Havinga, Pervasive Systems Research Group, University of Twente, NL: *Inertial Sensing System for Advanced Chronic Condition Monitoring and Risk Prevention (IS-ACTIVE)*
3. Fiorella Marcellini, Research Department, INCRA (Italian Institute on Ageing), IT: *A home-based approach to the years of ageing (HAPPY AGEING)*
4. Didier Stricker, German Research Center for Artificial Intelligence (DFKI) GmbH, DE: *Physical Activity Monitoring for Ageing People (PAMAP)*
5. Wolfgang Zagler, fortec, Vienna University of Technology, AT: *Domestic Robot for Elderly Assistance (DOMEO)*
6. Martin Litzenberger, Austrian Institute of Technology, AT: *Safe Private Homes for Elderly Persons (CARE)*

In this session, six projects funded by the first call for proposals of the AAL Joint Programme, entitled "ICT based solutions for Prevention and Management of Chronic Conditions of Elderly People", are presented.

1. Dimitrios Tzovaras presented the REMOTE project. Fifteen partners from eight countries are involved and are investigating the needs of elderly people and the self-care and the self-management of chronic conditions. REMOTE will prototype technology-based solutions well adapted to the respective diagnosis, prevention and treatment opportunities that can be pursued while allowing the elderly to stay "at home". The homes of the elderly will be enhanced with audio-visual, sensor/motoric monitoring and automation abilities to trace vital signs, activity, behaviour and health conditions, and to detect risks and critical situations as well as to provide effective and efficient support at home, both proactively and reactively.

[1] Department of Neurosurgery, Medical University of Vienna, Austria.
[2] Institute of Clinical, Biological and Differential Psychology, University of Vienna, Austria.

2. Paul Havinga introduced the IS-ACTIVE project. The project aims to promote and encourage activity in older people with chronic conditions. Target groups are, in particular, patients with chronic obstructive pulmonary disease (COPD) and their caregivers. Firstly, activities are monitored by a wireless sensor system and evaluated. Finally, real-time feedback is given in order to stimulate and enhance self-management of chronic disease.

3. Fiorella Marcellini presented the HAPPY AGEING project. The project partners come from seven countries and different disciplines. The project aims to prevent the incidence of chronic illness and the management of conditions supporting independent living. The target group are older people and their caregivers where older people with mild physical impairment are motivated to live at home. In all stages of the project, user-involvement is intended. The developed system will integrate sensors and technologies available on the market in a whole smart system (RFID), able to assure reliability and the privacy of the user. The system will be composed of three main modules: life style monitor, navigation assistant and personal assistant.

4. Prof. Didier Stricker from the German Center of Artificial Intelligence presented the PAMAP project. The abbreviation stands for "Physical Activity Monitoring for Ageing People". The aim of the PAMAP study is to increase motivation in the elderly towards physical exercise, as sufficient physical activity is an important precondition for "healthy ageing". In general, (elderly) people across Europe are not active enough and overestimate their amount of physical activity. In the PAMAP project an on-body sensor network analyses musculoskeletal motion in order to compare actual and targeted physical activity. The PAMAP system consists of a mobile platform and a home TV station. The information collected with the system can be shared with family, friends and clinicians via the Internet.

5. Dr. Martin Litzenberger from the Austrian Institute of Technology (AIT) introduced the CARE project. CARE is used as an acronym for "Safe private homes for elderly people". The project aims to develop and implement an intelligent optical tracking and alarm system for elderly end-users. The system detects falls and informs on unusual behaviors (like not getting up in the morning) by means of an optical sensor chip (CMOS). Another aim of the study is to integrate the system with an established wireless home care system. As the system can be easily integrated into existing homes, it is not only applicable for nursing homes but also for elderly people living alone. The CARE project is carried out in cooperation with Finnish, Hungarian and German partners.

6. Prof. Wolfgang Zagler from the Technical University of Vienna presented the benchmark data of the DOMEO project. DOMEO stands for "Domestic Robot for Elderly Assistance". It is a threeyear project with eight French, Austrian and Hungarian partners involved. The objective of the DOMEO project is to evaluate two assistive robotic systems in different settings and applications. The RobuWalker provides physical interaction with the user assisting the sit-to-stand and walking activities. Moreover, the device can monitor the user's heart rate and sends the reading to the processing centre. The RobuMate is a communication device providing verbal and visual human robot interaction. It also addresses cognition and memory, and supervises the user's behaviour.

AAL PROJECTS II

Lukas Roedl[1], Markus M. Morandell[2], Michael Huch[3]

1. Introduction

This session is about projects funded under Call AAL-2008-1. The topic of the call is "ICT-based solutions for the prevention and management of chronic conditions of elderly people". It is stressed that it is not about chronic illnesses or diseases, but focussed on elderly people with identified risk factors and/or chronic conditions. The aim is to focus on the end-user and not on caregivers or professionals.

In total 118 proposals were submitted, 56 were evaluated positively. In total 452 partners collaborated in those projects (an average of 8 partners per project). The high percentage (39%) of SMEs within the projects is remarkable.

2. "Home-based Empowered Living for Parkinson's Disease Patients (HELP)" - Mrs. Maria Elena Cruz Martin

Project Name	Home-based Empowered Living for Parkinson's Disease Patients (HELP)
Coordinator	Luis Pablo del Arbol Perez, Telefonica Investigacion y Desarrollo (ES)
Duration	06/2009 – 06/2012
Involved Partners	7 partners, 3 countries Hahn-Schickard-Gesellschaft für angewandte Forschung e.V. (DE), Nevet Ltd (IL), Mobile Solution Group GmbH (DE), SALIWELL Ltd (IL), Telefonica Investigacion y Desarrollo Sociedad Anonima Unipersonal (ES), Telecom Italia S.p.A. (IT), University and Hospital of Palermo (IT)
Aim	The objective of the HELP project is to develop a comprehensive system able to administer drug therapy in a controlled and either continuous or on-demand basis, to manage disease progression and to mitigate Parkinson's disease (PD).

[1] Austrian Institute of Technology, Health & Environment Department, Biomedical Systems (Wr. Neustadt, Austria).

[2] Austrian Institute of Technology, Health & Environment Department, Biomedical Systems (Wr. Neustadt, Austria).

[3] Central Management Unit of AAL Joint Programme, Germany.

Total funding:	€ 2.5 million
Webpage	-

The developed system consists of several parts:

- A non-invasive, intra-oral, continuous anti-PD drug delivery device (for continuous drug delivery),
- A subcutaneous pump to deliver rescue medication in order to prevent PD blockade episodes based on motor activity,
- A PAN (Personal Area Network) to gather user's environment information to detect blockades,
- A telecommunication and services infrastructure to analyse and transfer information both from the user to an automated system (majority of the time) or a point-of-care (for regular follow-up and emergencies) and in both directions,
- A remote point-of-care unit to supervise the patients,
- A base station is used to read the amount of delivered drugs and to transmit it to the care professionals. This allows direct feedback and adjustment. This is also compared with the amount of movement by the user with motion sensors. Thus, the effects of blockades can be prevented.

3. A technology pLatform for the Assisted living of Dementia elDerly INdividuals and their carers (ALADDIN) - Maria Haritou

Project Name	A technology pLatform for the Assisted living of Dementia elDerly INdividuals and their carers (ALADDIN)
Coordinator	Maria Haritou, Institute of Communication and Computer Systems, National Technical University of Athens, (GR)
Duration	27 months
Involved Partners	8 partners, 6 countries Aethia (IT), ATOS Origin (ES), Badalona Serveis Assistencials (ES), Psychiatric Hospital Of Attica (GR), Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (DE), Institute of Communication & Computer Systems (EL), The National Hospital for Neurology & Neurosurgery (UK), Universita di Bologna (IT)
Aim	To utilise state-of-the-art in ICT in order to develop an integrated solution for the self-management of dementia, supporting both patients and informal caregivers (by de-stressing them) in this procedure
Total funding:	€ 1.4 million
Webpage	-

The system consists of: data monitoring, a data repository, risk assessment, information aggregation, social networking utilities, interfaces to existing systems like HER, HIS and security

features. It should allow an efficient patient follow-up and a timely detection of deteriorating symptoms as well as an adaptive care/personalised intervention.

4. Hear Me Feel Me - Compensating for eyesight with mobile technology (HMFM) – Dr. Minna Isomursu

Project Name	Hear Me Feel Me - Compensating for eyesight with mobile technology (HMFM)
Coordinator	Minna Isomursu, Technical Research Centre of Finland (FI)
Duration	24 months
Involved Partners	8 partners, 3 countries Fundación ROBOTIKER (ES), Organización Nacional de Ciegos Españoles (ES), Nokia Corporation (FI), ToP Tunniste Oy (FI), Caritas Foundation (FI), Finnish Federation of the Visually Impaired (FI), Oulun 6. Joutsen apteekki (FI), National Center for Scientific Research „Demokritos“ (GR)
Aim	The HMFM project explores services related to medication and medicine-related information and services, and to health monitoring and diet information. Enabling technologies for the services will be mobile devices and near-field communication (NFC) technology.
Total funding:	€ 1.5 million
Webpage	http://www.hearmefeelme.org/

The project goal is to improve the quality of life by providing a mobile service access for the visually impaired elderly. To reach this goal, medication and medicine-related information and services as well as health monitoring and diet information is used. Another goal is to support the user by means of touching and hearing through mobile phones and digital service access through NFC tags. So the concept of this project is to gather information from home medical equipment (e.g. medical parameter levels), information about food and other information available through a multimodal phone which supports a visual display, speech synthesis, audio input/output and vibration. Another scenario is that the user can access his/her personal medication dosage and additional information with the help of NFC tags which are attached to the medication packaging.

5. Development of a non-invasive CAPacitive sensor oral MOUSE interface for the disabled elderly (CAP MOUSE) - Tomas Brusell

Project Name	Development of a non-invasive CAPacitive sensor oral MOUSE interface for the disabled elderly (CAPMOUSE)
Coordinator	Tomas Brusell, Brusell Dental AS (NO)
Duration	
Involved Partners	4 partners, countries HMC International NV (BE), Pensionärernas

	Riksorganisation (SE), Lots Design (SE), Stinct (SE)
Aim	With a non-invasive modus operandi, CAP MOUSE will use external capacitive sensors mounted on a CAP MOUSE headset to scan tongue movement and feed the signal into a processing unit that extracts and translates features from the signal into e.g. mouse clicks and commands of the integrated Mobile Device, thereby replacing the keyboard, the remote control and other electronic devices.
Total funding:	€ 1.3 million
Webpage	http://www.brusell-dental.com/aal

The project goal is to develop a patented technology for truly hands-free computing and remote control. Therefore, the most flexible muscle in the human body – the tongue – is used in a non-invasive way to enable an "ultimate human interface" totally without medical risks. Basically a standard headset is used and no parts of the device are inside the mouth. It's also possible to combine this technique with an additional "voice to screen" and numerous other interface technologies. The device is already in the pretesting phase.

6. IT: Health @ Home - A Telecare System for Patients with Chronic Heart Failure - Luca Fanucci

Project Name	Health@Home (H@H)
Coordinator	Luca Fanucci, Consorzio Pisa Ricerce (IT)
Duration	02/2009 – 02/2011
Involved Partners	8 partners, 3 countries Caen Aurelia Space (IT), Caribel Programmazione Srl (IT), Centro Andaluz de Innovación y Tecnologías de la Información y las Comunicaciones (ES), Consorzio Pisa Ricerche (IT), Fondazione Gabriele Monasterio (IT), Mediasoft Ltd (SI), Hospitales Universitarios „Virgen del Rocío" (ES), Zdravstveni dom Koper (SI)
Aim	The Health at Home project (H@H) aims at solving societal problems related to the provision of healthcare services for elderly citizens affected by Chronic Heart Failure (CHF).
Total funding:	€ 1.4 million
Webpage	http://www.health-at-home.eu/

To date telemedicine is hardly "extensively" used by public health organisations. Chronic heart failure is the most common cause of hospitalisation for Europeans 65+. Therefore, the aim is to develop a tele-monitoring system that is included in the public health system. Thus, it is made compatible with the "As.Ter Software Platform "that is used in 20% of the Italian public health

institutions. It is HL7-RIM and HL7-CDA compliant. The project is user (health care providers) driven.

The system will apply a wearable sensor device for monitoring pathophysiological cardiovascular and respiratory parameters and, at the same time, enable medical staff to monitor situations from a distance and take action in where necessary.

7. User-Sensitive Home-based Systems for Successful Ageing in Networked Society (AGNES) - John A. Waterworth

Project Name	User-Sensitive Home-based Systems for Successful Ageing in Networked Society (AGNES)
Coordinator	John Waterworth, Umeå University (SE)
Duration	36 months
Involved Partners	9 partners, 7 countries CanControls (DE), Research and Education Laboratory in Information Technologies-Athens Information Technology (GR), Graz University of Technology (AT), Universidad Nacional de Educación a Distancia (ES), ModernFamilies (AT), KMOP (EL), Onda Communication S.p.A. (IT), Fundacion Instituto Gerontologico Matía (ES), Skellefteå Kommun (SE)
Aim	The vision is to provide a user-sensitive, ICT-based home environment that supports a person-centric care process by detecting, communicating, and meaningfully responding to the relevant states, situations, and activities of the elderly person with regard to mild cognitive impairment or dementia.
Total funding:	€ 2.6 million
Webpage	-

The aim is to reduce isolation and loneliness by increased social interaction, sensitive emotional support, more participation in shared activities, practical support for daily needs and enhanced feelings of security. Thus elderly people should be able to extend their independent life in their own home. Furthermore, the new possibilities of ICT in the cognitive well-being of the elderly should be explored.

Agnes follows a “User-led innovation approach”. Thus, design options are kept open to allow users active involvement in design and testing from the very beginning. The vision is a “secured social network system for older people” with tangible user interaction around the retained skills of older users. The system should allow an unobtrusive detection/communication of activities and states.

AAL JP PARTICIPATION RULES

Pekka Kahri[1]

1. Introduction

The AAL Joint Programme is a new type of R&D funding programme in Europe. It is based on joining the activities of its partner states on the theme of Ambient Assisted Living which is supported by a financial contribution of the EC through Article 169 of the Treaty. AAL Joint Programme has some characteristics that make it different from other European initiatives that are addressing the questions of demographic ageing: 1) AAL aims at launching R&D activities that have a 2-3 year time to market; it tries to fill the gap between research activities and the market introduction of new products, systems and services. 2) AAL emphasises the role of end-users and especially older people as active participants in the projects. 3) AAL stresses the importance of market analysis and business model development in the projects in order to boost the market introduction of new products, services and systems that are being developed. The session focusses on the participation rules of the AAL Joint Programme and the specific requirements of business models and end-user involvement.

During the session, a MobiTed polling system was used to stimulate the discussion and to understand the viewpoints of the audience and to learn about their professional backgrounds. The audience totalled about 70 persons, about half of whom belonged to the research community – the rest being split according to the pie chart below (Fig. 1):

[1] Pekka Kahri is a Senior Technology Adviser at Tekes, which is the most important publicly funded expert organisation for financing research, development and innovation in Finland. Tekes promotes a broad-based view on innovation: besides funding technological breakthroughs, Tekes emphasises the significance of service-related, design, business, and social innovations. Pekka Kahri is the Finnish NCP in AAL Joint Programme and has been a member of the AAL Executive Board and the chairman of the AAL Contents Working Group 2008-2009.

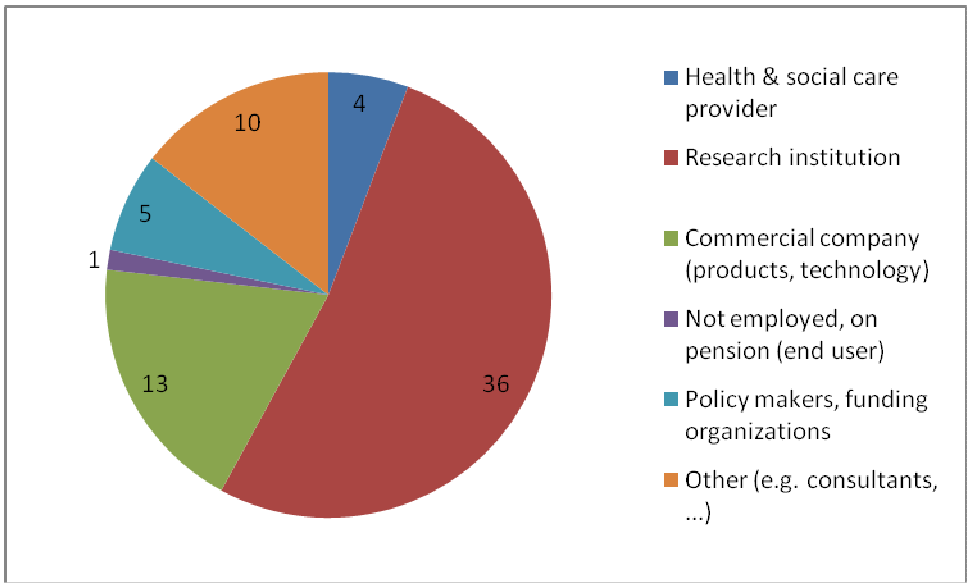

Fig. 1: Professional background of session attendees

2. "Framework for Business Models in AAL" – Mr. Pekka Kahri

AAL Joint Programme aims at launching research, development and innovation activities that can bring new products, solutions or service concepts to the market within about 2 to 3 years after the project end. The close-to-market nature of the programme means that developing suitable business models for the developed solutions must be an essential part of the projects.

Wikipedia defines business model as follows: "A business model is a framework for creating economic, social, and/or other forms of value. The term business model is thus used for a broad range of informal and formal descriptions to represent core aspects of a business, including purpose, offerings, strategies, infrastructure, organisational structures, trading practices, and operational processes and policies."

Business model development should be approached in a systematic manner, utilising a suitable conceptualisation framework and involving different actors of the value network (end-users, financers, delivery partners, service providers, integrators). In the domain of AAL Joint Programme, "business model development" is not to be interpreted as only relevant in activities involving enterprises and business partners, but whenever the objective is to create economic, social or other forms of value with new solutions. This means that in AAL Joint Programme, activities of non-profit and public sector organisations must also include business model development aspects.

Using the MobiTed polling system, the audience was asked to give their opinion on the question: "Where is the biggest challenge/obstacle for the success of Ambient Assisted Living?" The replies revealed that technology was not seen as a big issue (the majority of researchers in the audience!). Instead the challenges are in understanding the market and older people's needs and how to capitalise that market (economic and structural questions). Results are illustrated in Fig. 2:

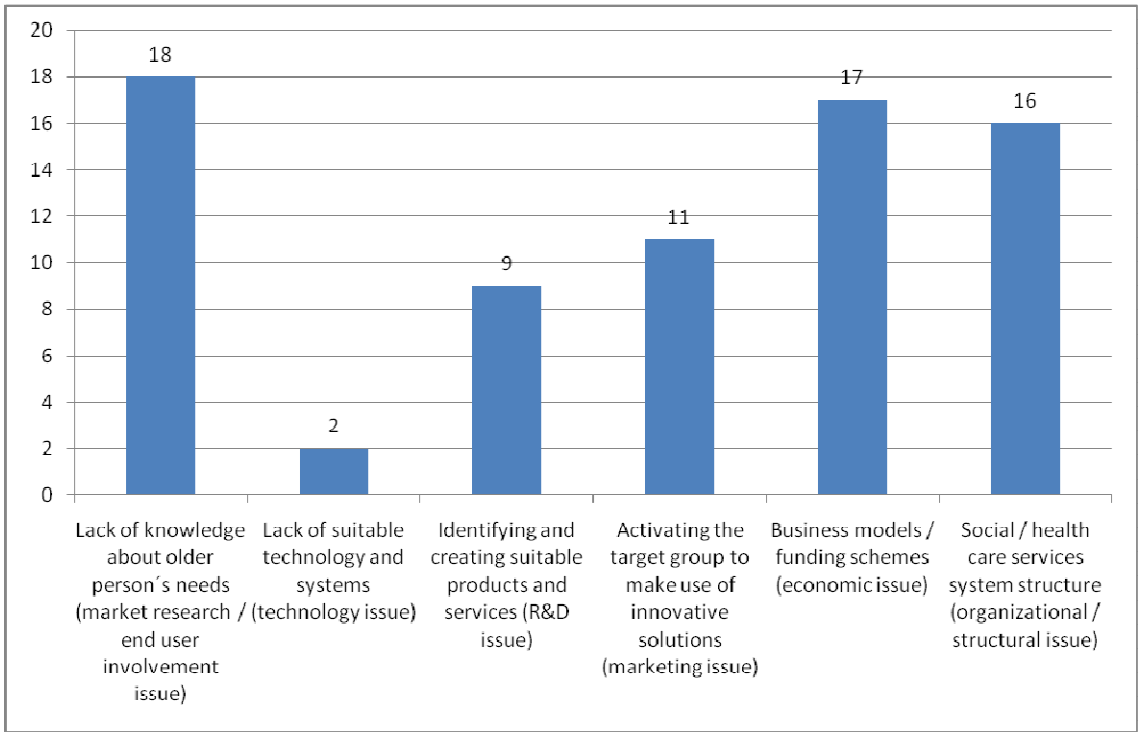

Fig. 2: Question: Where is the biggest challenge/obstacle for the success of Ambient Assisted Living (Number of votes)

3. "Framework for End-user Involvement in AAL" – Ms. Maja Arnestad[2]

End-user involvement is a mandatory and an essential part of all collaborative projects funded under the AAL Joint Programme. When developing new solutions for older people, there are specific challenges related to end-user involvement that need to be addressed:

- Who are the different end-users needed in creating new solutions?
- Who is the customer of the new solution?
- How can the end-users express their wishes and needs, especially when new technology is involved or when older people have decreased cognitive capabilities?
- Who may act legitimately on an older person's behalf, especially in health and care related issues?
- How can the innovation potential of end-users in general and older people in particular best be harnessed?
- How to create an innovation culture where the design of new solutions is done with and for the older people?
- How is the input from end-users collected, documented, analysed and used in the development of new solutions?

To poll the prior experience of the audience about methodologies of end-user involvement, the following question was asked, using the MobiTed polling system: "Which methods of end-user involvement do you have prior experience in?" Results are illustrated in Fig. 3:

[2] Maja Arnestad is the programme co-ordinator for the Norwegian programme IT Funk (ICT for the disabled), and she is the AAL NCP in Norway.

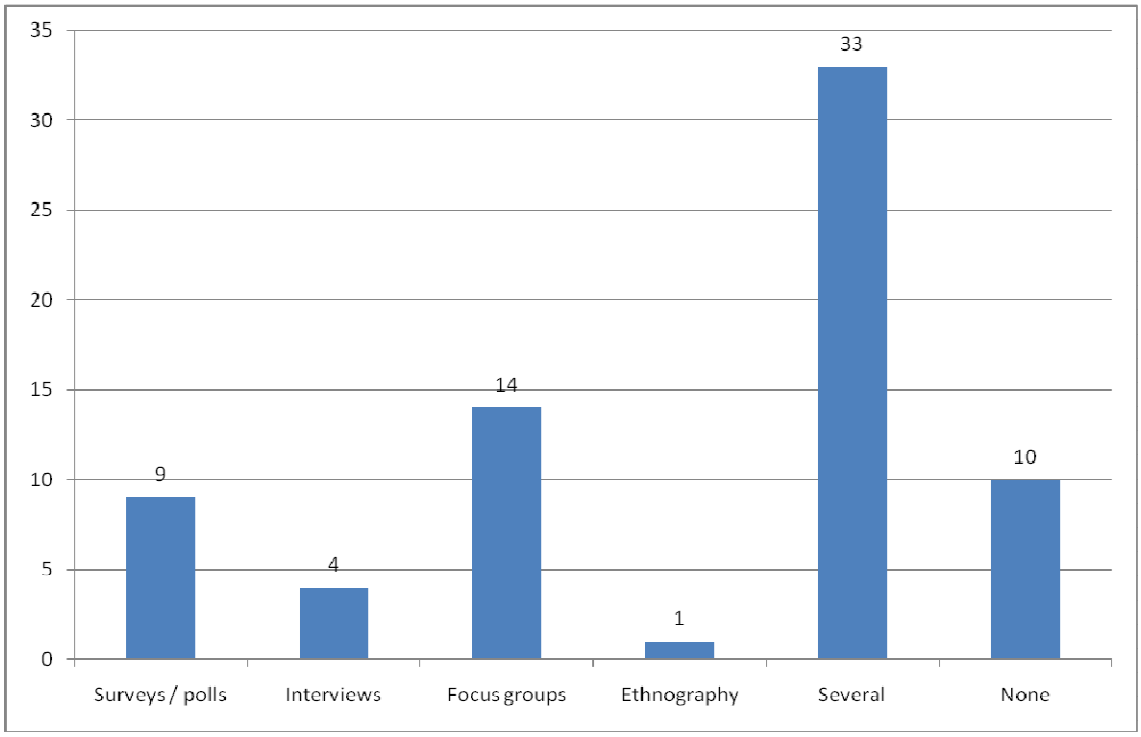

Fig. 3: Question: Which methods of end-user involvement do you have prior experience? (Number of votes)

After the presentation and lively discussion about end-user involvement, a check question was asked: "In which phase of the innovation chain is end-use involvement most important?" The results revealed that the audience was listening closely to the message from the presenter (Figure 4)

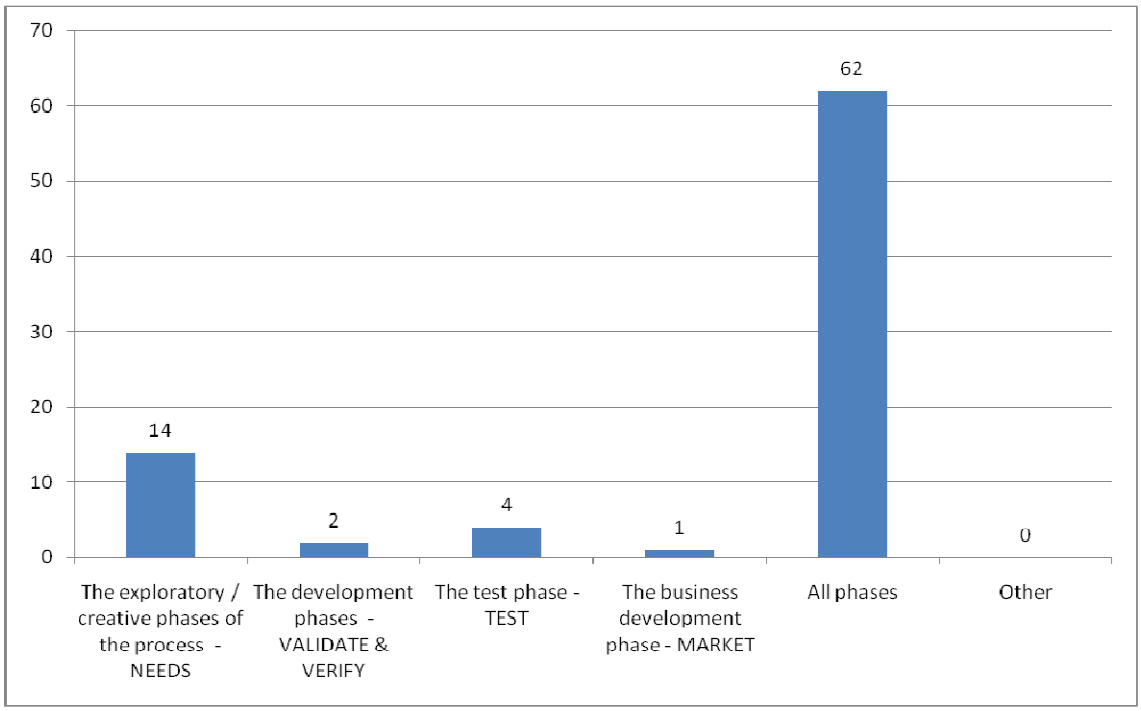

Fig. 4: Question: In which phase of the innovation chain, end-use involvement is most important? (Number of votes)

4. "AAL rules for participation, eligibility and evaluation criteria" - Dr Gerda Geyer[3]

The core of the AAL Joint Programme is to provide innovative Information and Communication Technologies (ICT) based solutions to older people, which means innovative products, systems or services addressing identified wishes and the needs of the end-users. Projects funded under the AAL Joint Programme will be multinational, collaborative and cost-shared. Funding contracts of individual project partners will be concluded with the national funding authority. The presentation addresses the requirements for the AAL projects:

- Characteristics of the collaborative projects
- Eligibility criteria
- Evaluation criteria

After the presentation and some detailed questions, the audience was asked to give their opinion on the future thematic direction of the AAL Joint Programme (Fig 5).

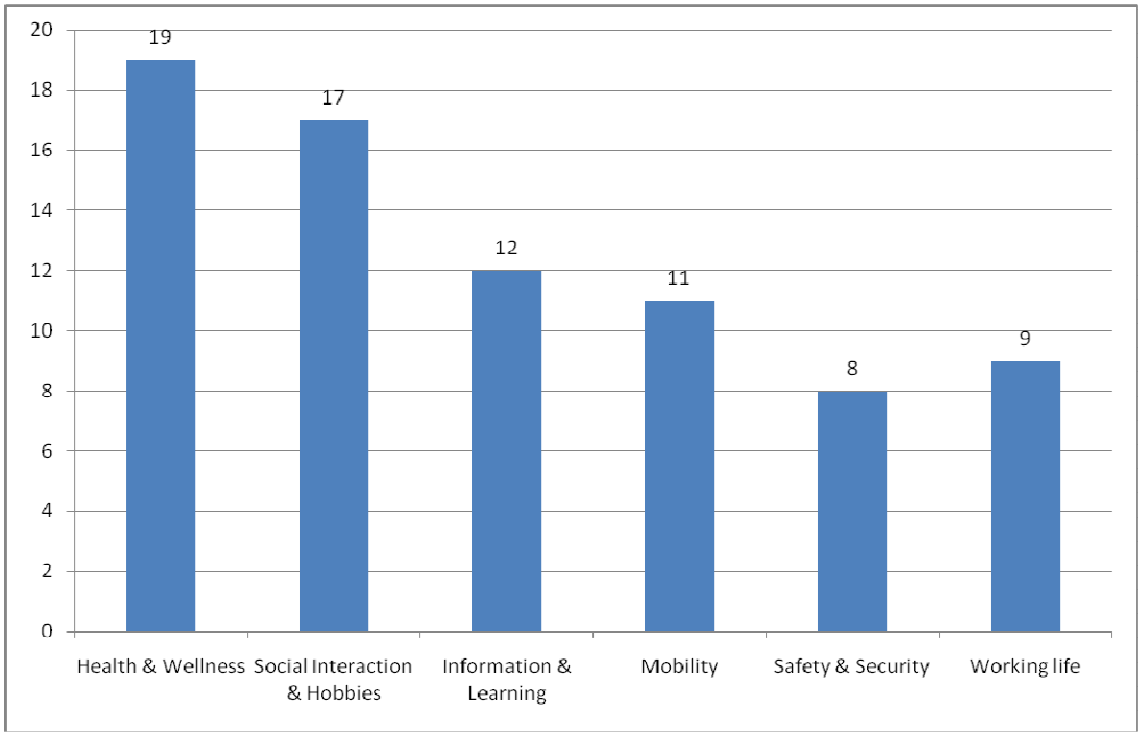

Fig. 5: Question: In Which thematic area should AAL Joint Programme focus most in its future calls? (Number of votes)

[3] Gerda Geyer is the programme co-ordinator for the Austrian programme benefit, and she is the AAL NCP in Austria and acted as the vice-chair of the AAL Contents Working Group 2008-2009.

HEALTHY AGEING

Uli Waibel[1]

1. Introduction

The ageing population poses a great challenge to Europe's economic and social development. As people are living longer, it is of paramount importance that costs for medical and social care will not explode and that individuals can enjoy their lives in good health for as long as possible.

Healthy Ageing is one of the keys to a good quality, independent life – and thus it can also be seen as an important foundation for Active Ageing.

What exactly do we mean by Healthy Ageing? Despite the fact that there is no "official" definition, most characterisations of Healthy Ageing centre on the same ideas such as: "Healthy ageing describes the ongoing activities and behaviours one undertakes to reduce the risk of illness and disease and to increase one's physical, emotional and mental health. It also means combating illness and disease with some basic lifestyle realignment that can result in a faster and more enduring recovery."[2]

A closer look reveals a number of topics,[3] amongst others in Healthy Ageing, to be addressed:

- Retirement and pre-retirement,
- Mental health,
- Nutrition,
- Physical activity,
- Injury prevention.

But Healthy Ageing not only represents challenges to society and individuals – it also offers opportunities for economic growth based on new technologies, products and services.

Challenges and *opportunities* in Healthy Ageing are addressed and discussed within this session.

2. "Health and functional capability of older adults" - Dr. Harriet Finne-Soveri

Dr. Finne-Soveri is a geriatrician and consultant who graduated from the University of Helsinki,

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[1] Uli Waibel is managing director of Innovendo, a consulting firm specialized on marketing support for technology based innovations. For several years Innovendo has been carrying out investigations and studies in the field of Ambient Assisted Living and has supported the development of the Austrian AAL programme benefit.

[2] http://www.seniors.gov.au/internet/seniors/publishing.nsf/Content/Healthy+ageing

[3] Healthy Ageing project (2004–2007) - co-funded by the European Commission.

Finland in 1980. She became board-certified in geriatric medicine in 1994. She has been involved in research and publications in the field of geriatrics since 1982.

At present, she is responsible for the Ageing and Services unit at the National Institute for Health and Welfare which works to promote the well-being and health of the population, prevent diseases and social problems, and develop social and health services. Prior to that, Dr. Finne-Soveri was chief medical officer and managing director in the largest nursing home in Helsinki. She also is adjunct professor in geriatric Medicine at the University of Helsinki.

In her talk, Dr. Finne-Soveri addressed the session's topic by looking at the functional capacity of the older individual and deriving guidelines for Healthy Ageing that can serve as entry points for AAL products and services.

In essence, biological ageing leads to loss of functioning cells, increasing body fat, dehydration, slowing down/stiffening and - very important - ageing of the regulatory/feedback mechanisms. This decline in functional capacity in turn leads to more diseases in higher age and loss of social connections. To keep functional capacity high, four main areas should be addressed:

- Nutrition: *not* losing weight in old age, balanced food (vitamin D, calcium, proteins);
- Motion, exercise, sport - no matter the disease → MOVE (it's never too late!)
- Mental/intellectual activities need to be trained (strong scientific evidence that disability and loss of independence in old age is caused by loss of cognitive/mental capacity);
- Active social life maintains intelligence - makes life worth living.

Other areas to be addressed in order to keep up functional capacities - and to delay the need for care - include amongst others *vision/hearing*, *falls* (fear of falling), *depression* and *pain.*

3. "Answering the challenges of demographic change in the field of cure and care" - Dr. Guus Broos

Dr. Guus Broos studied sociology at Leiden University and received his doctorate from Radboud University (Nijmegen). Currently he is director of the consulting firm Strategicon which delivers medical provisions, technology and services to the semi-public sector.

Previously Dr. Broos was a member of the executive board of the Orbis medical and healthcare group in Sittard Geleen, the Netherlands (from 2002). Orbis is a public chain care provider and operates the Orbis Medical Centre, care centres, nursing homes, home care and mental healthcare with a staff of approximately 6,000. Amongst others, Dr. Broos is Chairman of the Dutch Association of Hospital Directors and a member of the advisory board of the Ambient Assisting Living Association.

Dr. Broos approached Healthy Ageing from a societal and structural viewpoint. In the ageing society, a paradigm shift is needed towards a structural change in the way health care is provided. Without alternative models of social infrastructure and a model for health services, the pressure on medical and care hospitals will be very high.

The lives of older people should be organised and thought of in a new manner, not the house/home alone (smart home approach) but as an integrated community approach which includes housing, services and infrastructure, on which providers can build innovative products and services that

people want to buy and use. New services should include areas such as social interaction, leisure activities, wellness, prevention, guidance, monitoring status and behaviour, and social and medical care.

A holistic approach is needed to achieve social participation and to keep costs for medical care under control. Cooperation, innovation models and living labs are needed for different phases of development, investment and realisation of new integrated living concepts.

4. "Technology and innovation challenges for ambient- assisted living" - Dr. Péter Hanák

Dr. Péter Hanák has been employed by the Budapest University of Technology and Economics (BME) since 1969. Between 1997 and 2006 he was employed by the Hungarian National Office for Research and Technology (NKTH) where he was responsible for national calls for R&D proposals in ICT, and represented Hungary in various committees established by the European Commission.

Currently, Dr. Hanák is a research fellow at the Dept. of Control Engineering and Information Technology at BME and director of BME's Biomedical Engineering Knowledge Centre. He has been involved in the national Hungarian AAL programme eVITA from the start. Dr. Hanák is also the delegate of Hungary in the General Assembly of the Ambient Assisted Living Joint Programme.

Dr. Hanák completed the session by focussing on technology options and challenges in Healthy Ageing. Many technological topics had already been addressed during the course of the conference – an indication that the technical challenges to be solved in AAL are indeed difficult: long unmanned operation, power consumption/battery power supply, reliable wireless connectivity, interoperability and vendor independence, plug-and-play devices, seamless indoor/outdoor usage, simplicity of user interfaces, wearable/environmental sensors – to name a few. While much effort has been put into these areas in the past few years, relatively little has been achieved in practice.

On the other hand, the real strength of ICT lies in the opportunity to combine and analyse data from various sources. As an example, the possible influence of temperature, humidity and a peaceful night's sleep on blood pressure or mental freshness is mentioned. ICT is also strong in collecting and storing data over long periods of time: significant but not obvious changes in one's health status can be detected and signalled by continuous analysis of such data.

The gender issue in old age seems to have been overlooked by technology developers – an area that will need broader attention in the future.

5. Discussion and feed back

Using the MobiTed polling system helped to stimulate the discussion, understand the viewpoints of the audience and learn more about their professional background: a majority of 55% of the audience belonged to the research community – the rest being split according to the pie chart below (Fig. 1):

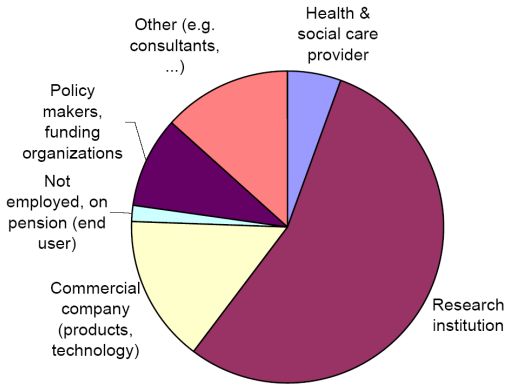

Fig. 1: Professional background of session attendees

The biggest *needs* in Healthy Ageing for AAL support were seen in *mental health* and *physical activity*, whereas the biggest *opportunity* for AAL support was seen in the area of *physical activity* – as the diagrams below illustrate (Fig. 2):

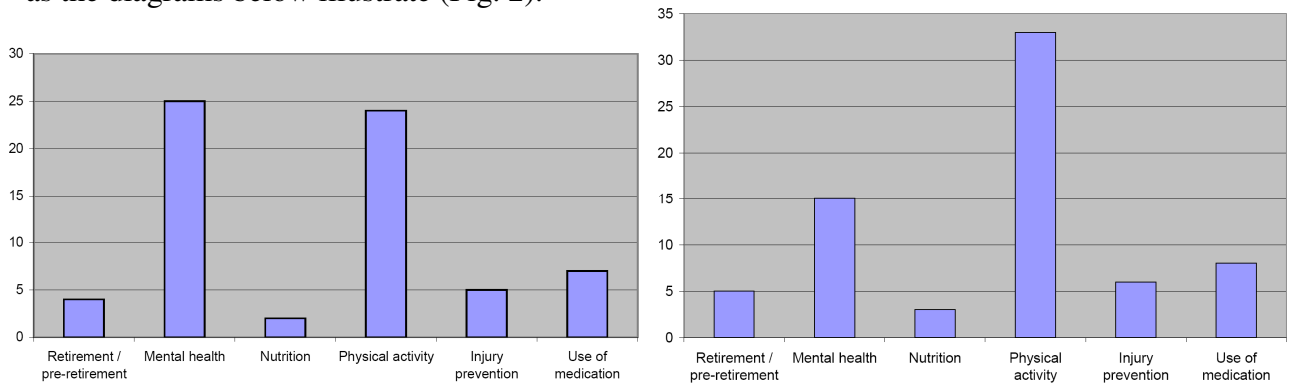

Fig. 2: Biggest *needs* (left) and biggest *opportunities* (right) for AAL-support in Healthy Ageing (numbers of votes)

Nutrician is still a key element in Healthy Ageing according to Dr. Finne-Sovery and will need to be given attention.

In the discussion it was also argued that private homes are the main focus for groups of elderly people (the so called *third age*) and represent a main market for AAL - when independence and special care services are not yet needed.

The question asking for the biggest *challenges* in AAL for Healthy Ageing did not reveal anything of surprise. Technology was not seen as a big issue (the majority of researchers in the audience!) – the rest being more or less evenly spread among the available options – as illustrated in Fig. 3:

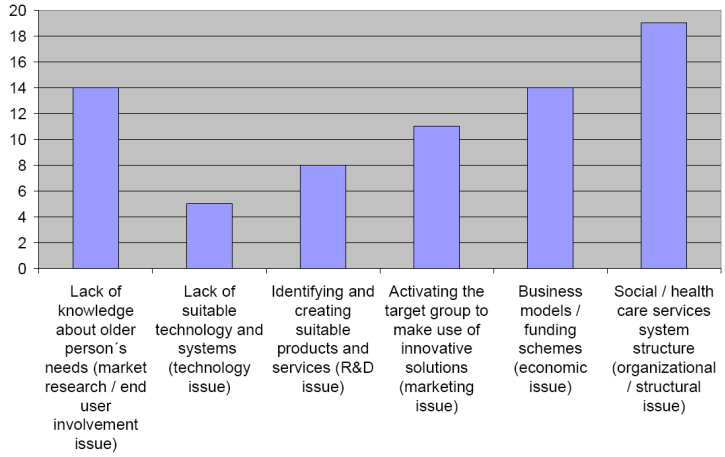

Fig. 3: Biggest *challenges* for AAL support in Healthy Ageing (numbers of votes)

ACTIVE AGEING

Antonio Mendes dos Santos[1]

1. Rationale for the session[2]

We live in an information society. Information and communication technologies (ICT) permeate almost every aspect of our lives. They can be powerful tools for bringing people together, adding new value to life and creating new wealth, health and welfare, and accounting for a richer and more rewarding professional and social life.

The other side of the coin is that in Europe (and elsewhere) millions of people cannot fully reap these benefits and a significant percentage is effectively cut off from them for a variety of reasons: geographic, social, economic, educational, cultural, physical or cognitive disabilities, age, etc.

Today, older people are estimated[3] to make up almost 20% of the European population or 90 million people. Furthermore, the prevalence of both disabilities and other minor functional limitations is strongly related to age. The ongoing demographic shift in Europe, as a result of a greater life expectancy and decreasing birth rates, will cause a noticeable increase in these numbers over the coming years - 18% of the European population was aged over 60 in 1990, while for 2030 that percentage is expected to rise to 30%.

There are concerns that the European social model will be unsustainable with too few people of working age who are able to support the welfare and social security systems providing for older people. The renewed Lisbon Strategy calls for an extension of working life.

Additionally, a US-based study[4] found that 60% of working-age adults, aged between 18 and 64, are likely or very likely to benefit from the use of accessible technology due to mild difficulties and impairments, or to functional difficulties with current technologies.

The audience had at their disposal an interactive polling system which allowed the Chair to put forward questions and have real-time replies.

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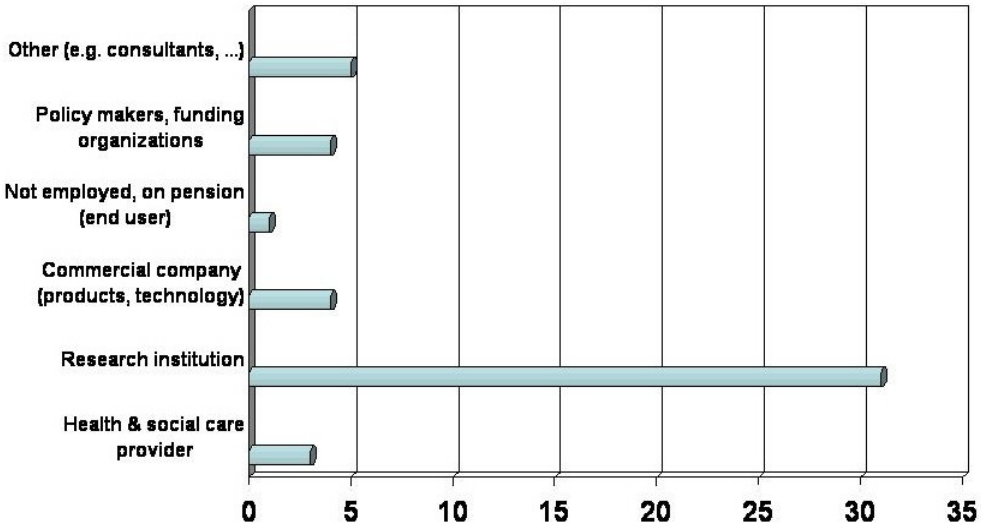
[1] UMIC -- The Knowledge Society Agency, Ministry of Science, Technology and Higher Education, Portugal.

[2] Adapted from the European Commission Staff Working Paper "Extended Impact Assessment of the Commission Communication on eAccessibility" (Brussels, Sept/2005).

[3] United Nations World Population Prospects (2002) and Eurostat 2004 Demographic Projections. See also SENIORWATCH project reports (http://www.seniorwatch.de).

[4] "The Wide Range of Abilities and Its Impact on Computer Technology" – Forrester Research Inc. 2003; study commissioned by Microsoft Corporation, available at http://www.microsoft.com/enable/research/phase1.aspx.

There were 48 people in the audience at the start of the session, increasing to about 60 by mid-session. The background of the initial audience was as follows:



2. "Active Ageing – The Various Needs of Older People" - Dr. Heidrun Mollenkopf

"Active Ageing" is a term and concept used in many ways in public and scientific debates and programmes. The presentation started with the question "What does 'Active Ageing' mean in older people's everyday lives?", showing the significance of being able to pursue desired activities for their quality of life.

The next issue addressed by Dr. Mollenkopf was "How far new ICT and AAL technologies and related services have the potential to support older people in active ageing". The speaker concluded by highlighting the preconditions needed for a fruitful implementation and application of the technologies, systems and services in order to meet older people's various needs and wishes.

Speaker's short CV

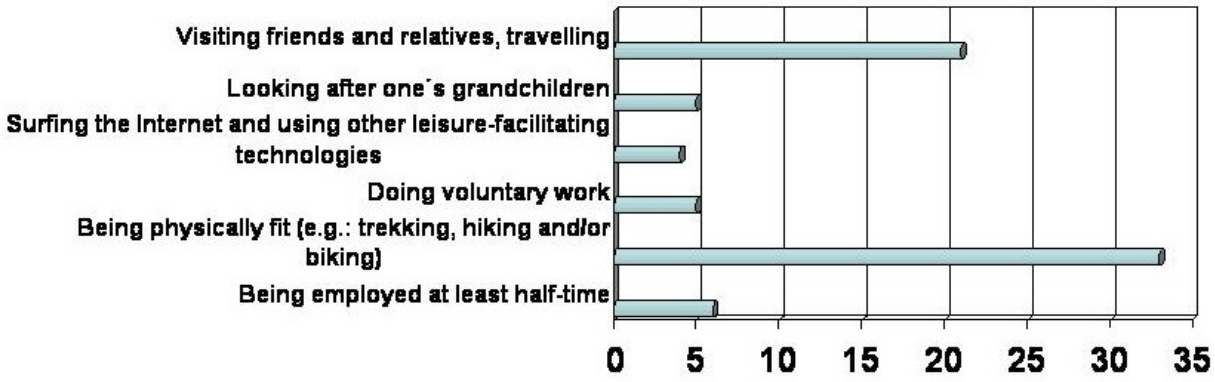
Dr. Heidrun Mollenkopf is a sociologist and gerontologist. She was Senior Researcher at the German Centre for Research on Ageing (DZFA) at the University of Heidelberg until December 2004. Her main research focusses on the interplay among personal, societal, technical, and environmental conditions with regard to maintaining autonomy and social participation, and hence, the quality of life in old age. She has pursued this interest in several large-scale research projects on technology and ageing, and on the outdoor mobility of older people, initially at the University of Mannheim and then at the Social Science Research Center Berlin (WZB) and the Free University of Berlin, and finally at the former DZFA.

Amongst others, she coordinated the EU-funded project "MOBILATE – Enhancing Mobility in Later Life" and was in charge of the social sciences sub-project of the interdisciplinary research project "sentha" (Everyday Technologies for Senior Households), funded by the German Research Foundation (Deutsche Forschungsgemeinschaft) at the Technical University of Berlin. She has published widely in the fields of ageing and technology, mobility, senior friendly neighbourhoods

and quality of life of older people. In addition, Dr. Mollenkopf served as a consultant and evaluator in several European initiatives and programmes.

Since 2007, she has been a member of the BAGSO (The German National Association of Senior Citizens Organisations) Board of Experts, of the VDE Ambient Assisted Living Innovation Partnership (IpAAL) and Chair of the "Universal Accessibility and Independent Living" Expert Group of AGE - The European Older People's Platform.

Kick starting the discussion:



Before the presentation started, the audience was asked the question "What do you understand by 'active ageing'?", the results of which were presented after the speaker finished:

3. "Enhancing User Experience of Older Adults" - Ms. Anna E. Pohlmeyer

Older adults, when given the chance, report more than just usability-related aspects of interactive products. In laboratory settings, older adults are often confronted with unfamiliar technology. In this case, instrumental qualities are of primary concern. However, the picture might be different, when it is up to the participant to choose the device.

The presentation addressed a recently conducted ethnographic study: results demonstrate the diversity of technology acceptance criteria. These surpass mere usability-related aspects and can be better summarised as dimensions of user experience. The findings should be taken into account when designing interactive products for older adults. Despite the prospect that technology can enable prolonged independent living and active ageing, this will only hold true if older adults accept the provided technology and feel motivated to use it.

Ms. Pohlmeyer concluded by stating the importance of user-centred design in the realm of gerontechnology.

Speaker's short CV:

Ms. Anna Pohlmeyer has an educational background in psychology from the University of Freiburg and the Humboldt University Berlin (with distinction). She enhanced her studies with an emphasis on cognitive psychology from an interdisciplinary perspective, including industrial design and engineering.

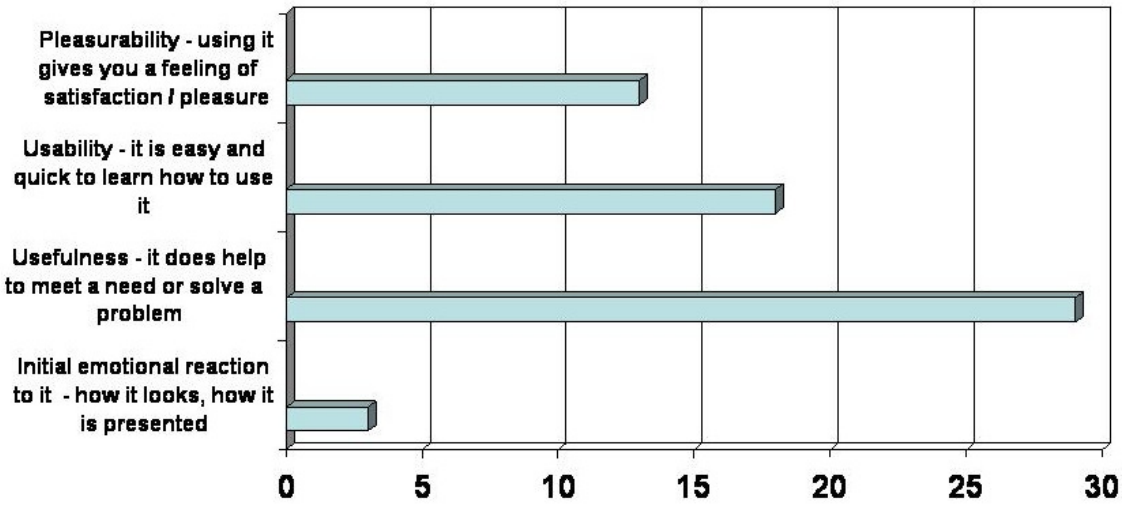
Ms. Pohlmeyer's research focusses on ageing, having started during collaborations with industry (Daimler, Siemens) and continued at the Center for Lifespan Psychology, Max-Planck-Institute for Human Development in 2005. In 2006, she joined the MIT AgeLab, working on ideas and technologies to improve the quality of life of older adults.

Following a short-term teaching position for interaction design at the School of Art and Design Berlin-Weissensee, Ms. Pohlmeyer is currently affiliated to the University of Luxembourg and the TU Berlin as a research scientist of the Engineering Design Group.

Ms. Pohlmeyer's areas of expertise are: 'user-centred design', 'intuitive use of user interfaces', as well as 'ageing and user experience'.

Kick starting the discussion

Before the presentation started, the audience was asked the question "When you need to use a new device or technology, what is most important to you?" the results of which were presented after the speaker finished:



4. Active Ageing: The perspective of working life and intergenerational relations - Dr George W Leeson

As populations across the world continue to age well into the 21st century, societies are presented with a number of challenges and opportunities. With the prospect of significantly more people aged over 60 than under 15, societal and institutional infrastructures will have to respond to the needs (and demands) of a mature society. This is true in the workplace, where the retention, recruitment and re-training of mature workers will be key to securing workforces, and it is also true in the community and the family where the contribution of individuals in later life is key to future development.

From the Global Ageing Survey (GLAS) in Oxford, a new concept of later life in the 21st century is emerging, and it is one of responsibility and contribution (in the workplace, the community and the family).

This presentation linked the needs and demands of people in later life in the 21st century – as evidenced by GLAS – with the desire and need for skills sets which will enable them to contribute and age actively.

Speaker's short CV:

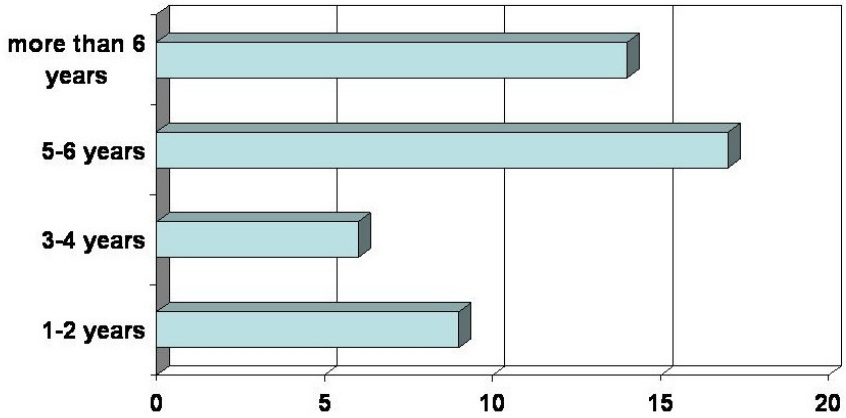
Dr George W Leeson is Deputy Director of the Oxford Institute of Ageing and a Senior Research Fellow in the Department of Sociology at the University of Oxford. Dr Leeson's main research interests are in the socio-demographic aspects of ageing populations, covering both the demographic modelling of population development and the analysis of national and international data sets.

Since 1985, Dr Leeson has directed the Danish Longitudinal Future Study, which elucidates the attitudes and aspirations of future generations of older people in Denmark, and he is responsible for the Institute for the Global Ageing Survey carried out in three waves in more than 20 countries in Europe, North and South America and Asia and involving approximately 45,000 people aged 40-79 years.

Dr Leeson's other research includes the demographic inequalities of global ageing, the changing populations of Europe, migration and migrants in Europe, health and social elder-care migrant workers, older people and homelessness in Denmark, family care in Denmark, life-long learning, age discrimination, and working in later life and retirement.

Kick starting the discussion

Before the presentation started, the audience was asked the question "How much is the difference between your initial (when you started to work) expected retirement age and the current expected retirement age?" the results of which were presented after the speaker finished:



LABOUR-SAVING INNOVATIONS: CONTRIBUTIONS FROM THE UK, DENMARK AND THE NETHERLANDS

Barbara van der Linden[1],
Jane Hendy[2],
Nanna Skovgaard[3],
Claus F. Nielsen[4]

Introduction

Across Europe, projections have demonstrated the increasing number of elderly people in the next decades. Since at least 2005, all demographic studies show a shift in population towards more citizens aged 65 and above, and within that group in particular, higher numbers of frail elderly people over 80 in all European countries by at least 2040. The rate and extensiveness of the demographic shift differs between countries, but the overall trend has been recognised across Europe as a whole.

Numerous research and policy papers indicate that if health care systems are faced with meeting the care needs of this rising elderly population, the pressure on the health care labour force will increase dramatically. In the Netherlands, it is estimated that if the health care system continues working as it does today, there will be a demand for 470.000 more health care workers by the year 2025.

The flipside of this demographic shift is that the proportion of younger potential care givers is decreasing and the feasibility of being able to recruit sufficient numbers of new care givers and of being able to finance them is not perceived as realistic. Besides increasing efforts to find, train and employ new care givers, policy must then also be directed towards a better utilisation of existing personnel. In the UK, Denmark and the Netherlands, several programmes are directed towards finding, developing and testing labour-saving innovations that can be implemented to address this growing need. This article discusses labour-saving initiatives in these three countries and presents steps that must be taken to ensure that care of an acceptable quality is available for elderly people in the next decades.

1 Barbara van der Linden, ZonMw, NL.

2 Jane Hendy, Imperial College Business School, UK.

3 Nanna Skovgaard, Agency for Governmental Management, Ministry of Finance, DK.

4 Claus F. Nielsen, DELTA Business Development, DK.

Overview of the current investment in 3 countries

The need for labour-saving innovations has been recognised in the UK, Denmark and the Netherlands and programmes have been initiated in each of these countries.

UK:

In the UK over 20 government reports since 1998 have called for telecare. The UK has backed this policy drive with financing. Approximately £177 million has been allocated by the government to health and social care services to introduce remote care into around 180,000 homes during 2006 – 2011 (via the Preventative Technologies Grant in England and equivalent schemes in Scotland and Wales). This activity has been further supported by one of largest government sponsored, randomised, controlled trials of telecare. Called the "Whole System Demonstrator programme", the trial involves a combination of remote-care systems and redesigned service delivery models that are being implemented in 6,000 homes at a cost of approximately £50 million (Department of Health, 2007). The total resident population covered is at least one million and covers a variety of chronic conditions and care needs.

Denmark:

The Danish government has allocated approximately 400 million euro to a dedicated programme (2009 to 2015) directed towards developing and improving public sector services through the implementation of labour-saving technologies and more efficient working processes. The programme spans all public sector activities and a range of projects are currently being funded across different thematic areas including "Telecommunications Solutions and Information and Communication Technology (ICT)", "Robotics and Automation", "Digitalisation" and "Care Technology".

The programme aims to increase productivity and efficiency in the public sector and to improve current working conditions of public employees, thus making jobs in the public sector more attractive to a shrinking labour force. In addition, the objective is to provide the choice of more flexible, user-centred services to citizens, empowering them to remain independent for as long as possible and to take responsibility for their own lives.

Across the entire public sector, public authorities can apply for project funding, either alone or in collaboration with private companies. This is in order to stimulate growth in Danish trade and industry. There are two types of projects:

- Local demonstration projects where new labour-saving technologies and organisational models are tested in pilot settings;
- National implementation projects where well-proven technologies and practices are implemented on a national scale;

Applicants should be able to profit from the main part of the labour-saving potential, service and production improvements themselves, but the programme also stimulates implementation nationally when a project has proved to be a positive business case/benefit realisation.

The Netherlands:

In 2006 the national health care research and innovation institute ZonMw held a survey which yielded 200 labour-saving 'ideas'. From 2007 to 2009, an innovation programme was run in long-term care (15 million euro) with three distinct sub programmes:

1. In order to increase the evidence on which interventions can actually save care givers time, two new measuring instruments were developed. A tool for determining the labour-saving potential and the actual labour-saving effects of new interventions was developed, tested and made freely available online for use by health care organisations (see website, currently only available in Dutch; an English translation is currently being planned). Another tool was developed for a more in-depth analysis of cost-benefit ratios for creating business cases of promising new interventions.
2. These tools were applied to the ideas that had emerged from the 2006 survey and in 110 projects that were commissioned through a call for new ideas.
3. 57 successful labour-saving interventions were guided towards communication and implementation activities through a website, breakthrough series and inclusion in practice guidelines.

Lessons learned from labour-saving investments

The UK initiatives have resulted in thousands of pilots mainly in remote care innovations which show the huge labour and cost saving gains to be made by more widespread implementation. However, because telecare can be seen as a service-delivery innovation supported by new technology, and given the complexity of the care system, it is difficult to evaluate telecare using conventional approaches. The small-scale and often shorter term nature of telecare trials also means that rigorous evidence about the longer term impact of many types of telecare remains elusive. To investigate long-term systemic outcomes, there is a need for simulation modelling. This is recognised as an appropriate technique for exploring the long-term effectiveness of telecare on resources and is used as a tool to improve the basis for decision-making (Bayer, Barlow & Curry 2007).

The Danish programme is still in an operational phase and is currently too preliminary to demonstrate proven effects. A range of projects is currently being supported across the different thematic areas. Within the theme "Care Technologies," projects, for example, test and deploy age-friendly toilets, electronic bath/shower chairs, electronic tools supporting people with autism, alarm/tracking systems for people with dementia, medication reminders for people with mental disorders, electronic tools for self-activation of retarded adults, solutions for lifting/moving frail older people, electronic door locking systems and fall management.

The focus placed on service delivery by health care institutions as well as limited capacity and resources to make investments have been identified as barriers to innovation by the Danish initiators.

The establishment of a dedicated programme on a national level that gathers the best new ideas and projects, funds them, evaluates them and communicates key learning points to all involved partners has great potential. This programme should coordinate and help facilitate the sharing of knowledge between different initiatives (e.g. in different parts of the public sector) in order to generate synergy effects and reap benefits on a larger scale.

Access to the right decision-making arenas and budget negotiations on a national level is a key to success. Denmark is a very decentralised country when it comes to providing welfare. Every year, the government (via the Ministry of Finance) engages in budget negotiations with the municipalities and the regions (the latter of which are responsible for the health care sector). In this way, by linking budgets with the use of new technologies and more efficient ways of working, the state will be able to steer the development of the public sector in a clear direction.

Both UK and Danish experiences indicate a currently existing lack of evidence and convincing business models which can, in part, explain a perceived lack of sense of urgency in these countries to upscale labour-saving interventions.

The Dutch programme yielded evidence on the labour-saving effects of reorganising basic work processes in health care organisations such as bathing, eating, transferring, and medication dispensing. Some projects showed labour-saving results in reorganising back office logistics through the introduction of electronic records, planning or routing systems for personnel and patients as well as in education and a reduction in sick leave. In addition, self management by patients results in positive labour-saving effects through the use of telecare and e-health technologies and simple domotics. The projects showed savings ranging from €7 to €16.000 per patient per year. An extrapolation was made to determine relevant target groups nationwide. They ranged from 2,100 to 500,000 patients for respective interventions nationwide. ZonMw concludes tentatively that millions of euro and thousands of personnel FTEs can be saved without quality loss and without, as yet, introducing high-tech solutions.

Necessary next steps

The experiences gained by these three countries' labour-saving initiatives are similar. Evidence on actual labour and financial savings by the introduction of a wide range of types of high and low tech interventions is promising, but not yet robust. The Dutch programme has yielded user friendly measuring instruments which, through a more widespread application, could build on a larger knowledge base. Work is currently being done on producing an English translation to enable use of the instruments by a wider community. As yet, tests are being run to determine the applicability of these instruments in commissioned AAL projects and the support necessary to use them. Application in the AAL programme could help to build a database of evidence-based, labour-saving interventions which would promote further knowledge dissemination and implementation. More extensive use of simulation modelling and extrapolation techniques could further build on evidence of cost effectiveness without requiring the time that is most often needed for actual experimentation in service practice. Demonstration projects, however, can also be commissioned to show real world attainability of results.

The next step is to use the gained evidence to create more convincing business cases. These will encourage decision makers to invest in labour-saving innovations. In each country, however, the need for active implementation trajectories has been indicated. Financing and/or co-financing through government programming is deemed necessary in a context where urgency is not (yet) felt to address looming personnel shortages and decreasing availability and quality of care that will inevitably occur across Europe as a result.

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PROGRAMME benefit: LAUNCH OF THE FIFTH CALL FOR PROPOSALS

Gerda Geyer[1]

The Session was designed to give insight into the genesis, the implementation and the thematic background of Programme benefit and its focus "ICT-based Solutions for Advancement of Active Ageing". Various aspects of the living situation of older people in Austria and other European countries were outlined on the basis of the SHARE project. Project examples illustrated the different thematic clusters within the focus of the call.

The Ambient Assisted Living Joint Programme is a common funding activity by 23 European and associated States. Some countries also fund national programmes in the thematic field of AAL, as Austria does with the R&D funding Programme benefit. The Programme benefit is owned by the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT). In her introductory presentation, Kerstin Zimmermann (BMVIT) gave a brief insight into the strategic interplay between the Ambient Assisted Living Joint Programme and the national counterpart Programme benefit which focusses on the thematic field of AAL as well.

Kerstin Zimmermann highlighted the fact that in Austria 80% of care is based in the families and that 80% of carers are women with an average age of 56 years. The value of these services amounts to approximately 2-3 billion euros per year. She also stated that implementing new technologies into society is extremely challenging because social, political and economic systems change linearly whereas technological change is exponential.

Georg Niklfeld from the Austrian Research Promotion Agency (FFG) gave some explanations about thematic funding in the FFG. The Austrian Research Promotion Agency (FFG) is the national funding agency for industrial research and development in Austria. As a "one-stop shop" offering a diversified and targeted programme portfolio, the FFG gives Austrian businesses and research facilities quick and uncomplicated access to research funding.

The FFG was founded on 1st September 2004. The FFG is wholly owned by the Republic of Austria, represented by the *Federal Ministry for Transport, Innovation and Technology (bmvit)* and the *Federal Ministry of Economics and Labour (BMWA).* As a provider of funding services, however, the FFG also works for other national and international institutions.

[1] Dr. Gerda Geyer, Austrian Research Promotion Agency, programme manager of Programme benefit and National Contact Point for the Austrian participation in the AAL JP.

The thematic funding programmes managed by the FFG focus on strategic priorities for Austria's research landscape and thereby promote research activities in promising fields concerning socio-economical and technical needs. The range of available funding types is geared towards forming critical masses in specific thematic fields by increasing cooperation at an early stage between the business and science sectors to improve international visibility.

In 2008, the department of "Thematic Programmes" within the Austrian Research Promotion Agency comprised 12 R&D funding programmes. The funding budget amounted to 190 million euros. In total, 1,106 proposals were submitted. 533 new contracts for funded projects were established.

From the funding perspective, the session then made a shift towards a deeper understanding of the primary end-users group of AAL/benefit proposals. Isabella Buber-Ennser from the Vienna Institute of Demography discussed "The Living Situation of Older People in Austria compared to other European Countries". The presentation was based on the "Survey of Health, Ageing and Retirement in Europe" (SHARE), a European dataset that includes accurate cross-national information on economic circumstances, health and well-being, integration into family and social networks. Living conditions of older people in Austria were compared to other European Countries, including family status, children and housing. Diverse financial indicators like income, net worth, house ownership as well as the subjective assessment of the economic situation of the household were presented for Austria and for the other 10 European countries included in SHARE. Another main aspect of ageing is health and the presentation focussed on dimensions like self perceived health, diagnosed chronic conditions, limitations in the "Activities of Daily Living" (ADL) as well as in "Instrumental Activities of Daily Living" (IADL). Finally, the social network of the population aged 50 years and over was discussed, including children and the geographic distance to children, social engagement such as participation in voluntary work as well as given and received help.

From the end-users perspective, the session returned to the funding possibilities of programme benefit. Gerda Geyer from the Austrian Research Promotion Agency (FFG) presented "The Fifth Call for Proposals" launched in the programme benefit.

The presentation gave basic information on the focus and the objectives of the Fifth Call for Proposals, the proposal requirements and the practicalities of proposal submission.

Similar to the WHO definition of active ageing, the Austrian programme benefit defines active ageing as a process which enhances the quality of life of the individual by reaching the maximum access to participation / social integration, security and health.

An overview on the thematic focus of projects funded in 2008 was given according to the thematic clusters included in the focus on active ageing. Funded projects covered the following thematic areas:

Cluster 1: Social inclusion

- Communication terminal; touch screen interface
- Interactive, user-oriented and user-driven web portal
- Multimedia communication system for people who live alone

Cluster 2: Activities

- Strength-based training system for home usage
- Unassisted control of balance risk of falls and activity levels, exercise programme

Cluster 3: Comfort and security

- Vital monitoring, contextualised personalisation and support
- Reliable and automated computer vision system, robust fall detection

Programme benefit: Types of Projects Funded in 2008

Cooperative Projects	7
Human Resources Projects	2
Stimulation Projects / Studies	7
Stimulation Projects / Workshops	3
Concept initiative	1

Source: FFG, 2009

In order to gain a deeper understanding of what projects in the Programme benefit are about, two examples of funded R&D projects were presented at the end of the session.

Scientist Brigitte Krenn (ÖFAI & Scientific Consultant to Research Studios Austria) presented the project VITASMART which was funded under the third call for proposals of the Programme benefit (2008) in the Thematic Cluster 3: Comfort and Security.

The chief goal of VitaSmart is the development of SmartyVital, a smart home companion performing the monitoring of vital functions. SmartyVital is based upon the prototype of BEKO's Smart Home Centre and provides contextual personalisation and situation-driven support of end-users of smart homes with regard to monitoring vital functions. The project defines the monitoring of vital functions as the ability of a system to identify and qualify changes in the daily routines of the smart home user and react appropriately, for example, by activating emergency assistance systems. Existing systems currently offered by emergency assistance organisations rely on periodical confirmation by the user which is given by pressing a button within a specified time window. Such systems suffer from an enormous error rate, mostly due to the smart home users' forgetfulness, so that in most cases such services are unsubscribed after a short time or not offered at all due to cost considerations. The smart home companion, which is to be developed in the project VitaSmart, is a contribution to the alleviation of these shortcomings.

The aspect of VitaSmart that makes it unique is the 24/7 real life data obtained from smart home installations used and tested by friendly customers. These data are used in the development process of SmartyVital. The consortium expects SmartyVital to raise the quality of life for the assisted individuals and thereby create considerable public benefit in the long run.

The second project was presented by Christian Menard from FH Technikum Kärnten. The Project Health@Home has been funded under the third call for proposals in Programme benefit (2008) as well as in the thematic cluster: Activities.

Due to a number of epidemiological studies over the last few years, it is well established that structured, regular *training is one of the most important pillars*, if not the most important, *for the*

prevention and rehabilitation of society's number one disease – the metabolic syndrome. Sport and movement can be utilised in the treatment of a number of illnesses ranging from metabolic syndrome with its accompanying illnesses, e.g., insulin resistance, type 2 diabetes, lipometabolism problems, high blood pressure and obesity as well as a variety of heart and lung conditions such as chronic obstructive bronchitis. A well-implemented training therapy (a combination of *weight/strength training***,** endurance training and coordination training) can improve the psychosocial and bodily well-being as well as the fitness condition of the people suffering from the above-mentioned illnesses. Not only that, this training may even reduce the symptoms and stop the advancement or even reverse the progress of these diseases.

Thus innovative technologies must be developed not only to keep people healthy longer, but also to make the therapy process more effective while simultaneously reducing costs after health problems have appeared. In the framework of the project **Health@Home**, a *novel therapy process* based on modern IT-technology will be developed to allow elderly people at risk of health problems to participate in a continuous medically controlled health training programme in the comfort of their own homes (Home-based Training). Thus, costs in comparison to the current conventional stationary stays in therapy centres will be greatly reduced, and especially for elderly people, the participation in medical-directed health training programmes will be much easier. Moreover, *the motivation to be more active is encouraged through constant monitoring and suggested improvements.* Especially now in the area of health training programmes for the elderly and people in higher health risk categories, controlled strength training is becoming a more important type of training. A precise validation of the progress of the training programme is presently only possible in an outpatient environment and with expensive strength measuring devices.

The goal of the project Health@Home is to develop a home-based, computer-supported training system for the elderly that is, on the one hand effective while still being very simple to use, yet, on the other hand, it can provide the attending physicians and therapists the possibility to continuously monitor the training progress, on which to base their further medical decisions (Decision Support System). The system will be implemented and executed within the framework of a pilot study that will consist of 70 -90 end-users under clinical observation. The expansion of the proposed system to include recognition and data capturing of exercise movements in targeted training programmes is planned within an international framework. With this system, it will be possible to control complex training programmes and, as such, to be able to provide more advanced feedback to the end-users.

END-USER INVOLVEMENT

Barbara van der Linden[1]

1. Rationale

The involvement of end-users is a big issue in the AAL JP - and for good reasons.

AAL solutions have to be 'wanted' by older people and their families and also by the carers or service providers that are supposed to work with the solutions or the organisations that have to provide or finance them. The average ICT-solutions designer – being a *(relatively) young technically oriented person – in general has no clear insight in the needs* of older people. Although general studies on needs and wishes of older people can definitely give insights and directions, it is not sufficient.

Only the real involvement of the different types of end-users can realise real solutions.

Special attention is needed when solutions for people with cognitive impairments like dementia are developed.

In the successive stages of the designing process, the role of end-users will differ; varying from expressing needs to testing usability and assessing usefulness of solutions. In all phases, serious involvement of end-users can highly contribute to the quality of the solutions and the marketability and implementation of the products and services.

2. Encouraging user involvement of older people in technology: End-user groups and how to involve them - Sidsel Bjørneby[2]

Due to demographic changes, we must realise that old people have to accept that technology is part of active participation and care work. Old people are less homogeneous than younger people, not only because of age, but because life has treated them differently. The most difficult group of older people to involve in the development of new technology is people with dementia. They are also the group that is most rapidly growing, an estimated doubling within 20 years, posing a major challenge to care services. Care services providers will need to combine medical care and nursing with adapting housing and designing ICT that can support end-users, helpers and stakeholders in society at large.

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1 Staff member Implementation and Innovation at ZonMw, The Netherlands.

2 GERIA, Oslo municipal resource centre for dementia.

The basic needs of people with dementia that need to be met by ICT support are memory, independence, orientation for time and place, activity and entertainment, and wellbeing. Meeting these needs will also help the carers managing daily life. The easiest group to start with are persons with an early dementia, still living at home. Involvement must be very early in the design process and throughout user trials of prototypes.

The aim is to reach a point where the designed ICT solutions will combine usefulness, user friendliness and acceptance by the users. Methods to include users with dementia in these developments can focus on four steps. The steps, in order, are Attention, Interest, Desire and Acceptance (AIDA).

Combined with these steps it is essential to have knowledge about communicating with persons with dementia, understanding that this process is time consuming, having genuine respect for the user's situation and opinions, and thorough user requirement specifications. This way it is likely that the users will appreciate being involved and contribute with valuable knowledge in the design process.

Speakers CV

Sidsel Bjørneby is an advisor and occupational therapist at Geria, Resource Centre for Dementia and Old Age Psychiatry, Oslo, Norway. She has worked with human factors and user aspects of technology for older people since 1988 and recently mostly in relation to people with dementia. Several EU projects (TIDE ASHoRED, TED, ASTRID, ENABLE) and Norwegian projects, amongst others on smart house technology and the Internet. She is presently participating in a working group on the use of GPS, and planning a demo flat for products and systems for people with dementia in Oslo.

3. Social networking: success and failure factors of www.50plusnet.nl, an internet-based community for older people - Beppie Spruit[3]

50plusnet.nl is an internet community in the Netherlands for older people which has more than 27.000 active members. You can meet people of your own age through 50plusnet and it provides the possibility to get in touch through chat and mail. 50plusnet is aimed at people who wish to extend their social network. It facilitates online joint activities of its members. People are linked up through a matching system in order to share a hobby, go out together or engage in sports activities.

The objectives of 50plusnet are:

- To get older people out of isolation and/or to prevent older people from becoming isolated;
- To stimulate participation, independence (ability to take care of yourself) and the social involvement of older people;
- To support 'Self-management': to motivate older people to take the initiative;
- To stimulate (physical) activities of older people and to promote a healthy lifestyle and mental well-being.

[3] Coordinator E-Health, Netherlands Institute for Health Promotion (NIGZ) The Netherlands.

In the subscription process, people choose one or more activities for which they are looking for a companion: 1. Going out together, 2. Sharing a hobby, 3. Sports activities, 4. Friendship, 5. Setting up a club/community.

Afterwards, people choose a specific activity within this category, such as cycling, walking, cooking or visiting a flea market. People can make one to one appointments or join one of the hundreds of clubs that have been established by the members of the site. The interested person gives a description of him/herself. The description is done by using a multiple choice questionnaire as research had shown that people find it difficult to describe themselves. The result of the questionnaire is the member's profile. After filling in the personal description, people define the matching criteria. They can indicate the gender, age category, maximum geographical distance they are looking for. Afterwards, the system will start looking for matches.

When we developed the site a lot of attention was to privacy. Members can send messages through the site without revealing their private e-mail address. In addition, members can block other members if they wish to end the contact. They can also hide their profile if they wish to interrupt their membership.

Every week, about *6.000 messages* are put on the bulletin boards of the site. There are four bulletin boards: on average, 8.000 messages are sent every week, and an average of 1.200 chat talks take place weekly. Between 100 and 200 members are always online. Health is a popular issue on the bulletin board. You can read quite often that members are about to be admitted to hospital. Those members receive many supportive messages. We also hear that their children take these messages to the hospital and read them to their mothers or fathers.
The bulletin board reflects very well what is on the mind of older people.

Speakers CV

Beppie Spruit is currently working as Manager E-Health on the Netherlands Institute for Health Promotion in Woerden, The Netherlands. She holds a degree in information management from the The Hague University. Beppie Spruit has been active for many years in the field of Health Promotion. Her main expertise and experience is in the Web 2.0 concepts and social communities. Besides this, she has experience in training and coaching, implementation, product and project management and developing information-systems.

4. Involvement of older people in R&TD for assistive technologies - Walter Hlauschek[4], Paul Panek[5]

When developing Assistive Technology (AT) products and services, the intensive and early involvement of users in the innovation and design process is of the highest importance to ensure that the intended future product will be able to meet the actual needs of the future users in their daily life. This early involvement in the complete development process is the main object of the Living Lab Schwechat. To reach this target, a working cooperation between main partners has been established: (a) senior citizens, (b) local centre for senior citizens, (c) research institute Ceit Raltec, (d) city administration, (e) companies, (f) mobile social service providers and (g) international

4 Managing director of CEIT RALTEC, Austria.

5 CEIT, planning/implementation of Living Lab Schwechat.

contacts. Some main phases of a design process are: creation of ideas, iterative development of prototypes, testing and evaluation.

Some main principles applied in the AAL Living Lab are: to meet the users and carers in their daily living situation, to have regular monthly meetings with the user representatives and to be aware of the many stakeholders (not only primary and secondary users but also financing institutions). Also to consider is the involvements of the users as early as possible. Another main aspect is the importance of ethics in the AAL Living Lab.

Examples of current projects are:
– "e-Home": user-centred development of a minimal intrusive wireless monitoring and guidance system to increase the safety and autonomy of senior citizens living independently and to detect Activities of Daily Living (ADLs). One target of the system is detecting falls and generating an automatic alarm in case of emergency;
– "e-Shoe": the development of a wearable measurement system integrated in a conventional walking shoe which is equipped with different types of sensors in order to measure several characteristic parameters of human ambulation. Extensive sensor data fusion and interpretation are used to evaluate and demonstrate gait characteristics in order to be able to recognise and prevent falls of older persons;
– "interactive picture frame": participatory design and development (with intensive end-user involvement) of an interactive touch screen-based voice & video over an IP phone system for older persons which allows initiating phone calls by just touching the photograph of the person one wants to call to;
– "Long Lasting Memories": an integrated ICT platform which combines cognitive exercises against cognitive decline with physical activity in the framework of an advanced AAL environment; by enforcing this approach of simultaneously inducing neural and corporal stimulation in a safe and controlled environment, this platform will deliver an effective countermeasure against age-related cognitive decline;
– "Demo apartment for seniors": establishing an apartment at the local senior's centre showing a barrier-free dwelling environment and AT-equipment to interested persons and acting as a test and demonstration environment for newly developed AAL technologies as described above.

Speakers CV's

Walter Hlauschek, managing director of CEIT RALTEC since 2007, holds a master's degree in electronic engineering from the Vienna University of Technology. He has been working in the area of ICT and electronics for more than 30 years. His main expertise and experience is in the architecture and concepts of complex circuit and packet-based switching systems. Besides his technical skills, he has experience in management of R&D organisations, product and project management.

Paul Panek holds a master's degree in Communication Engineering. Since 1993 he has been working in the field of Rehabilitation Technology in the group of Prof. Zagler at Vienna University of Technology. His main areas of interest are man-machine interface for multiple impaired persons, alternative and augmentative communication (AAC) for profoundly and learning disabled children, environmental control systems (ECS), self-adapting bath room systems for disabled and old persons and the application of telematics in the area of Assistive Technology. Since November 2006 he has been employed at CEIT participating in the planning and implementation of a Living Lab for old

persons and assistive technologies. He has been involved in the coordination of EU funded RTD projects in FP4, FP5 and FP6.

5. User's role in innovative projects - Luc de Witte[6]

Innovations in assistive technology and health can only be successful when they fit the needs and possibilities of end-users. When this is not optimal, the innovation will not be accepted and implementation will be difficult. Therefore, the involvement of end-users in innovation processes is essential. It is not easy to really involve end users successfully. Mostly their involvement is limited to participation in a kind of advisory board. In two EU-funded projects, FORTUNE and USEM, we tried to develop criteria for successful user participation in innovation projects, and developed a training programme for end-users who want to participate in such a project. The result was a list of seven principles:

1. Co-operation should be based on equal partnership;
2. User representatives in projects are members of an organisation of end-users;
3. Financing participation should not be a barrier for participation;
4. All process materials, communication and premises are made accessible to the users;
5. Every partner has to provide qualified representatives for the process;
6. The planning of the standardisation process contains appropriate planning of user participation;
7. Users are partners from the very beginning of the project.

Working with these principles is not self evident. Researchers as well as the end-users have to learn to work together. The training programme we developed for end-users seems to be effective in supporting them in this task.

Speakers CV

Luc de Witte is currently working as professor of Technology in Care at Maastricht University and Zuyd University in Heerlen, The Netherlands.

Luc de Witte has already been active for many years in the field of technology and care as manager of research and development and as manager of the cluster technology and accessibility at Vilans, the national centre of expertise for long-term care in The Netherlands. He has also been an associate professor in technology in care and in autonomy and involved in the participation of people with disabilities at Zuyd University of Applied Sciences.

After the short presentations, a corner of the room was made available to each speaker. People from the audience could go to the speakers with questions and discuss the presentations.

6 Professor, Technology in Care, Zuyd University Heerlen, The Netherlands.

ETHICAL ISSUES

Antonio Mendes dos Santos[1]

Rationale for the session

AAL technologies and applications bring forward many questions on ethical issues. As always, issues like systems reliability and safety, privacy (regarding data entry and exchange) are at stake, which have already been debated for a long time, albeit in different application environments. Smart surroundings, constant monitoring of different body functions or activity levels can help to save people in urgent situations, but they are also amenable to keep people under constant surveillance.

What does this mean for the end-users and their families and how does it affect their lives and relationships? What do telecare solutions mean for the quality of care, for personal contact, for the quality of work? How to act if people are not able to give informed consent? How can the dignity of older people be guaranteed? How does the use of smart technology affect personal relations with family and friends? What is the effect of living in '*your own little hospital at home*'?

The debate about these issues has hardly begun. The AAL Forum is one of the places to start these discussions at a European level, to identify relevant issues to be considered (not only theoretically but also under a practical perspective) when developing and using applications, as well as in the AAL Joint Programme itself.

Robots: 'Mechanical love'; entering robots in elderly care - Ms. Lone Gaedt[2]

Abstract

The presentation focused on the PARO-project conducted by DTI (PARO is a robotic baby harp seal with social and therapeutic effects). The project focuses on documenting the effect of using PARO, as well as it identifies preconditions for successful interaction between humans and robots etc.

Target populations for the project are primarily people with different types and degrees of dementia and brain damages, including people with complex, multi-faceted and severely debilitating diseases and cognitive and behavioral symptoms or loss of function.

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[1] Chair: Antonio Mendes dos Santos, UMIC - The Knowledge Society Agency; Ministry of Science, Technology and Higher Education; Portugal.

[2] Ms. Lone Gaedt, Physiotherapist, Senior Consultant; Centre of Robot Technology, Danish Technological Institute.

The presentation described concrete ethical aspects based on the experiences in the project so far, as well as care-professional conclusions: Paro can be a supplement to, enrich and qualify care-giving; Paro can evoke and catalyze (earlier, forgotten) personality, feelings, behavior, spoken language, memory; Paro can´t substitute caregivers (but reduce their strain), caregivers should rather be the ´professional managers´ of Paro. Caregivers must be confident with and motivated for creative use of Paro, i.e. they must learn how to use Paro (professionaly and ethically) at a one-day Certification Course, in order to have an individual approach to every unique user. Paro also can entertain, win confidence and stimulate laughter, anger, creativity, communication, discussions, (self)performance, spontaneity, dreams, caregiving etc.

The presentation concluded that Paro and Welfare Technology in general are neither bad, threatening, dangerous nor unethical, but that the way it is used and organized is important. And that technological development therefore should not be stopped but controlled, in order to see whether, how and where it can enrich lives and life quality, support independence, reduce needs for caregiving etc. Finally the presentation recommended that fear, horror scenarios and statements about robots as ´unethic´ should not stop development, testing and visions, - as human beings we should not react as programmed, simple robots ourselves.

Speaker's short CV

For 30 years Ms. Gaedt has been working with - and teaching about - old people and their physical and cognitive resources and handicaps.

During the last 5 years she has focused on - and got experience from - people with dementia particularly when using (high and low) technological helping aids, systems and possibilities for this target group.

Currently she is involved in testing and evaluating different new robot-technologies within the elderly care in general, and specifically leading the Paro-project.

Ambient Intelligence; ethical issues in application in health and care - Prof. Jan Gerrit Schuurman[3], Mr. Michiel Besters[4]

Abstract

Ambient Intelligence is a vision on the future development of care technology. It promises personalized care: care that is carefully tailored to the person, and where possible, fully automated.
In the Ambient Intelligence vision, five consecutive layers of technology are identified, each building onto the previous one and each with an increasing number of automated aspects: (1) embedding, (2) context-awareness, (3) personalization, (4) adaptation, and (5) anticipation. Ambient Intelligence does more than merely introduce new functionality to the life of citizens and patients. The more we progress in the Ambient Intelligence vision, from the integration to the anticipation level, the more we expect of the technology. It has the potential to improve the setting in which people live, providing greater comfort, anticipating events, making technology more user-friendly, adapting to the user, and thus enhancing quality of life.

[3] Prof. Jan Gerrit Schuurman, Visiting Professor, University of Lincoln, UK.

[4] Mr. Michiel Besters, Researcher, Rathenau Institute, The Netherlands.

To provide personalized care for everyone, the relevant parties in a care network around the individual users must exchange detailed information about their health. This formation of networks is essential for the personalization of care, yet it is also the biggest threat to it. Firstly, healthcare practitioners, health insurers, government agencies and other such parties may wish to make use of an individual's health information yielded by intelligent surroundings. Such use is not necessarily in the patient's interest. Secondly, since active involvement of the user is often a requirement, it becomes an issue whether people have the requisite competences. Consequently, all kinds of normative questions come to the fore: greater independence versus new forms of dependency and social isolation, self-care versus behavioral control, the quality of healthcare, and privacy issues. Regarding the promises, expectations and normative issues, the question is raised whether the vision of Ambient Intelligence has a viable future or is a dangerous illusion.

This presentation at the AAL Forum 2009 is based on the study "*Ambient Intelligence. Viable future or dangerous illusion?"* of the Rathenau Institute, a Dutch think tank on science and technology. The study can be downloaded from the website of the Rathenau Institute: http://www.rathenauinstituut.com/showpage.asp?steID=2&item=4070.

Speakers' short CV:

Jan Gerrit Schuurman (1967) is a visiting professor at the University of Lincoln (Faculty of Health, Life and Social Sciences), where he holds a chair in health and community development. He leads a cancer rehabilitation programme in the Netherlands.

He read experimental cognitive psychology at the University of Groningen before obtaining a doctorate from the University of Twente in 1999, with a dissertation on knowledge transfer in ICT training.

Since 2000, he has been involved in various health care sector projects commissioned by the Erasmus Medical Centre, the Utrecht University Medical Centre, the Dutch Cancer Society, the Ministry of Health, Welfare and Sport.

Michiel Besters took his Research Master in Philosophy at Tilburg University in 2007.

Since September 2008, he is working at the Rathenau Institute on projects in which different kind of technologies (medical, surveillance, and databases) are assessed in terms of their cultural, societal and political significance.

Ethical dimensions in the involvement of older end users in technology R&D projects - Dr. Marjo Rauhala[5]

Abstract

There are a number of reasons for the need to pay close attention to ethics in the research and development of AAL technologies. The fact that the target group of AAL technologies consists predominantly of older people, some of whom may be considered vulnerable, forms an obvious reason for addressing ethics. Furthermore, the applications in question tend to be intrusive, bringing many privacy and security issues to the fore. The context of use of AAL applications is the private

[5] Dr. Marjo Rauhala, Researcher, Vienna University of Technology, Austria.

home; little is known about how the introduction of new ICT-based technologies into the realm of the private home affects the feeling of being at home. Not only are older primary users of AAL technologies and the lives of those users affected by the introduction of new AAL applications, also their family members are likely to feel some changes. The allocation of responsibilities of care followed by implementation of new care-related technologies in private homes has been recognized as a significant issue that needs to be dealt with also from the ethical point of view. In addition to these rather obvious reasons for taking ethics into account in the AAL field, some less obvious ones also figure in, namely the fact that AAL technologies do and will participate in shaping our discourses about the very basic questions of ethics, such as what is the good life? What is good care? What kind of society do we want to live in? How should we treat others who are potentially in a weaker position? In order to appropriately address the diverse ethical issues that are likely to surface in the lifecycle of AAL applications, the author suggests a comprehensive and systematic look at ethics in the AAL field.

Speaker's short CV

Marjo Rauhala (PhD; MSSc., BA) is an ethicist and social scientist currently employed as a researcher at the Institute "integrated study" at the Vienna University of Technology.

Her work focuses on investigating ethical dimensions of technology research and development, especially with vulnerable user groups, and ethical review of R&D projects.

In her approach to ethics in technology R&D contexts, Dr, Rauhala combines methods of empirical research and traditional academic ethics.

The discussion:

After the three presentations and in order to provide a lively start of the discussion, the Chair asked the audience to "*play an opinion game*" - the following assertive statement was shown on the screen:

> *AAL systems and applications bring forward a new specific set of ethical issues requiring specific research and legislation on their own.*

The people in the audience (there were 56 persons at the start of the session, increasing to about 70 by mid-session) were then requested to move to the left of the room if they agreed with the assertion or to the right if they did not.

A noticeable majority (~75%) agreed with the statement. Then, the Chair asked two persons from each side to present short speeches "*defending*" their view. The most noticeable view expressed was that of a medical doctor, who did not agree with the statement, arguing that the well-researched field of "*Ethics and Medicine*" provided a safe and ample enough basis for the needs of AAL.

BUSINESS MODELS

Juan Carlos Castrosin Gutierrez[1]

Speakers and Topics

- Hubert Oesterle[2]: Collaborative Business Models for Independent Living
- Peter Rumm[3]: Business Development in the PERSONA Project
- Peter Levene[4]: CARING FOR PATIENTS, supporting Vulnerable and Elderly People at Home and in the Community
- Nissim Darvish[5]: Trends in Healthcare

In Europe the environment of national health care and social security systems is rather heterogeneous. This hinders the development of common (European) business models and a common market for AAL solutions. Currently, reimbursement schemes in most countries do not encourage the adoption of technological innovations in these systems and provide no clear perspective in linking investments and revenues/savings for adopters. Investors and developers have to deal with a wide variety of welfare, healthcare and care systems in European countries. Each of these systems provides a complex legal and regulatory basis which restricts or encourages the use of AAL technology in the public healthcare and care services in specific ways. In both, the more regulated markets of healthcare/care and the consumer-oriented private markets, the lack of visible value chains is obvious. The complex structure of the developing AAL markets and the lack of market information and visible value chains make it difficult for SME or entrepreneurs to develop business strategies and evaluate the future market potential in this sector. To foster the market entry and participation of (innovative) SME and start-up companies in these important (technology and service oriented) market segments, it is important to stimulate innovation and deployment in the whole AAL ecosystem.

In his introductory remarks, *Juan Carlos Castrosin Gutierrez* explained that, in a general view, any business model is a representation or basic framework for any type of value creation – be it economic, social or otherwise. For any type of company, a business model is of crucial importance: established companies need to innovate their business model(s) constantly or find new ones to compete against competitors. Start-up companies seek to establish new business models to enter existing markets or to create new ones. Economic history shows that the cycle of creation and innovation of business models has accelerated in the past decades. However, every business model is built of several basic building blocks which need to be considered when thinking about possible

[1] CEO Platform of Investments and Powerful Inventions PI&PI, Member of the AAL Advisory Board.
[2] Director of the Institute of Information Management, University of St. Gallen.
[3] Project Manager, FutureCamp GmbH.
[4] Business Development Director, Docobo Ltd.
[5] Partner, Pitango Venture Capital.

entrepreneurial strategies: Value Proposition, Market Segment, Value Chain Structure, Revenue Generation and Margins, Position in Value Network, Competitive Strategy, Cost Structure, and Distribution Strategy.

Hubert Oesterle in his talk emphasised that the demographic changes in Europe, especially in the care sector, will lead to a need for services for older people on an industrial scale. Without further efforts to enable more people to live independently at home, the future costs for care homes and services will not be fundable. Industrial players like Philips, Tunstall and others have already entered this growing market. In most cases, new technology and new services have together established new business models in the past. Services in independent living need to support and cover a combination of consumer activities in related areas, e.g. housekeeping+care+security+social participation. Through interviews with potential customers, Oesterle and his team were able to draw a matrix of preferred services packages from a customer's point of view. By clustering these packages, a certain set of services with market potential could be identified. When thinking about the provision of these service packages, potential service providers face a dilemma: if the services are not attractive and comprehensive enough, there will not be sufficient customers. If there are not enough potential customers, service providers will not take the risk of offering the envisaged set of services. In order to escape this dilemma, two approaches are reasonable. A break-through killer application might be developed, thus solving the dilemma and breaking the barriers. However, applications like that are not easy to find. Another solution could be the development of an ecosystem for independent living. In such an ecosystem, consumers and suppliers of different services are linked via a service platform. This (electronic) platform handles the determination of user demand, the selection and ordering of appropriate services, the execution of the service and the payment procedures. It operates as a middleman between the users and the providers of certain independent living services. In order to enter the game in such a model, companies need to define and find their role in the value chain and become part of the IL supplier database which is part of the whole ecosystem. When putting the pieces together, customer demands, market overview, market potential and existing solutions are connected in the IL ecosystem. The University of St. Gallen has set up such a network (IL Network St. Gallen) with members (user organisation, service providers) from Switzerland and Germany. Practical experience shows that such an ecosystem is successful in reducing the complexity for the consumers. Good management of the whole ecosystem is the key to success in order to establish sustainable business models. In the discussion, it was mentioned that building an ecosystem with a heterogeneous group of companies needs standards and guidelines for collaboration which is a highly political issue. It was also emphasised that the consumer needs to be in the middle of the ecosystem. This also pointed to the fact that speaking about the "user" (in a R&D context) is not necessarily the same as speaking about the "consumer" (in business terms).

A different approach to the IL network has been implemented by the Persona project, which was presented by *Peter Rumm*. Persona (Perceptive Spaces Promoting Independent Aging) is an EU-funded project with 21 partners and duration of 42 months. Part of the project is the exploration of a high-level (IT) architecture for independent living services which involves home-located devices and middleware, and web services to connect to outside medical and care service providers, and other stakeholders. The business model and strategy development in the project was based on the (hypothetical) Persona Ltd Persona Ltd would combine a technology platform, AAL services and service provision to the customer, together with external partners from the relevant sector. In order to provide the right kind of services to the end user, a customer analysis was undertaken in which target customers, their market power, potential weaknesses and necessary resources of the Persona Ltd were analysed. As a result, a list of the most promising services with the most market potential

(and prospective numbers of users) was developed with personal health management and emergency and risk management in top position. The case of the Persona Ltd showed that market entry of new companies needs a mix of technology push and demand pull by the customers. Thinking in terms of products and offers to potential customers is important when making the step from research to business models.

The real-life example of UK SME Docobo was presented by *Peter Levene*. The company, established in 2001, is active in the telecare sector. The starting point for the business was the great potential to help people, the potential market and the commercial opportunities identified in the telecare sector. However, the entrepreneurs underestimated the necessary time to market for their disruptive product and were also not aware of the fragmented nature of the UK National Health Service (NHS), its inability to take quick decisions and its lack of interest in investment in health care. The journey for Docobo became more difficult than expected. Demographics and the demand and supply side challenges in the UK health sector showed a clear business case for Docobo's doc@Home service. The NHS, as the main public healthcare and care provider (and Docobo's main customer), was not ready to adopt new services easily: since additional spending for care technology was only accepted for very ill people, the market for the service was not huge and was also very fragmented. Also the NHS did not have practical experience in identifying the right patients for the service. Concrete use cases, established with the help of carers for severe chronic conditions, showed the real-life benefits for the ill person and the carers, and helped to overcome some of the barriers of wider adoption. For Docobo, the telecare service is just the beginning - if the assistive-living market is to be fully developed, a holistic approach should be implemented that fosters case co-ordination and care convergence in an integrated and interoperable system. The current telehealth reduces admissions, visits and calls, and therefore delivers cost reduction for the NHS. The wider benefits of an improved quality of life (QoL) for patients and carers are relatively out of scope and unexamined. The NHS therefore will currently concentrate on cost reduction for a small number of very ill patients. A wider QoL-oriented approach could also stimulate the private market and open additional business opportunities. Docobo is engaged in new research projects (i.e. integration of telecare and telehealth, and wearable systems or personal care systems) that could lead to new business models in this field.

Finally, an investment perspective on ICT and ageing was given by *Nissim Darvish* from Pitango Venture Capital. In this perspective, the global healthcare industry is an exciting industry forming 8% of the world GDP. There is a strong growth in medical devices and biotech driven by continuous innovation. Demographic change will also shape the future of this industry in an immense way: ageing and declining populations, and increasing life expectancy, changing family structures and shifting patterns of work and retirement together with a growing burden of chronic diseases will lead to rising healthcare expenditures and emerging economic challenges. The pressure on healthcare systems fosters the need to reduce healthcare costs by investments in IT, the implementation of preventive care and disease management programmes and the coordination of care among providers. This opens new business opportunities for healthcare information technology, home health care and the development of new drugs. Here, venture capital investments can play an important role as an economic model for new market creation and modernisation for healthcare reform. There are already large investments in healthcare, hardware and software, and healthcare IT (HIT). Home health care services and novel drugs development will attract additional VC in the future. Upcoming information technology innovations will allow critical medical data, including images of the operating field, to be processed and transmitted rapidly, saving both patients and physicians time and speeding up the delivery of treatment. Information from devices such as pacemakers, blood-glucose test kits and blood pressure readers will be monitored over the

internet or via wireless connections thus achieving better disease management. There are also challenges in HIT: technical challenges like secure/wireless connections, batteries, errorless sensors and the lack of business models, costs, interoperability, privacy and confidentiality issues, and the demand for skilled workforce. The transformation of health home care is already taking place. Philips entered the home health care market and seeks to become a global home healthcare market leader in 2015. Home monitoring is a key segment in this upcoming market with devices like the intelligent home healthcare embedded system for fall detection. Since healthcare reform is a must, innovation will accelerate the necessary modernisation. To foster this transformation, governments should apply leverage to the venture capital model in order to push progress ahead (e.g. direct support for companies, tax incentives, etc.). In the final plenary discussion, the question was raised as to whether the necessary holistic systems for independent living should be targeted immediately in research, or if iterative improvements of single one-problem-one-solution devices are today's better approach. In the latter sense, system compositions and merging devices into a system will be done in the end by the market. Another issue was the importance of social business models focussing on the benefit for society. In the projects of the AAL Joint Programme, these societal benefits should be part of the business plans of the projects.

AAL AS A CHANCE FOR INNOVATION

Urs Guggenbühl[1]

In the face of unprecedented longevity, the challenge for society is to understand and plan for how best to enable older adults to age well, maintain their personhood and their place as members of society and, last but not least, make sure that this is financially sustainable. The convergence of an ageing population with today's availability of advanced technology is an opportunity to innovate and to think differently about how we live throughout our life span. The home is the primary platform for much of life's activities influencing health, wellness, well-being, independence and safety as we age. Sometimes though, technology seems an attractive option when we are faced with an improvement challenge. However, it is understood that technology is not a panacea for the skills we lack or for every improvement issue we encounter. The AAL JP aims to catalyse innovation in exploiting technology to provide not only products but services that are needed, desired and financeable to enhance the lives of older people among member states. It recognises that technology is a tool that complements abilities and has the potential to allow our ageing population to do more and become more productive.

It is in the recognition of the older adult as a person first and foremost that the AAL JP addresses the investment in supporting research and development for ambient-assisted living from a holistic point of view. In this session, we address innovation within the AAL JP from a number of perspectives. How can we generate creativity and innovation from the older person's perspective, from the perspective of family and carers, as well as that of business? The AAL joint programme aims to distinguish itself from a myriad of other research and development ageing programmes through its ability to challenge the various disciplines and sectors to innovate in the psycho-social, socio-cultural, physiological and economic realms in pursuance of the old adage, live long and live well.

Before we consider the three presentations in this session perhaps we should have a closer look at what is "innovative". The common understanding of "innovative" is to be creative. Everyone always thinks of new things which could make life much easier and fulfilling, if they were developed and offered as a new product or a new service, etc. To have a new idea is one thing, to develop this idea into a successful product or service, etc. is another thing. Thus it is not surprising, that innovations usually don't fail on the idea but on their implementation. Every good idea follows a difficult innovation development pass which is multidisciplinary, customer oriented and has a business perspective. With this understanding we could define innovation as being a new idea which was developed into a successful product or service, etc. with a positive return of investment.

The first presentation "Innovation in healthcare: key challenges and opportunities" was given by Terry Young, Chair of Healthcare Systems, School of Information Systems, Computing and Mathematics, Brunel University, United Kingdom.

[1] Director of the Innovation centre of the University of Applied Sciences, St. Gallen, Switzerland.

Although there is much talk about the need for innovation in healthcare, there are some barriers that are not at all obvious. A major difficulty lies in the fact that service provision is the main business of most healthcare delivery organisations, and yet much of the innovation focus lies at the technology level.

In this context Terry introduced MATCH (Multidisciplinary Assessment of Technology Centre for Healthcare) a joint research initiative between Brunel University, University of Nottingham, University of Birmingham and University of Ulster as well as the Engineering and Physical Research Council, UK (http://www.match.ac.uk). MATCH works with demand-side organisations such as the NHS Purchasing and Supply Agency (PaSA) and its Centre for Evidence-based Purchasing (CEP) as well as with the NHS National Innovation Centre (NIC) to develop decision-support methods and tools. On the supply side of the fence, embedding Health Technology Assessment (HTA) into the product development cycle is also a challenge, especially since the practicality of a new invention, and end-user attitudes to it, are often unclear until a solution has been engineered. As a great deal is based on belief rather than evidence at the start, the MATCH team works with a range of companies to develop an integrated suite of methods that connect between the worlds of "based on belief" and "based on evidence". This involves producing guidelines, developing methods, and providing integrated HTA tools for business processes – for those producing medical technology and those who take it up and use it.

By considering a simple model of innovation, Terry and his team attempt to understand the difficulties mentioned above and to work out some ways of coordinating the introduction of inventions into the flow of service improvement. In this context, he also introduced another line of research called RIGHT (Research into Global Healthcare Tools) which is a collaborative research venture between seven UK universities that aims to assess, through "proof of concept" testing, the feasibility of applying to decision-making in healthcare, some of the best-practice modelling and simulation methods that are used to support decision-making in other sectors, such as industry and manufacturing, and the military. In doing this, RIGHT is applying research to a widely recognised gap in healthcare management (http://www-edc.eng.cam.ac.uk/right).

Terry concluded his presentation with the words, innovation in healthcare is hard, especially because of the dysfunctional interactions between the service improvement cycle and the cycle for the invention of new technologies. Simulation and modelling, however, offer a means of overcoming this critical barrier, while better articulation of the value of technologies should help to improve the synchronisation and adoption of technologies.

The second presentation "AAL - transforming care, enabling choice and driving innovation" was given by Madeleine Starr, Strategic Programme Manager, Carers UK, United Kingdom.

Madeleine's presentation focussed on ways in which assistive technologies can deliver innovative care solutions that have wider benefits not only to families, but to communities, employers and the wider economy.

Innovating for family and carers simply means innovating for people. Many people do not associate assistive technologies with their own everyday lives, often because of the way they are described and promoted. We need to promote them as 'tools for living' and make them familiar and accessible.

Who are the end users of these technologies? We talk about supporting people to live independently, but in reality people live inter-dependently. Services are not delivered in a vacuum, they are delivered into relationships, families and communities, and their impact has to be assessed on all these, beyond a single 'user'. Technologies need to be responsive to our ordinary, everyday NORMAL lives which will include disability, frailty and caring, all of which are normal. People have never lived in isolation, people have always grown old, people have always been born with or acquired disability and people have always cared. However, successes in healthcare technology mean that we are now living longer, and living longer with disability which requires greater levels of care, much of it family care. We are also facing a future in which we will be required to work longer to support an older population and a growing care and pensions bill. These are powerful policy imperatives.

Assistive technologies will be a vital part of the jigsaw of support needed to manage complex interdependent relationships – family, community and working relationships. All relevant stakeholders will need to be engaged in developing, using and, above all, mainstreaming these new technologies, and are the real market for them.

We need to make consumers visible in the development and marketing of these new 'tools for living'. Consider that in 2008 in the UK £244 million was spent by private purchasers and £177 million by local authorities on aids and adaptations. At the same time, £167 million was spent on anti-ageing creams – and who is the most visible of these two consumer groups? Most consumers of assistive technology have no part in the choice of what they use, and do not know what is available until they become users. However, women from as young as 20 – and as old as 70 – are targets for the marketing of anti-ageing creams which are sold on the benefits of the science they incorporate, and with the empowering message – 'You're worth it'.

I might argue that my mother and I are worth great technology support to manage my care of her, her care of me and my family, her participation in her local community, and my working life. And of course we are, as too are her local community and my employer, but none of us really knows what choices we have about what is available, where we can find it, or even how we pay for it, no matter how much it might help.

It is time to mainstream this technology, to make it about lifestyle choices, to design it beautifully so people want it, to sell it commercially and to target its marketing beyond what is often characterised as the immediate end user and the other parties who will benefit from it.

We should, however, not only focus on the hardware – we have to transform the response services that underlay a lot of these technologies and see private investment as well as public investment in these too, with venture capital embracing the call centre or triage service in the same way it embraced internet shopping.

If these technologies are to be mainstreamed they must be designed for real people and marketed to them in ways that make sense to their real lives. Only then will we truly see demand-led innovation.

The third presentation "What is wrong with AAL?" was given by Dirk Elias, Executive Director of the Fraunhofer Portugal Research Centre for Assistive Information and Communication Solutions (AICOS).

In his presentation Dirk questions the effectiveness of R&D funding for AAL related projects in health care on national and international levels. Technologies to implement AAL services are

available and stable. Lab tests and living lab trials show a general usefulness and the value of the product. Although there is a huge potential market in Europe and today some regions of Europe are already facing a demographic ageing problem greater than the average predicted for 2025, AAL products are still rare and no significant market success can be observed. The reasons for this mismatch according to Dirk are:

- the lack of a definition of a reasonable common denominator from a large amount of requirements from a magnitude of stakeholder needs,
- the focus which should be on elderly people and not on the sensors,
- the policy makers who are suffering from the "Boiling Frog Syndrome",
- only a technically integrated ecosystem will be able to provide a sustainable mass market for AAL solutions.

Dirk argues that the problems we will face due to the demographic change already exist today. In Portugal for example, there are some regions where the elderly population (65+) is already larger than the 20% of the national average predicted for the year 2025. He sees a solution by collectively defining a primary care standard. On behalf of the Health Cluster Portugal (HCP), AICOS is driving the development of a national project called AAL4ALL. This project aims to bring together all key players in this field, to define together a primary care standard, design the appropriate business models and adapt to already existing international standards. Dirk also calls on the other European countries to participate in creating a common denominator for a "Public Primary AAL-Care Standard" to be able to create mass markets within and outside of Europe. For this he has set up a questionnaire available to everyone: (http://aal4all.projects.fraunhofer.pt/aal_questionary_final_verteilt.pdf).

Although 70% to 75% of elderly people are in good health, these three presentations and the discussion which followed showed clearly, how AAL is still dominated by health care issues. For the next AAL-Forum in Denmark, we hope to see more presentations focussing on aspects of AAL solutions for elderly people other than only health care!

STANDARDS AND INTEROPERABILITY

Jeroen Wals[1]

Speakers and Topic

- Ger van den Broek[2]: Standardisation in AAL
- Marco Eichelberg[3]: Interoperability in AAL
- Chuck Parker[4]: Interoperability and Certification Activities in the Continua Health Alliance
- Ad van Berlo[5]: Interoperability in Smart Homes

Standardisation is a prerequisite for a broad deployment and use of ICT, and triggers and enables new business. The ICT standards community is characterised by a large number of standards bodies and indeed a large number of different types of activity, spanning over a wide spectrum ranging from the infrastructure, represented by the Internet and basic communications standards to the content standards. It is commonplace to state that ICT standards are (or should be) global, and that "regional" standards have no place. If anything, ICT standardisation is becoming more critical an issue. This is particularly true in the context of AAL Technologies. There are many different subjects for AAL Technology standards, for example, hardware, technologies, software, interfaces/architectures, processes, services, data, content, etc. Each may require a different approach, or involve different actors and methods. Establishing such standards economizes on co-ordination costs, creates an integrated market with economy-of-scale advantages and helps to build trust in quality of devices and services, where error-free functioning can be critical to the individual. Another approach to achieve the necessary interoperability is certification on product level. Here the Continua Health Alliance – an industry-driven global consortium – has taken first steps and established design guidelines and a product certification process for health and medical devices. Another important sector where interoperability is crucial is the Smart Home. Here a wide range of different services and application - provided remotely or existing solely within the home environment - are connected for creation of information or data, its processing, aggregation, understanding, delivery, actions based on information received and display to some user or operator. In the end service delivery and home based applications are to be operated independently of underlying technology.

Ger van den Broek explained the basic approach towards standardisation that has been used in the AALIANCE project. His starting point is the observation that the Ambient Assisted living domain consists of a large variety of independently developed systems and services. An added value can be expected when data from these systems and services can be exchanges, aggregated and used by

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reasoning services to provide better support for the individual client. This however can only be achieved if the systems and services are interoperable and can be dynamically integrated. HL7 (Health Level Seven - used for the exchange, integration, sharing and retrieval of electronic health information) defines interoperability in several dimensions: Systems should fit in existing environments (physical and environmental interoperability), they should be able to communicate and to exchange data (technical or syntactically interoperability), they should be able to understand each others data (semantic interoperability) and be able to process and use the exchanged data in compliance with their internal procedures (process interoperability). These different dimensions of interoperability can only be achieved when standards are being used. Speaking about standards in general, we see that there are categories of standards – they could official/mandatory or voluntary, it could be proprietary or open standards. Of course, industry groups play an important role when standards are developed and adopted. The landscape of standards presents itself rather heterogeneous: conflicting version of standards exist (or conflicting implementations of the same standard), in certain areas there is a lack of specific standards or a lack of certification of products and services. There are a lot of barriers for standards adoption. On a supplier side, typical barriers for standards adoption could be the following: primary focus on internal efficiency (not on external connectedness), standards do not follow user needs, so it is difficult to adopt them. An organisation might be ignorant about standards or is not willing to take the costs of implementation or migration. A care delivery organisation might be hesitating to adopt standards because it also has a focus on internal efficiency or a lack of financial incentives to adopt information technology and the accompanying standards. Furthermore there might be political barriers, regulations or barriers within the standard development organisations which hinder development and adoption of a standard.

In the context of AAL there a different types of standards: Equipment and environment standards (like home and building electronics, etc.), generic technology standards (like PAN, LAN, WAN, web based services, middleware, etc.), domain specific standards (healthcare, home control, infotainment, shopping) and AAL integration standards like exchange formats and ontologies. The later one is the most important one for the creation of a whole AAL eco system with different subsystems and service – development of these standards is at the beginning and has just started. In the AALIANCE project a first inventory of related standards in AAL has been developed. A number of standards in the domain in different categories have been identified: 11 domain specific standards, 9 on equipment and environment and 14 on generic technologies - and there may be more (Document available on http://www.aaliance.eu/public/documents). The Cenelec standard for smart homes for example consists of several subgroups of different standards in the area of installation, certification, communication, applications and architecture and hardware requirements. There is a wide range of different actors in the AAL and standards field. (EU) research projects in AAL do often use standards, but only few of them are actively contribute to standards development. The Cenelec group is working on a related roadmap in this area. Also the TAHI Home Interoperability Framework Initiative and the Continua Health Alliance must be mentioned. What is needed at the moment is more awareness for the need, problems and opportunities of standardisation in AAL. Also researcher and developers should identify and select standards and promote the use of these standards by developing deign guidelines with these standards. Also more labelling and certification of products and services will be needed. In the discussion the need for sharing information between the different organisations and groups active in standardisation was emphasised. Standards should not only be promoted towards the technical community but also towards the healthcare and care sector.

Marco Eichelberg is the head of the interoperability working group in the German Innovation Partnership for AAL, a non-profit working group addressing issues of Interoperability in AAL with experts from different domains. In order to present the current state of interoperability in AAL and to give recommendation, the network will publish a 2-volume book on the issue in autumn 2009/Spring 2010 (in German). Like Ger van den Broek, he emphasised that interoperability (a term which is not easy to define) is the result of different layers of interoperability: Protocol interoperability (technical exchange of information) – Syntactic interoperability (exchange of data in the right format) – semantic interoperability (understandable semantics of data) and user perceived interoperability (effective and correct communication that leads to service provision to the user). Although the later is the main target, the other layers are necessary preconditions for it. The ability to connect and exchange information is one of the distinguishing marks of AAL systems and this makes interoperability indispensible for AAL. Much research is going into AAL currently, but with regards to standards, interfaces and interoperability the developments so far are fragmented, uncoordinated and often proprietary. A situation very similar to the state of medical IT 10-15 years ago. A consolidation towards a few interface standards for AAL is therefore quite desirable. When connecting devices a lot can go wrong: connectors don't fit (.e.g. USB), different network protocols are used (Bluetooth, ZigBee, and WLAN all use the same frequency) or different transport protocol (HTTP, SOAP, RTP, WebDAV, HL7 MLLP) and different application level protocol (i.e. ECG transmitted in DICOM, HL7 aECG, SCP-ECG, or ISO/IEEE 11073-10306 format?). Finally there a lot of different interpretation (semantics) of data transmitted (Character set: ASCII, UTF-8, UCS-2 or Latin-1, HL7 "veteran's military status" vs. "patient's profession", a problem of translation and context). In AAL there additional and multiplied challenges. AAL brings together components, products and vendors from different market segments:

Building automation, Household appliances, Medical devices, Consumer electronics, Microsystems technologies, Telecommunications. These all have different standards, different terminology, different products, and address very different markets in terms of price sensitivity, distribution channels, market „players" etc. Who can design a system that combines vital signs with data from building automation, detects an emergency, establishes contact via a TV set, switches off a cooker, and calls for an ambulance? There is a multitude of relevant standards and norms which poses a challenge for product designers, developers, integrators. There are also rivalling standards. In an ideal world, we would have exactly one standard for each task or interface. In reality, there are often overlapping or rivalling standards, driven by different vendor "camps". So what can an AAL developer do? Supporting all standards is too expensive. Wait for one standard to replace all others? This will probably no happen. Implement a software abstraction layer that permits certain interfaces/standards to be replaced? Good if possible. Choose one standard and accept incompatibility with all others? Bad, but sometimes this is the only choice. Also same standards are missing completely: For many topics relevant for AAL, there simply are no standards (with market acceptance) yet – e.g. remote maintenance of AAL systems, connection to medical sensors, AAL terminology/AAL Middleware/Service Execution Environment, Emergency Calls and Connection to Call Centres. This forces everybody to "re-invent the wheel" with every new product/project. The integration with existing healthcare IT is another crucial point. AAL technology enables us to permanently monitor relevant health parameters at home. How can we secure that the AAL system at home „knows" which values are critical for the patient and that the data measured at home is available to the family doctor or specialist for follow-up? This requires connectivity between „professional" healthcare IT and AAL systems at home, but IT infrastructure in hospitals and practices is not prepared for this at all. (The fact that health insurance (at least in Germany) will not pay for such services does not help either…). Product labelling needs also to be addressed in AAL. When purchasing a device such as a scale, the product's classification with regard to reliability and

precision is not obvious: consumer product (fitness, wellness) or medical device - both carry a CE mark. When purchasing a component, it is not easily possible to determine whether or not that component can be integrated into an existing AAL system. The capabilities of an AAL product should be described through a harmonized terminology (compare DVD players: plays MP3, plays VCD, supports 5.1 audio…). This calls for a harmonized approach towards product labelling (and possibly certification) in AAL. All these challenges make it clear, that Interoperability is one of the topics AAL research needs to address. However, Interoperability is just one out of many challenges AAL research needs to address: Robustness (systems that work in "real life"), Sustainable business models (hybrid products etc.), Usability and the necessary training for planners, plumbers & technicians. In the discussion, the need for a comprehensive overview of the AAL standards landscape for the European AAL community was expressed. It was also mentioned, that issues of safety and security have a very close link to standards and interoperability and should therefore not be forgotten.

The certification activities of the Continua Health Alliance were presented by *Chuck Parker*. Continua was founded to organize the market participants and to establish an ecosystem for development in the remote patient monitoring area including developer resources, market intelligence and collaboration among the members. Over 1,400 members are currently participating in the various Working Groups – involving all supply and demand side industries: Medical devices, Governmental Agencies, Fitness, Pharma, Health care providers, Health insurers, Telecommunications, IT, Integrators, Applications (PHR, EHR, desktop). One strong value of Continua is the certification program for interoperability of devices. In its working groups, real-world use cases from industry and healthcare are modelled. In the working process then the requirements are being deconstructed and the best industry standards are selected. The processes are examined closer and existing standard holes are directly closed within SDO's or additional definitions and refinements are defined. After selection of the connectivity standards, the guidelines for strict interoperability are published. Continua has also established a test and certification programme – certified products will receive a recognizable Continua logo. To organize its work, Continua segmented the market in three large use cases: Aging Independently, Health & Wellness and Disease Management. Here the different single use cases are developed. The complete system consists of PAN/LAN devices, application Hosting device, WAN device and the health record device. Current use cases (V1.0) focus on PAN and LAN interfaces. The next use cases (V2.0) will go towards Service (WAN) interfaces. Current V1.0 use cases cover protocol standards, syntactical (data) standards and semantic interoperability. V2 will have further implementation and conditional understanding. In its activities, Continua uses a three-tier approach in interoperability. Continua constrains the outputs at the device level (PAN interface) (which reduces device overhead and intelligence requirements, power requirements, development time and connection complexity) and locates the intelligence at the Hub / Manager. Reference devices exist for all device classes. When taking the Continua certification, members need to provide the SDO transport certificate, test plans will be developed and in the Continua test lab the certification tests will take place. When tests are successful accomplished certificate and logo will be provided. The logo shows the user/customer that these certified devices will work together in safety-critical health-related environments.

In Continua's view the remote patient monitoring market will be driven by a number of significant changes or trends. The individual home will establish as the hub for future systems. Healthcare will be more and more tailored towards the needs of the consumer. Public health and corporate wellness support programmes will become more and more important including rewards and public incentives to stay people healthy. There will be a greater integration among wellness, health and social care,

technically speaking we will see increased connectivity and evolutionary, scalable, service driven offerings.

Some practical examples of non-technical standardization issues in smart houses were given by *Ad van Berlo*, R&D manager at Smart Homes the Dutch national expert centre for smart technology and smart living. A typical current smart home companies different numbers of ageing well applications (safety alarms, videophones, door lock, etc.). A control hub (e.g. i2home) would connect different controller devices, external resource servers and target devices. But apart from the technical standards necessary to establish these connections, also non-technical standardisation plays a vial rule in the AAL and smart home context: e.g. standardisation of user needs, standardisation of technical design / basic electrotechnical infrastructure, standardisation of installation, sandardisation of usability. Ad demonstrated that when a smart home is established and the inhabitant move in, a lot can go wrong in very practical terms: Old furniture may not fit to the existing network installations, the inhabitants are not happy with the installed network infrastructure from an aesthetical point of view (and it may not be changed any more) or basic design and usability principles are neglected in the installation. Strong user involvement in the design process is therefore a necessity. What is needed are flexible technical infrastructures than can be adopted to the user needs. Also the installers of the technical equipement (electricians, plumber, etc.) need specific expertise of these requirements which raising the issue of professional education in these area.

Other crucial topics are the standardisation of evalution methodologies and the standardisation of privacy. Ad underlined there is a need for standardised evaluation methodology in AAL projects. In many AAL projects running we find a great variety in evaluation protocols. Therefore it is difficult to prove evidence, to find justification for exploitation and to find and establish business cases. Commonly accepted standards (consensus on number of end users, duration of trials, set-up, guidance, payment, etc.) could help here. The same is true of privacy protection. Here also common standards to fulfill govermmental privacy regulations. (A prototype for privacy protection has been developed within the Netcarity project, in which Smart Homes is involved.) Finally Ad concluded that that there are many technical interoperability and standardisation issues that need to be solved. But also the big number of non-technical issues need at least harmonisation in order to overcome these non-technical barriers.

ROADMAPPING/TECHNOLOGY TRENDS IN AAL

Christian Wehrmann

Chair:

Christian Wehrmann (VDI/VDE-IT, AALIANCE Coordinator)

Speakers and Topics

- Filippo Cavallo (Researcher, Scuola Superiore Sant'Anna): The AALIANCE Roadmap
- Ben Knapp (Head of CAPSIL Executive, Queen's University Belfast): CAPSIL Project
- Emilio Mordini (SENIOR Project Coordinator, Centre for Science, Society and Citizenship): SENIOR Project

Summary

In recent years, the European Commission and European member states have made considerable investments in ICT and ageing research in the Framework Programme, the AAL Joint Programme and national initiatives. Similar approaches have emerged in other geographical regions, e.g., Australia, Canada, Japan and the United States. Further research needs to build on these results and be guided by a trends assessment and roadmaps which provide an extended look at the future of active ageing and ageing well in the information society. This requires co-action between various technology areas and innovative technology approaches. Information and knowledge about mid-/long-term R&D perspectives will be crucial for defining future R&D steps on the way to Ambient Assisted Living.

Through development of a shared vision and RTD roadmaps by main stakeholders, vital needs not just for R&D actors but also for other stakeholder will be served. Public Health Authorities can gain insight in future development affecting their spheres of action, second and third level potential suppliers for AAL applications can realise challenges ahead. Several ongoing and soon to be completed FP7 roadmapping projects – AALIANCE, CAPSIL and SENIOR – have addressed different and complementary perspectives of ICT and ageing.

The AAL Roadmap of the AALIANCE was presented by *Filippo Cavallo*. AALIANCE – The European Ambient Assisted Living Innovation Alliance – is a coordination action funded under the ICT and Ageing theme of the 7th Framework programme. The 2 year project involves 14 members and more than 20 associated partners from industry, research and user organisations. The development of an AAL Roadmap is one of the core tasks of the AALIANCE. The first version of the AALIANCE roadmap was published in August 2009 (available for download on http://www.aaliance.eu/public/documents/aaliance-roadmap/). In the view of the AALIANCE, "Ambient Assisted Living" (AAL) denotes concepts, products and services that interlink and

improve new technologies and social systems, with the aim of enhancing the quality of life for all people in all stages of their lives. AAL could be translated as "intelligent systems of a specific assistance for a better and safer life in the home environment". The AALIANCE roadmap gives a comprehensive overview of the different applications domains and the enabling technologies providing the necessary functions, including scenarios and development projections up to 2025.

The roadmap has been discussed with external experts in an evaluation workshop in September 2009. An updated version of the roadmap is planned for 2010. The next step in the AALIANCE project will focus on identifying and prioritizing the research challenges in the different application domains and technologies in order to develop a strategic research agenda (SRA) as an action plan for innovation and research activities in AAL. In the discussion members of the audience expressed the opinion that in AAL also the user requirement, and not just technological developments (convergence) as to be considered as a development driver. Filippo Cavallo agreed and explained that the roadmap aims to give a comprehensive overview of the technological developments and possibilities. User involvement and user requirements are essential in any R&D efforts, but the roadmap could not tackle them in full detail. It was also appreciated that the AAL roadmap addresses the issue of ageing at work.

Another roadmapping effort is done in the CAPSIL project (International Support of a **C**ommon **A**wareness and Knowledge **P**latform for **S**tudying and Enabling **I**ndependent **L**iving – www.capsil.org). *Ben Knapp* explained that CAPSIL is developing a roadmap and Wiki for EU research to achieve effective and sustainable solutions to independent living based on an in-depth analysis of clinical requirements and the ICT scenarios developed or under development in the EU, as well as the US and Japan. The three fundamental objectives are therefore to develop a consolidated roadmap on ICT for independent living, to gain and share knowledge in this area via a online wiki and to provide policy makers in the EU, the US and Japan with this knowledge in order to coordinate research. Part of the project were exploratory mission to the US and Japan to investigate the current status of AAL technologies in these countries and to meet relevant stakeholders. Very similar to Europe, most activities in the US concentrate on safety and health/wellness technologies. Quietcare and Orcatech are examples of companies already active in the US market. Also serious gaming is becoming more important in the US. In Japan, health and care policies in recent years are moving from cure focus towards prevention and control. A business example is the ANZEN Centre focusing on home alarm services. Service and welfare robotics is highly developed in Japan – several products are already in the market. Analysing the differences in between the EU, US and Japan it shows, that especially in the reimbursement there are large differences in care delivery and economic cost distribution. This offers the opportunity to examine best practices in a foreign context. In terms of technology development the differences between the 3 regions are relatively small. The CAPSIL roadmap and the related wiki currently provides more than 230 pages with information on the status, visions and gaps in ICT for independent living. Starting with the situations older people encounter to the preventive measures and interventions that may be taken, the enabling technologies and issues in the field have been identified in the Wiki. Here common themes like Body sensor networks, Transportation, Home and mobile monitoring and the necessary software emerged. In scenarios typical use cases were described and built the basis for the CAPSIL roadmap. Several gaps were identified in the project. First, a knowledge gap: there is no easy way to collect comprehensive information on the active stakeholders, requirements, research and development results in AAL. The CAPSIL seeks to be an answer to this gap. Furthermore, there is no clear understanding of the relations between the quality of life to be achieved by AAL, the necessary research and innovation activities and the costs to provide the technological solutions (and the cost-savings to be achieved after the IT products and services are in

place). Only future research and larger deployments can provide an answer here. In terms of technological gaps, CAPSIL has identified the following:

A non-technical roadmap approach is undertaken by the SENIOR project, which was presented by *Emilio Mordini.* SENIOR (www.seniorproject.eu) seeks to develop a dialogue roadmap on Social Ethical and privacy Needs in ICT for Older People. SENIOR is a 24 month support action which aims to provide a systematic assessment of the social, ethical, and privacy issues involved in ICT and Ageing, to understand what lessons should be learned from current technological trends, and to plan strategies for governing future trends. A wide range of ethical and privacy issues have been analysed based in interaction with more than 50 experts across Europe. Cross-media analysis examined current understandings of the elderly, the relations between technology & the elderly and the ethical issues involved. In a socio-anthropological workshop current theoretical and empirical approaches towards ICT and ageing were discussed. Disengagement theory argues that, as a natural consequence of ageing, senior citizens wish to withdraw from society and thus become disengaged. Understanding the meaning of age and ageing requires awareness of the social and cultural context in which people age. While senior citizens are not necessarily technophobic, they are critical and selective in their use of computers and the Internet. Access to appropriate training and support is also a prerequisite for successful use. Monitoring technologies in particular raise ethical questions concerning privacy and consent. It is important to reach a balance between the pros and the cons of ICTs for ageing, and this is perhaps best achieved by accommodating the technology to individual needs. Technology alone will not produce truly innovative or desirable services for senior citizens, nor will it ensure that senior citizens have equal access to those services. We need better codes of ethics, standardisation and policies to promote ICT for inclusion. In technology focused working specific technologies and their potential impact on ethical issues were discussed. *Ubiquitous computing* technologies are beginning to become more mainstream, but much of the technology is still in the laboratory or pilot stage. These technologies can be highly effectively in addressing some key issues for the elderly, but their use can raise a number of ethical concerns. The hidden nature of ubiquitous computing solutions can help in overcoming stigmatisation that is often experienced with assistive devices and technologies. However, this same quality can tend to raise issues with informed consent, for example, when visitors enter an environment where ubiquitous computing technology is used. As technology evolves and becomes more broadly available to assist in monitoring the elderly person, there may be a tendency to implement the technology solution, rather than thoroughly understanding the needs of the individual. As ubiquitous technologies collect data through sensors, the individual may be subject to a loss of privacy, and systems need to be designed to ensure an appropriate level of privacy (i.e., that data is shared only with authorised individuals, and data is not stored for use beyond purposes agreed to during informed consent discussions). Effective opt-out capabilities need to be built into those systems. The nature of *ubiquitous communication* systems seriously affects notions of autonomy, privacy, informed consent, and opting-out. If the user has difficultly in understanding the technology, whether because of unfamiliarity with technical issues, or because of cognitive impairment, there is risk to loss of autonomy and agency. Key issues in assessing the potential threats to these areas are based largely in understanding who has access to control the system/devices, who has access to the personal data, how is data retrieved, interpreted and processed, how is data transmitted and to whom, how and where data is stored (both on a temporary and permanent basis), how is authority to access granted, and how informed consent is obtained. The mere existence of a ubiquitous communication system does not guarantee connection or inclusion. *Intelligent user interfaces* can make life easier, rather than to be experienced as a technological burden. Benefits of the use of technology vary considerably depending upon the individual's ability and attitude towards human computer interaction. If an individual does not benefit from the technical solution, non-technical solutions or

other types of support should be readily available. Safeguards are needed to ensure that the technical device does not become a substitute for personal contacts. Where older persons, especially those with hearing or vision impairments or reduced mobility, may be more dependent on systems than other user groups, and for this group, having effective and available service/support organisations is crucial. *Assistive technologies & robotics* raise concerns about autonomous decision making by robots, about systems for human augmentation and the impact of humanoid appearance of robotic devices. These Technologies requiring special attention during development, i.e. in the case of brain-machine interfaces (BMIs) Also of concern are the consequences of replacing carers with robots and the distress that could be caused by the attachment of the older people to humanoid or pet robots. There are also a wide range of risks inherent in *artificial intelligence and adaptive software.* There is a potential of adaptive software solutions to be unpredictable and thus unsafe. There is a risk that technology that is adaptive may be difficult to effectively and thoroughly test. With systems doing advanced decisions making, it could be difficult to protect an individual's autonomy and sense of control. It may also be difficult to provide informed consent for technologies whose behaviours may not be fully predicted. Dependence upon supportive, intelligent systems may give rise to isolation from human carers and result in isolation – that is, technology development could become focused upon replacing humans in the care environment, rather than upon addressing human needs.

In the end, ICT has *huge impacts on dignity and non-discrimination* of older citizens. Nothing so clearly violates the dignity of persons as social exclusion that demeans or humiliates them. Put in positive terms, respect for the intrinsic worth of a person requires a recognition that the person is always entitled to participate in social and community life notwithstanding her age, disability, and health conditions. Article 25 of the EU Charter recognizing fundamental rights for the elderly puts forward the central idea that the elderly have a right "to lead a life of dignity and independence and to participate in social and cultural life". Dignity offers clear guidance about the goals that EU policymaking need to pursue. Older senior citizens are facing the last years of their lives. New technologies may offer a way to extend their lives in a more comfortable, more dignified condition. Yet it should be clear that there are some questions concerning life and death that do not allow for a technical fix. The right to life should never be conceptualised in terms of an obligation to submit to any anti-ageing technology. In Europe, the digital divide is mostly age-related, which is in open contradiction with the principles of equality and non-discrimination that are well established in EU law. According to a consolidated jurisprudence, a difference in treatment constitutes discrimination either when it lacks "objective and reasonable" justification, or when there is no reasonable proportionality between the means employed and the legitimate aim sought to be realised. Fair distribution and inclusiveness in the digital environment are crucial because they are basic good. Universal access to communication and information services must be recognised as a fundamental right of senior citizens. We need to understand how ICT may be developed and evaluated by older people in different cultural contexts and how they can inform technology designers of their needs and preferences. ICT has also an impact on *freedom and autonomy of older citizens.* The bodies of senior citizens are increasingly invaded by micro-technologies, reconstructed as nodes in vast information networks, and controlled through automated responses or network commands. Privacy is at the core of the trade-offs that have to be weighed when evaluating the feasibility of deploying ICT for ageing. In a world where the ability to handle data is rapidly outpacing agreement about how that ability should be used, the standard approach to privacy is difficult to be applied. For instance, the EU principles demand that private information may not be required in return for essential services unless the information is essential for the proper execution of those services, but would it be possible to make such an evaluation in the field of ICT for Ageing? And other questions arise: How can one implement the "Individual participation principle" - which states that

information may not be collected without the explicit informed consent of the individual – in smart environments? Connectivity and data collection is increasingly default and this poses serious ethical and privacy problems to ICT for Ageing because older people may be less technologically skilled and consequently unable to disconnect themselves.

WORKSHOPS

WORKSHOP FOR YOUNG RESEARCHERS AND PHD

Ilse Kryspin-Exner

The "Young Researchers and PhD-Workshop" that took place during the AAL-Forum in the Vienna Hofburg from 30th September to 1st October 2009 was aimed to enhance scientific discussion among young European scientists concerning the variety of projects dealing with technical solutions for the elderly. The main objective was to force dialogue between young scientists originating from different disciplines such as geriatrics, engineering, architecture, informatics, psychology, sociology, nursing sciences, economics, etc. in order to enrich the scientific spectrum and to offer the possibility to create networks for gaining new knowledge as well as mutual support, and furthermore to encourage the participants to initiate future collaborations.

This workshop was especially intended as a kick-off activity for further workshops within the AAL Forum offering a continuous reflection on the topic and providing the opportunity to report ideas and progress in work. The installation of an online discussion platform (http://www.univie.ac.at/aal/), which reaches out beyond the workshop boundaries to appeal to other young researchers within the EU, was another successful step towards integrating Ambient Assisted Living research in a multidisciplinary discourse.

The call for poster presentations was met with great response. 33 Posters were presented with more than 40 young researchers involved. After a "teaser presentation" of the various projects (two slides each within a maximum of 2 minutes) the participants were divided into 3 groups, each supervised by a senior scientist. Wolfgang Zagler & Paul Panek (fortec, Technical University of Vienna), Helmut Hlavacs (Department of Distributed and Multimedia Systems, University of Vienna) and Ilse Kryspin-Exner (Faculty of Psychology, University of Vienna) gave a short introduction of their groups and provided assistance during the free poster session which followed the presentations in the plenum and closed with a plenary discussion and summary.

The first group, which was chaired by Wolfgang Zagler, covered a wide area of research such as the monitoring of daily living activities and multidisciplinary work as a user interface design for elderly persons and carers. The focus was on distributed (e.g. 3D surveillance systems) and wearable approaches (e.g. integrated in shoes) for fall detection and prevention, smart home technology for AAL (using and integrating existing devices and products including approaches for standardisation) and self-adapting intelligent systems for monitoring purposes (e.g. developing software agents).

The representatives of this block had a clear technological background, whereas the young researchers in the second block had scientific origins, AAL & Care, which was supervised by Ilse Kryspin-Exner and constituted a miscellaneous assembly. The projects referred to tele-monitoring solutions for Alzheimer and dementia patients, patient-centred ICT support, patient controllers for deep brain stimulation and Personal Electronic Nursing. The projects of the last block, chaired by Helmut Hlavacs, focussed on social inclusion and enhancement with presentations with regard to,

among others, the improvement of social interaction of the elderly, Ambient Assisted Shared Living, e-mail work flow management of the ageing workforce and mobile phone acceptance by older people.

Due to the lack of time for discussions the organisers decided to provide the young researchers with the possibility to meet the following day to discuss possible concerns, pose further questions and exchange ideas and critique. It was on this occasion that a number of issues were raised among the participants and senior scientists. One of the greatest concerns relating to the organisational aspects of the workshop was the often mentioned lack of time for networking and an in-depth discussion of the matter.

With regard to the content of the poster presentations quite a few questions emerged both during the power point presentation to the plenum and the free poster survey. Some of them pertained to research and development in general and put emphasis on the problem of funding and the time needed for research processes such as the difficulty in finding cooperation partners and cooperating with diverse disciplines, and hence integrating multidisciplinary approaches. Another issue discussed particularly in this heterogeneous group of young scientists originating from different European countries was that of cultural differences which by all means have to be taken into account when conducting research. Furthermore, the emphasis was put on the problem of already existing information technology systems and the question, by whom and whether these are actually used and if, in this case, research in this field should concentrate on the scope of ameliorating already existing technology. Altogether, the attention of almost all discussions among the researchers shifted towards the issue of end-user involvement and linked problems such as assessing the needs, expectations and opinions of the elderly and guaranteeing the compliant behaviour of an end-user towards assistive technology. There were three main focusses concerning usability (can we use the new technologies?), usage of new interfaces (do we want them?) and assistance or unwanted interference.

In future research projects elderly people will be confronted with a plethora of different interfaces, equipment, and devices. The necessary complexity will present a challenge to the users, especially concerning fault management.

The questions arose how 1) to design simple user interfaces that do not require any learning efforts, and 2) to construct fail-safe or self-monitoring and self-repairing systems that do not require interaction with their users, and yet guarantee to deliver a minimum service even when facing failure situations.

Further, smart systems that constantly put their users under surveillance might proactively choose modifications of the living conditions based on system settings and dynamically learned data. In the extreme case, human living conditions might be totally regulated by machines, and by technology assistance turning into human independence.

In conclusion, the creative atmosphere of the “Young Researchers and PhD-Workshop” provided an inspiring outlook for next year’s meeting in Odense and was a unique opportunity to exchange the concerns, problems and hopes within the field of Ambient Assisted Living solutions for the elderly. Its apparent success points clearly towards the need to continue such networking and cooperation and emphasises the desirable goal of allowing this exchange to seize more space and time within the research and development process.

THE WORKSHOP ON BUSINESS MODELS

Urs Guggenbühl[1] and Chris Flim[2]

The AAL programme aims to create innovations in the area of ICT for elderly people. This means that the research and development supported by AAL funds should culminate in a successful product or service for the elderly within a reasonable time. Success is indicated when end users and elderly people respectively use this product happily and are even willing to pay money for it. Thus, it is necessary to look at the market place early on in the project and plan the business side of the product innovation or service innovation. The instrument for this is called a business plan, which usually starts with a business idea which looks at the market potential, defines the typical customer and their requirements, and describes the competition. It looks at the way the innovation can be communicated and defines the optimal price for the innovation, defines the organisation and resources needed to develop and to market the innovation, and designs a business model which puts forward a unique value proposition to the user. The business plan shows the value chain of the innovation and clarifies how it makes money along the chain, points out the potential and risks involved in the future, and calculates exactly the capital required to develop and market the innovation as well as the expected profit and loss statement for the next 5 to 10 years.

For this workshop, we focussed on business models and discussed guidelines which are required to develop business models for AAL solutions. Experience shows that the focus in AAL projects is usually much more on the technical development rather than on the market or the user aspect. However, it is the user who defines the success of the product. A business model looks at the needs of the market and the user respectively and puts forward a value proposition - a unique offer to the customer, a value chain which defines the value of a product at each stage in the chain of development and a process as to how money can be earned, so that the company, which produces and offers the product, can sustain itself.

By paying more attention to business models, the process of thinking about market readiness is stimulated from the beginning. However, a business model is a tool, not an objective in itself. Furthermore, there is no ‘golden standard’ for a business model, but a framework of topics to be addressed for AAL consortia. A business model itself does not guarantee success. Good business models may help to make services successful. Bad ones may cause services to fail.

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[2] CEO, Flim P&C, Utrecht, Netherlands.

Possible practical solutions:

1. The consortia need to ask themselves some specific questions about their business model and explicitly provide argumentation to endorse their answers.

- Who are the target groups? What needs do they have? How can they be addressed?
- How do the products/services fulfill the needs of the target groups?
- Who will pay for the products/services?
- Who will deliver the products/services?
- Analysis of the flow of costs vs. benefits.
- Who will carry out the maintenance of the products/services?
- Who are the stakeholders?
- What are the specific areas of attention with regard to different countries/regions?
- Which partners to choose in order to develop, implement and exploit determined products and services?
- What's in it for all the stakeholders, (Business Case - macro and per stakeholder); separated into medical, economical and social aspects.

2. The AAL JP needs to provide more guidance to both the consortia and evaluators to set up and evaluate a (good) business model.
The consortia should provide good argumentation for their answers. Evaluators should not take the answers for granted, but should be able to judge the proposals on the substance of the arguments. For many people involved, (especially from a R&D background) business models are a new territory through which they should be guided. The way in which both consortia and evaluators are helped to answer and to evaluate the questions is important. The relevant background information should be provided on the AAL website.

3. The key question is who will pay for the actual product/service when it reaches the market?
Although there are differences within European countries, there are similarities as well. It can be useful to provide some background on the key motivations, for example, for elderly people, healthcare insurers and social institutions etc. to pay for AAL services. What's in it for them? At a later stage, it might be an option to go into more detail for the specific AAL member states. The answers to these questions should guide the development process of services.
From the outset as well as for the whole duration of the project, the end users and those who pay should be involved as a matter of common practice. They must be continually asked at different stages in the project, if they are still willing to pay for the AAL product/service which is being developed.
Another aspect that might be useful for the consortia, is a generic overview of the reimbursement systems for health and wellness-related services as per each AAL country e.g. the comment made by Laszlo Meleg on the Hungarian situation

- The health market (including the tele-health and AAL) is not a regular market, at least not in Hungary. Almost the whole market depends on the reimbursement system. And within this irregular market, the patient does not care and usually has no knowledge of the costs. The decisions are not made by the patient. Most of the patients will not or cannot pay for any health service not covered by the reimbursement system. The purchaser (The National Health Insurance Fund) will pay, but it has very little influence on the purchasing and therapeutic decisions. In each case, the physician concerned will decide which device is to be used, but he/she does not care about the costs, as he/she has to choose the "best available treatment" according to the Hippocratic Oath. The suppliers of medical devices are able to sell within this reimbursement system, and, because they want to sell,

they have to convince the physicians to use their specific products. (The situation is very similar to the marketing of drugs, but without a comparably strict pre-market evaluation).

- Actually, the AAL market is similar to the video-recorder market before the VHS-system won, or marketing high-capacity DVD type storage media while blue-ray and the HD-DVD were in competition. Everyone is waiting for a winner. This market can start to grow as soon as compatibility can be assured. One possibility is to wait for a winner, but most probably, from a technical point of view, not the best system will win and the process will just continue. Another possibility is to help this process along by means of an actively developed protocol, which is freely available, and by persuading the main purchasers to necessitate compatibility.
- Competition can be reinforced by creating some freely available data centre software with very basic functionality to initiate the usage of the AAL systems.
- Many AAL systems and many aspects of them can also be used in the field of fitness/wellness which is closer to the regular market. At first, these systems/parts could be launched onto the market which would then also help to increase acceptance by elderly people.

4. Market research: Do we build upon the shoulders of others?
The consortia must do real market research. It is important, for example, that the consortium knows about all other R&D activities on their subject so that they can build on it. To guarantee success, the consortia should list at least three R&D activities on which they could build. Also, a short competitor analysis should be added which lists the products and services available on the market that aim to serve the same needs for elderly people as the planned service or product which the consortia want to develop. Finally, some argumentation should be presented (based on market research) to demonstrate that a market opportunity exists for the proposed AAL service(s).

5. Changing roles of consortia partners
What is the role of all partners during the process from the start of a project to the market launch? These roles will change. Some partners may even leave after a certain period. Some new partners may become involved. Who will be the organisation introducing the service to market? Who will finance the product launch and develop the product further? Who will maintain the service etc? This is a paradigm shift in the way proposals are usually written for European R&D projects. However, this is precisely what AAL is aiming for. It also raises the question as to who the main target group is that the calls want to address. For example, how can the call interest SME's and how can the call make them the frontrunners for the proposal?

6. Change the order of the criteria in the Call
The order of the four criteria should be changed by starting with the end users and their needs, and the proposed service and underlying business model. Answering these questions should cover the main part of the proposal. Then the scientific value and societal relevance can be briefly addressed as providing scientific evidence is difficult anyway. What are you trying to prove and for whom? Is it scientific or medical evidence? Is it social evidence or economic evidence? Whom is one trying to convince? The question cannot be whether or not there is enough scientific evidence but, rather, is there a market for the services and products?

A practical example from the Netherlands put forward by Chris Flim (for more information please contact the Netherlands Ministry of Health or Syntens.)
The Ministry of Health initiated a new programme together with Syntens, a non-profit organisation closely related to the Ministry of Economic Affairs, focussing on innovation through SME's in all market sectors. The project is called "Small-scale living for elderly people with smart housing or personal services". The project uses some of the objectives which are familiar to the AAL selection

criteria such as 50% of their own budget and a number of SME's must be involved, etc. However, the budget (partly earmarked, partly free to spend for specific objectives) is not spent on development, tests or pilot projects. The solution is expected to be close to market and the consortia will receive help in how to prepare for the market and how to scale up. Topics that are to be financially supported focus on economic and organisational questions like the business model, business case, target audiences and their needs plus reimbursement schemes and setting up the consortium to deliver the service (and develop it further). Attention will also be paid to ICT aspects. Open standards and interoperability should be guaranteed and should be decided by the organisations involved and not the suppliers of ICT in order to prevent customer lock in. This approach may not be fit-for-use to AAL as a whole, because no new solutions should be developed, but new services should be brought to market. However, one suggestion that could be implemented for AAL projects is to earmark a specific budget per project to invest in economic and organisational aspects.

It is important that the AAL JP finds ways and means to get the consortia to focus on the business aspects of the AAL solutions. Some ideas on how to do this have been put forward in this summary. It is also very important that we keep up the dialogue within the AAL community and together try to find ways and means to make AAL solutions successful on the market.

ARTICLES

PROGRAMME BENEFIT: PUBLIC FUNDING IN THE THEMATIC AREA OF AAL IN AUSTRIA

Gerda Geyer[1] and Kerstin Zimmermann[2]

The programme benefit is the first Austrian mission-oriented thematic programme in the field of ICT. The programme was set up in 2007 as the national backbone programme for the Austrian participation in the Article 169-Initiative Ambient Assisted Living Joint Programme (AAL JP). The initial phase of the programme was dominated by activities to build up the community and create a common understanding and common knowledge base. The first calls focused on "ICT-based Solutions for the Advancement of Active Ageing".

1. Introduction

The programme benefit is a new mission-oriented R&D programme launched by the Federal Ministry of Transport, Innovation and Technology (Bundesministerium für Verkehr, Innovation und Technologie, BMVIT) in November 2007. The programme was established as an Austrian backbone programme for the participation in the AAL JP. The funding programme was planned and prepared by the BMVIT together with the Austrian Research Promotion Agency (Österreichische Forschungsförderungsgesellschaft, FFG) which is in charge of the programme management.

The funding is based on the directive for research, technology and development (FTE-Richtlinie, BMVIT, BMWA 2007) in accordance with EU laws[3].

2. The Programme benefit – General Aspects

Under the headline "Demographic Change Perceived as a Possibility," the programme fosters research and development activities for ICT-based products and services enhancing the quality of life of older persons. Older adults shall be supported in living autonomously and as long as possible at home. In order to reach this goal, new business models, marketing concepts and value chains shall be stimulated.

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[1] Dr. Gerda Geyer, Austrian Research Promotion Agency, programme manager of programme benefit and National Contact Point for the Austrian participation in the AAL JP.

[2] Dipl. Ing. Kerstin Zimmermann, Federal Ministry of Transport, Innovation and Technology, Scientific Policy Officer for benefit and AAL.

[3] BMVIT, BMWA 2007: Richtlinien zur Förderung der wirtschaftlich-technischen Forschung und Technologieentwicklung.

Further aims of the programme benefit[4] are:

- Improving the competitiveness and networking of Austrian research, economy and social and health care service institutions within the thematic focus of the programme, through cooperation and involving end-users, also in the international context;
- Training highly qualified researchers;
- Improving the usability of developed, innovative ICT based products and services for end-users;
- Improving the acceptance of Ambient Assisted Living.

The programme benefit fosters innovation and application oriented projects in cooperation between enterprises, institutions providing health and social care services as well as end-users (primary, secondary, tertiary end-users) and research organisations.

The *types of funded projects* are:

- Cooperative projects between two or more enterprises or one or more enterprise(s) and one or more research institution(s);
- Stimulation projects (workshops, conferences, studies etc.);
- Human resources projects (scholarships for doctoral students etc.).

The time-to-market perspective of the projects ranges between one and three years.

Stimulation projects and human resources projects can permanently be submitted in the so-called Open Call.

3. Focus on: ICT-based Solutions for Advancement of Active Ageing

When the first call of programme benefit was launched in November 2007, the overall conception of ICT-based solutions for enhancing the quality of life of older adults was mostly associated to health issues. Yet in the initial phase of the programme benefit programme-owner BMVIT and programme-management FFG agreed to focus on "ICT-based Solutions for Advancement of Active Ageing".

The decision was based on the following rationale:

- most older adults enjoy quite a good state of health (the large group of the independent performers, so-called go-goes) and
- are willing to pay for useful and easy-to-handle-products,
- whereas most older adults in Austria who are supported retirees (no-goes) are not able or willing to pay for additional products and services[5].

The decision was also supported by the facts that

- the percentage of ICT-use among older adults is still very low when compared to other age groups and
- older adults who are not digitally literate run a higher risk of feeling and being excluded from society.

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[4] BMVIT 2008: Programm-Dokument benefit.

[5] Innovendo: SOPAAL – Feasibility Study on Socio-economic Parameters to Support a National Implementation of AAL in Austria. Vienna, July 2007.

Similar to the WHO definition of active ageing, the Austrian programme benefit defines *active ageing* as a process enhancing the quality of life of individuals by reaching the maximum access to *participation / social integration, security and health*.

Thematic clusters within that focus are:

- Social inclusion (e.g. including information, creation of networks);
- Activities within and outside the home environment (including tourism, fitness etc.);
- Comfort and security (e.g. including smart homes, measuring vital parameters).

The main target group in terms of primary end-users of products and services to be developed in projects funded by the programme benefit is the large group of older persons in (relatively) good mental and physical health who have a more or less active lifestyle. Focussing on active ageing is deemed to be promising for the programme benefit. Business cases for the mostly self-deciding, active older persons are easier to establish than for other segments of older persons. This should encourage industry to target this new market. It is assumed that people are willing to pay for useful products and services which really meet their needs and enhance their lives.

Thus people can befriend technologies even though they do not need them, but use them for their fun and for comfort reasons. This could prove to be beneficial to persons who face major limitations to their mobility etc.

Meeting real customers' needs, targeting an appropriate market segment as well as the usability and the design of products are important success factors when addressing older persons. In order to increase the project's chances to really meet the needs of the target group, it is highly recommended to integrate end-users in the projects. End-users who act as project partners are usually secondary or tertiary end-users and not the older persons themselves. Older persons are normally not integrated in projects as partners but as persons who support and provide input to a project by giving interviews, making observations and/or testing prototypes.

4. Building up the Community

Before launching the programme benefit, there was already a heterogeneous ICT-related research community in Austria focussing on usability, visual detection and telecommunication. Some of those activities were performed by high potential SMEs. As there was no dedicated funding instrument and the market sector for older adults is regarded to be complicated, activities remained scarce and scattered.

Contrary to the ICT-situation, basic research in the fields of geriatrics and gerontology has quite a long tradition in Austria[6]. In this respect, the potential for interdisciplinary collaboration was promising.

A new target group for the R&D programme were the so-called "Daseinsvorsorger" which according to the rationale of the programme are defined as institutions providing social and health care services to older persons. As those institutions have contact to the primary target group and are aware of many of their needs, they are important potential partners in projects.

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6 Geyer, Gerda: Alternsforschung in Österreich. Entwicklung, Institutionalisierungsgrad, Forschungsförderung. Wien, WUV, 2008.

In order to take pre-exisiting experiences and knowledge into account as well as to endorse networking, programme-management put a focus on community building by designing and organising different kinds of meetings and events. Several "Experts Consultations" were held before launching the first calls. Outcomes of the consultations were integrated in the call documents. Presentations and networking activities related to expert consultations and launch events endorsed the knowledge transfer, new cooperations and new contacts among the (potential) community.

The community was strongly encouraged to submit proposals which aim at holding conferences and workshops as well as human resource projects for giving young researchers the means to investigate relevant topics.

The programme-management also commissioned a study to investigate perceptions of selected "experts from practice" and to identify essential aspects of the context to be considered by the programme benefit. The study aimed at identifying important actor groups and the relevant topics according to their perceptions.[7]

5. Evaluation Criteria and Process

The whole evaluation process is organised, prepared and chaired by the programme-management. Normally, the evaluation process is concluded four to six weeks after the deadline for submission. Typically, each proposal submitted in programme benefit is evaluated independently by at least three national or international experts. After completing the independent evaluation process the evaluators attend a panel meeting. In the panel meeting each proposal is discussed. Finally the evaluators give a common and normally unanimous recommendation for funding or not funding the discussed project.

The programme owner BMVIT is also present at the panel meeting. The outcome of the panel meeting is the ranking list which the evaluators propose to the programme owner. The formal decision on funding projects has to be taken by the Ministry on the basis of the recommendation given by the experts[8].

The evaluation criteria for cooperative projects are as follows:

Quality of the proposed activity

- Technical and scientific quality / innovation
- Technical and scientific challenge, methods and dissemination
- Project management and resources

Relevance of the proposed activity: contribution to the aims of the programme

- Improvement of usability
- End-user involvement
- Ethical aspects
- Inter- and transdisciplinarity

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[7] Institute of Technology Assessment of the Austrian Academy of Sciences: Participatory Approaches for Technology and Autonomous Living. Vienna, May 2008.

[8] Find more information on the evaluation process in the Evaluation Manual (Bewertungshandbuch) on http://www.ffg.at/content.php?cid=747.

- R&D aspects

Suitability of applicants / partners
- Enterprises, social and health care providers (including end-users organisations)
- Research partners
- Consortium & cooperation partners

Economic potential and exploitation
- Market prospects
- Exploitation

Ethical aspects

Each benefit project which is submitted in a fix call will undergo an assessment of ethical aspects during the evaluation process. Ethical aspects include the way end-users are involved in a single project as well as ethical aspects of the project's idea.

Integrating end-users into projects gives rise to very practical ethical issues. Whenever end-users are involved in a benefit project in interviews, observations, and/or testing of prototypes they must be aware of the implications they are signing up for. Transparency is the keyword.

From the third call for proposals, the submission of a draft version of the "informed consent" has become a prerequisite in programme benefit when primary end-users are involved in a project.

6. Funded Projects in Programme benefit

In 2008 and 2009 a total of 66 projects were submitted, 37 of which have been funded. The success rate in the programme benefit is 56%. 16 out of the 37 successful projects are cooperative projects[9]. The total funding budget amounts to about five million euros.

FFG: Funded Projects 2008-2009 in Programme benefit

Call	**Number of funded projects**	**Number of funded Coop. Projects**
Open Call 2008	7	/
Second Call 2008	6	2
Third Call 2008	8	5
Open Call 2009	2	/
Fourth Call 2009	6	5
Fifth Call 2009	8	5
Total Number	**37**	**16**

7. Conclusions and Outlook

The first calls launched in programme benefit showed that the Austrian potential in this thematic area is high. The community seems to be well aware of the necessity of interdisciplinary and

[9] Find a compilation of funded benefit projects on http://www.ffg.at/content.php?cid=1066.

transdisciplinary cooperation. Some projects are very promising for what is regarded to be a quick entrance in the market after the project's end. Others are addressing very interesting aspects with respect to usability and smart home applications.

In the working programme for 2010, programme management focuses on

- continuing to put measures into place for building up the community,
- spreading interdisciplinary and transdisciplinary knowledge among the community,
- consolidating knowledge which has already been gained and
- including an additional thematic cluster within the focus of the call which will be launched in 2010.

THE LIVING SITUATION OF OLDER PEOPLE IN AUSTRIA COMPARED TO OTHER EUROPEAN COUNTRIES

Isabella Buber[1]

Europe's population is becoming older and older and population projections predict that in 2050 about half of the EU-15's population will be aged 50 or above (Scherbov and Mamolo 2006). In view of such an important shift in the composition of the population, analyses on individual life circumstances of the growing group of older persons in Europe are highly relevant. The current paper is based on the "Survey of Health, Ageing and Retirement in Europe" (SHARE), a European dataset that includes accurate cross-national information on economic circumstances, health, well-being, integration into family and social networks. Living conditions of older people in Austria compared to other European Countries are presented, including family status, children and housing. As a financial indicator, the subjective assessment of the economic situation of the household is presented for Austria as well as the other 10 European countries included in SHARE. Another main aspect of ageing is health, focusing here on self perceived health and limitations in the "Activities of Daily Living" (ADL). Finally, different aspects of social participation of the population aged 50 years are presented, like voluntary work or participation in a sport or other kind of club.

In 2008, Austria comprised 8.3 million inhabitants and these can be divided in three general groups: Children and adolescents, the potential labour force and old or retired persons. Traditionally, the cutting ages have been at 15 and 60 years, but ages 20 and 65 are more and more used for dividing populations and calculating dependency ratios. According to this grouping, today 17 % of the Austrian population are aged 65 years and more, 21 % are children or adolescents and 62 % belong to the potential labour force. Projections by Statistics Austria predict that the Austrian population in 2050 will have the following structure: About 28 % will be aged 65 and more, 18 % will be under the age of 20 and only 54 % will belong to the potential labour force. The projected structure of our society and the increasing relative size of older persons will represent a challenge for financing our health and pension system. Moreover, it constitutes a challenge for applied research and industry to develop instruments, tools and products that alleviate every day living of older persons and enables them to age in place.

The structure of a population and its dynamics is determined by fertility, mortality and migration. Only these three factors influence the shape of the age pyramid and the structure of our society. A comparison of France and Italy, two European countries with similar societies but different fertility

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rates reveals that the French society will be much more balanced compared to the Italian population in 2050, if the traditionally high fertility rates in France and the low levels of fertility in Italy pertain for the next decades. Migration is doubtlessly the most uncertain determinant for population dynamics, and also most difficult to forecast. In its projections, Statistics Austria assumes migration to decrease from currently 115.000 persons per year to 100.000 persons in 2020. Migration is determined to a great extent by political decisions and the economic situation within a country as well as by the political and economic circumstances in the countries of origin. The most recent economic development and the political changes after the fall of the iron curtain show that it is more or less impossible to anticipate the future development of migration.

One of the main indicators for mortality – the third determinant for shaping the age structure of a society – is life expectancy. Austria, together with the other Western European countries, has witnessed a steady increase in life expectancy. A boy born today has a high chance to celebrate his 76th birthday, and a girl even her 83rd one. Today, persons aged 60 years, can expect to live on for about 23 more years. The continuation of life expectancy increases throughout the 20th century was unanticipated by demographers and the pace of increase in life expectancy has not slowed down over the last half century. Although with some controversies, there is consensus among demographers that we have little reason to expect a generalised slowdown in the near future. Jim Vaupel, one of the directors of the Max Planck Institute for Demographic Research in Rostock states for Germany: "We should not assume to remain under the 90-year threshold until 2050."

In view of the increasing life expectancy, the question arises if this gain in life expectancy means a longer life in good health or in bad health. An appropriate approach is the concept of "disability-free life expectancy". It is based on self-perceived health and takes into consideration chronic diseases and impairments in activities of daily living, like bathing/showering, dressing, eating or using the toilet. Comparing Austrian health surveys carried out during the last 15 years indicates that the share of time spent in good health increased for men and for women. This can be interpreted as compression of morbidity which goes in line with findings for Germany. The calculations also show a characteristic of the ageing process in Austria: At higher ages, we observe frail women and dead men.

In view of such an important shift in the composition of the population, comparable data on individual life circumstances for the growing group of elderly persons are needed. The "Survey of Health, Ageing and Retirement in Europe" (SHARE) is the first European dataset that includes data on individual life circumstances for the growing group of older persons in Europe. SHARE was created to follow the English Longitudinal Survey of Ageing (ELSA) and the American Health and Retirement Survey (HRS). Understanding ageing and how it affects individuals in the diverse cultural settings of Europe is the main task of SHARE (Börsch-Supan et al. 2005). SHARE is a multidisciplinary enterprise with a strong emphasis on economics, health, and social networks. The data include accurate cross-national information on economic circumstances, health, well-being and integration into family and social networks for the following twelve countries: Austria, Belgium, Denmark, France, Germany, Greece, Israel, Italy, the Netherlands, Spain, Sweden and Switzerland. SHARE is designed as a longitudinal dataset with a biennial survey schedule. The first wave of data collection was carried out between 2004 and 2006, the second wave in 2006/07 and the third in 2008/09. SHARE expanded and the second wave included three new accession countries, namely Ireland, Poland and the Czech Republic.

The current study is based on data of the first wave and covers 27.320 individuals aged 50 years and more in the eleven European SHARE-countries. We do not include Israel in this study. For more

detailed information on results for the Austrian GGS we refer to Buber (2007), Buber et al. (2006). The following country codes are used in the figures: AT=Austria, BE=Belgium, CH=Switzerland, DK=Denmark, ES=Spain, FR=France, GE=Germany, GR=Greece, IT=Italy, NE=Netherlands, SE=Sweden.

The paper focuses on living conditions of older people in Austria and compares them to other European Countries. The SHARE Austrian sample comprises 1.839 men and women aged 50 years and more. For analyzing the partner status, persons living with a partner were considered as one group, irrespective of their marital status, therefore including married and cohabiting couples like widowed and divorced persons who were living with a partner at the time of the interview. Nearly three out of four respondents aged 50 to 59 were living with a partner, this proportion decreased to one out of four among persons aged 80 and more.

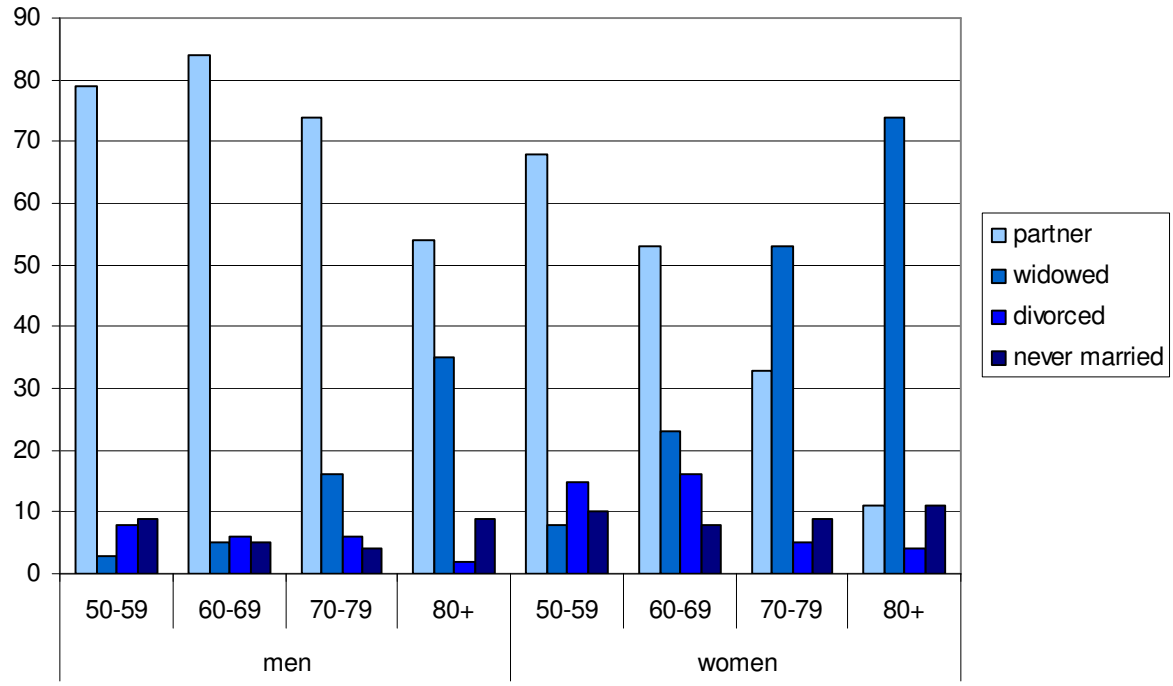

Figure 1: Partner status of older persons in Austria
Source: SHARE 2004 Release 2.0.1, weighted data, authors' own calculations.

The partner status of Austrian elderly shows striking differences by sex (figure 1). Especially at higher ages, i.e. 70 years and above, the percentage of widowed persons is much higher among women as compared to men. In the age group 70 to 79 years, 16% of Austrian men and 53% of Austrian women were widowed (and living without a partner); among the interviewed persons aged 80 and above, 37% of the men and three out of four women were widowed. The main reasons for these findings are women's higher life expectancy and losses during World War II. The gender differences in partner status are observed in all countries included in SHARE.

For older persons, children, proximity to children and relations to children are a crucial aspect. In the SHARE sample, between 10 and 15 per cent of all respondents had no child or stepchild. The availability of kin support largely depends on geographic accessibility and social contact. It is therefore important to have information on these two dimensions of parent-child relations. Regarding geographical proximity, the variation in the number of older persons living sharing the

same household with a child is astonishing (figure 2). In the Mediterranean countries, co-residence and thus daily contacts form the dominant pattern of parent-child relations. In Italy, Greece and Spain, about 50 percent of older persons interviewed in SHARE were living with a child in the same household or building. Co-residence is rare in the northern countries, Austria lies in between. About 30% of the Austrian respondents were co-residing with a child.

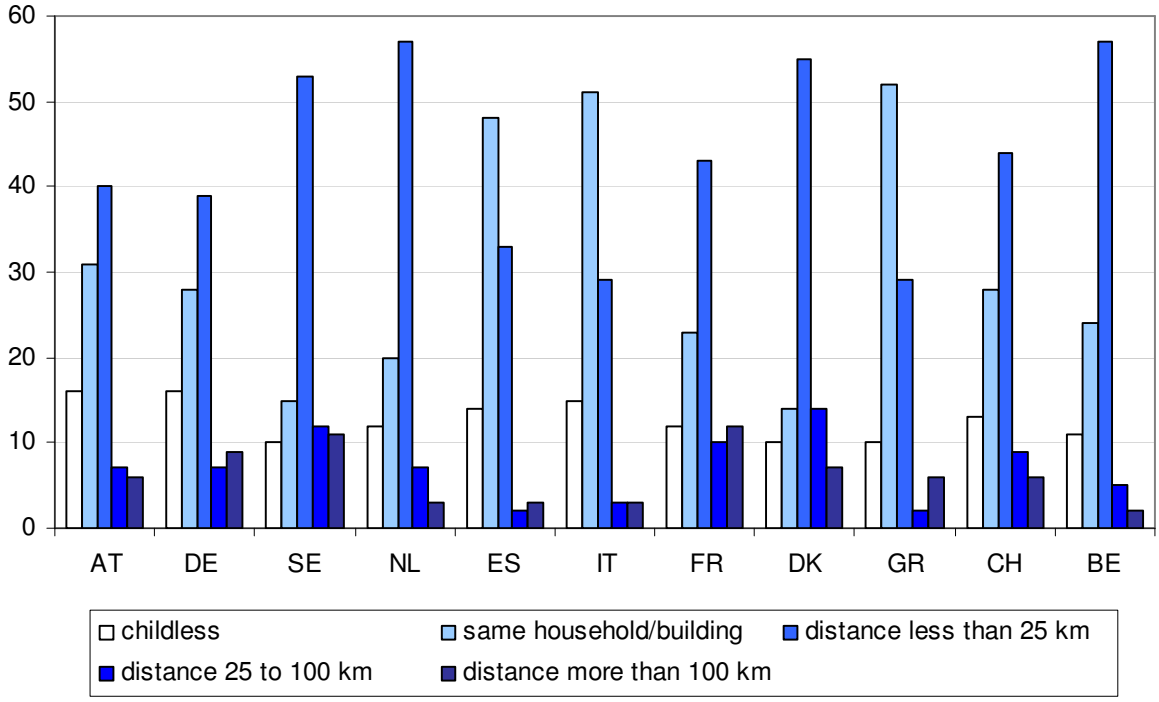

Figure 2: Proximity to children
Source: SHARE 2004 Release 2.0.1, weighted data, authors' own calculations.

The SHARE data confirm, on the one hand, the existence of longstanding regional patters of "weak" and "strong" family ties, while, on the other hand, they reveal many similarities across Europe. In all countries 75% of all parents have at least one child living at a distance of at most 25 km. Moreover, the share of parents with less than weekly contact to a child is equally low (7%).

A further aspect of the living conditions is the ownership of one's dwelling, which is part of the real assets and hence of the wealth of the household. In all countries about 50% or more of the respondents own their dwelling. This percentage is especially high in the southern European countries (over 80% in Spain and Greece, 76% in Italy). Roughly every second Austrian person interviewed in SHARE owned his or her house or apartment. Dwelling owners prevail among the younger age groups. However the differences across age groups are small in southern Europe and large elsewhere, especially in Denmark, Sweden, the Netherlands, Austria, Germany and Switzerland. In Austria, about six out of ten persons aged 50 to 69 years owned their dwelling, compared to 35% among those aged 80 years and more. The regularity might be explained by the fact that older people transfer their houses to their children or sell them and move to live as tenants in smaller dwellings.

Further aspects of housing included in SHARE concerned the size of residences, the number of steps to the entrance, the amount of rent payments, or the ownership of further properties like houses, land or forest. Moreover, individuals were asked for special features that assist persons who

have physical impairments of health problems. In Austria, 6% or respondents aged 50 years and more had any kind of features that assist impaired or ill persons, whereas such tools or products where much more common in Sweden, Denmark and the Netherlands (12-17%). As expected, the availability of these features are associated with age and mostly mentioned among persons aged 80 years and more. Moreover, residential mobility is captured in SHARE with asking for the duration of stay in the present accommodation. It turned out that Austrians and persons in the Mediterranean countries are the least mobile, since there the mean number of years living in the current accommodation are highest for all age groups.

SHARE includes very detailed information on the financial situation, like labour earnings, rent payments, imputed rents received from housing properties or capital income like bonds, stocks or interests from bank accounts. Moreover, respondents were asked about their subjective assessment of the economic situation. Perceived income adequacy is a useful indicator part of one's economic well-being and an especially important indicator for understanding the financial capacities of older people. The self-rated economic status is a robust indicator of financial capacity in older age and can be used by practitioners to gain meaningful information (Litwin and Sapir 2009). Fortunately, Austria is among the country with comparable low levels of financial constraints among older persons. Roughly three out of ten persons aged 50 years and more mention difficulties to make ends meet, compared to 50% to 70% in Greece, Italy and Spain. Although the subjective assessment of the own economic situation is comparable good, it has to be stated that older persons indicating a tight financial situation are a non-negligible group in Austria. Analyses by Litwin and Sapir (2009) suggest that the oldest-old may underestimate financial difficulties, eventually leading to an ever higher proportion of persons aged 80 years and more with financial difficulties.

Certainly, health is one of the main aspects of ageing and the collected accurate information on physical health comprises a broad range of different health measures, like self-reported general health, self-reported diagnosed chronic conditions or medications, symptoms as well as ADL limitations or IADL limitations. Further aspects of health, such as mental health, physical measurements (hand grip strength and gait speed), body mass index (BMI) and health care are also covered in detail.

Self-reports of general health have proved to be useful indicators of an individual's health. Respondents have been asked how they rate their general health on a 5-step scale ranging from "very good" to "very bad". Concentrating on those who rate their health as less than good, between 20% (in Switzerland) and 52% (in Italy) of persons aged 50 years and more perceive their health as less than good (figure 3). Except for France, the findings reflect that men report better health, but have lower life expectancy than women (Case and Paxson 2005). Although self-reported health is an essential indicator, it is a subjective measure and might reflect cultural differences. Although being a subjective measure, and biased to some extent by cultural differences, it has to be stressed that self-assessed health is a valuable indicator for true health. Moreover, the personal component of this measure is valuable, because it not only important how physicians evaluate a person's health, it is also crucial for an individual how healthy she/he feels.

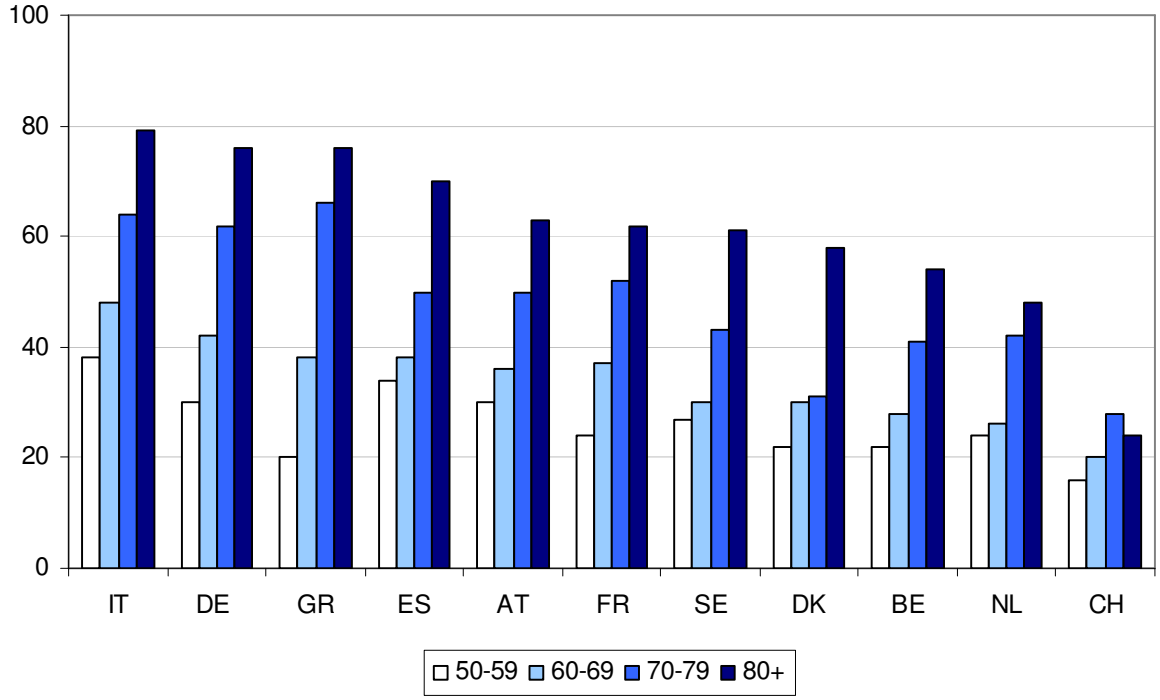

Figure 3: Self perceived health, proportion of persons with "less than good health"
Source: SHARE 2004 Release 2.0.1, weighted data, authors' own calculations.

An important dimension of health refers to limitations regarding the ability to engage in the typical physical activities of daily life, more exactly "Activities of Daily Living" (ADL) — which include dressing, getting in and out of bed, eating, etc. Physical functioning reflects the ability of individuals to perform normally in society and to manage everyday living, and older adults who have difficulty with ADLs often require personal assistance from relatives, friends, or neighbors to carry out these important tasks, or are possible consumers of products enabling to support daily life.

ADL limitations are highest in Belgium, Spain, Italy and France with a level of 13% among persons aged 50 years and more, and - with the exception of France - men claim less often to face limitations than women. Austria is in the group with comparable low levels of such limitations in the interviewed sample. The proportion of people with at least one ADL limitation grows with age: whereas Austrians aged 50 to 69 rarely report ADL limitations (6%), the proportion of those with functional limitations raises to 11% among persons in their seventies and to 29% for interviewed men and women aged 80 years and more.

Finally, different aspects of social participation of the population 50+ are presented, which are included in SHARE and constitute another aspect of living conditions of older persons. Leisure activities and engagement in productive activities require mental effort and are cognitively stimulating and may be important in maintaining cognitive vitality in old age and ageing in place. Activities in retirement might compensate the loss of previous active roles and are an important aspect of social integration. Social involvement and avoidance of social isolation most likely challenge individuals to communicate and participate in exchanges that stimulate cognitive capacities (Berkman et al. 2000) and enhances cognitive functions (Engelhardt et al, forthcoming).

Numerous older Europeans are engaged in a variety of productive activities beyond gainful employment. On average, over the last month preceding the SHARE interview, 11% of Europe's

generation 50+ performed volunteer work, 18% went to a sport, social or other club, 19% provided help to family, friends or neighbours, 5% cared for sick or disabled persons. The share of older persons attending educational or training courses or participation in a political or community organisation are low (5% and 4% respectively).

Participation varies substantially between countries. In general, the largest proportions of active elders are found in the Scandinavian countries, the lowest in the Mediterranean countries. Austria takes a position in between with 9% of older persons reporting volunteer work within the last month, 15% going to a sort, social or other kind of club, 22% participating in a religious organisation and 6% participation in a political organisation.

Table 1: Different types of social involvement by country

	AT	DE	SE	NL	ES	IT	FE	DK	GR	CH	BE	ALL
Voluntary or charity work	9	11	19	22	3	8	15	19	3	16	17	11
Cared for sick or disabled	7	6	8	8	3	3	7	6	5	8	9	5
Help to family, friends, neighbors	23	17	42	31	6	13	27	35	16	22	30	19
Educational or training course	4	6	14	8	2	1	4	11	4	18	10	5
Sport, social or other kind of club	15	26	26	30	7	7	19	32	6	35	22	18
Participation in religious organisation	22	10	6	11	11	5	5	5	37	12	7	9
Participation in political organisation	6	4	5	3	2	2	4	5	5	8	7	4

Source: SHARE 2004 Release 2.0.1, weighted data, authors' own calculations.

Acknowledgements

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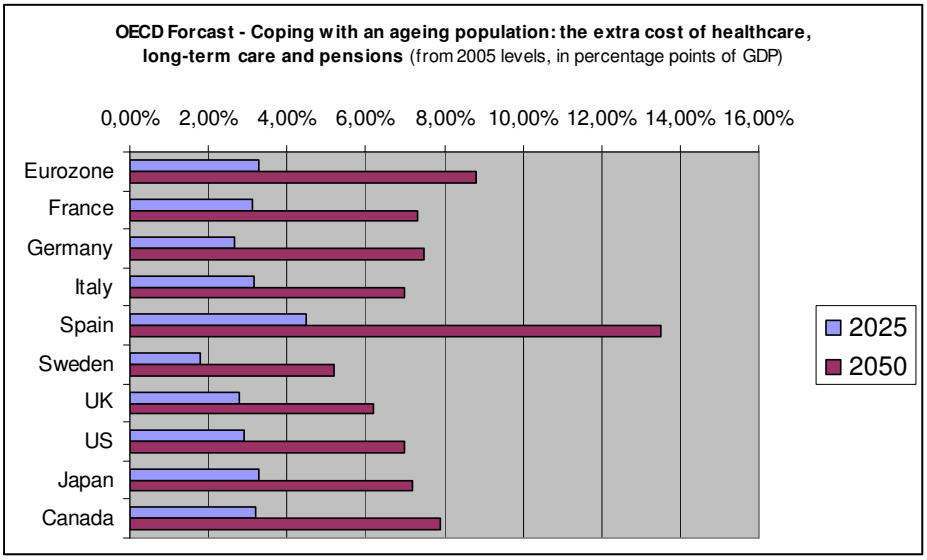
OVERVIEW OF THE EUROPEAN STRATEGY IN ICT FOR AGEING WELL

EU Commission

1. Why is ICT for Ageing Well important?

The number of people over 50 will rise by 35% between 2005 and 2050. The number of people over 85 will triple by 2050. Recent OECD analyses forecast escalating costs as a result of ageing populations in Japan, the US and Europe. As fertility rates are also declining, the ratio between people at work and remaining population will change from 4-1 today to 2-1 by 2050 in average in Europe!

Without a higher level of participation of the elder population in employment, and without better tailored and more effective health and social care services, these trends will put serious pressure on Europe's social models and public finances.



The total number of frail and disabled persons is likely to rise in the future because of Europe's rising ageing population. The OECD predicts for instance, that by 2020, the number of older people living in institutions will have increased by 74% in Japan, 61% in Canada, 33% in the US, 26% in Germany, 29% in France, 27% in Sweden and 18% in the UK. (Source: OECD).

The numbers of disabled people living at home are also set to grow fast. Between 2000 and 2020 they are expected to rise by 74% in Japan, 62% in Canada, 54% in France, 41% in the US and 29% in Sweden (source: Senior Watch study - www.seniorwatch.eu).

Although the older age group is not a homogenous one in terms of education, income, or even the types of disabilities often associated with age, older people as a group are at the greatest risk of being excluded from the benefits of the Information Society. A recent study, for example, found that more than 60% of persons over 50 in Europe feel that their needs are not adequately addressed by current ICT equipment and services.

2. What can Information and Communication Technologies contribute to Ageing Well?

ICT can help elderly individuals to improve their quality of life, stay healthier, live independently for longer, and counteract reduced capabilities which are more prevalent with age. ICT can enable them to remain active at work or in their community.

Independent living is the ability for older people to manage their life styles in their preferred environment, maintaining a high degree of independence and autonomy, enhancing their mobility and quality of life, improving their access to age-friendly ICTs and personalised integrated social and health care services. Ageing well is also about continued active and satisfying participation in social life and work, when ageing.

In addition ICT can help to improve the working conditions for people working in the care sector and as such help to make care work more attractive in the future, where there will be much greater competition for the available workforce.

ICT Solutions address daily and independent living such as:
- Social communication: easy access to phone and video conversation, notably if enabled by broadband to stay in touch with family and friends, overcoming social isolation (in several countries over half of the 65+ are living alone),
- Daily shopping, travel, social life, public services: easy access over the internet to order goods online e.g. when reduced mobility makes physical shopping more difficult,
- Safety (making sure entrance doors and windows are locked/closed when leaving the house or sleeping; checking for water or gas leaks; and turning all but one light off when going to bed, etc),
- Reminders (memory problems tend to be associated to ageing and thus support may be needed in taking medication and fulfilling household tasks),
- User-friendly interfaces (for all sorts of equipment in the home and outside, taking into account that many elderly people have impairments in vision, hearing, mobility or dexterity),
- Telemedicine opens up new opportunities for providing medical care to the home and there are many new developments in ICT-based home care, including ways of monitoring wellbeing and providing a secure home environment,
- Personal health systems include wearable and portable systems for monitoring and diagnosis, therapy, repairing/substitution of functionality and supporting treatment plans for individuals with a chronic disease – (e.g. heart disease and diabetes), complemented by telemonitoring and telecare, thus avoiding hospitalisation,
- Support for people with cognitive problems and their carers to stay at home for longer and remain active for as long as possible, e.g. through cognitive training, reminders, GPS tracking etc.,
- Support for more efficient workflows in care, by integrating health and social care through sharing information, monitoring and follow-up to interventions across different organisational and physical boundaries.

Future developments in many of these areas are underpinned by some key emerging technologies. These include robotics, new materials and biosensors. In addition, the emerging concept of Ambient Intelligence offers great potential, with the possibility for the whole environment (at home, on the move, in the street, whilst driving or during transportation, in public buildings and so on) to have embedded intelligence that helps solving everyday life's needs.

ICT-enhanced equipment, processes and delivery mechanisms can help to increase the quantity, value and quality of services provided to older persons (at equal or lower costs), especially in terms of short and medium-term health and social care, informal carers and personal assistance services.

3. What are the benefits for the elderly users, the society and industry overall?

Policies and initiatives aimed at promoting the conditions and technologies for ageing well in the information society, can achieve a threefold objective:

- Facilitating easy use of information society tools and services for the elderly, inter alia, removing barriers, making ICT tools easier for everyone to use, and encouraging people to make the best of them to enhance their independence in good health, to participate in work, and to be active in society;
- ICT can help to increase the efficiency and quality of social and health care delivery to a growing ageing society, and contribute to the financial sustainability of these services in the future;
- Due to the almost global phenomenon of ageing, innovating ICT products and services in ways to capture the needs of the ageing society gives the European industry, which is leading in this area, a substantial export base in global markets.

4. What is the market potential and benefits related to ICT for ageing well?

- It is estimated that Europeans over 65 possess wealth and revenues of over €3000 billion, thus representing a huge market potential.
- For example, the market for smart homes applications (age-related assistance in shopping, dressing, moving independently) will triple between 2005 and 2020, from 13 million people up to 37 million. This trend will be reinforced by the fact that incidence of disabilities is higher with age. It is estimated that 68 million people in 2005 had several forms of age-related impairment. This will grow to 84 million in 2020.
- Evidence also points out at the fact that ICT can improve the delivery and efficiency of health and social care systems.

Example: it was calculated that the introduction of mobile health monitoring would translate into early patient discharge from hospitals, thus saving up to €1.5 billion p.a. in Germany alone. Up to €1.5 billion/year savings through early patient discharge (Assuming 3 days less hospital stay for 20% of patients, Source: GesundheitScout 24 GmbH & Bayerisches Rotes Kreuz).

Example: Scotland Telecare Development Programme 2007/8 – 2009/10

Based on actual operational savings analysis, these will over the period 2007-2010 be a minimum of:
- 46,500 hospital bed days saved by facilitating speedier hospital discharge;
- 225,000 care home bed days saved by delaying the requirement for people to enter care homes;
- 46,000 nights of sleepover care and 905,000 home check visits saved by substitution of remote monitoring arrangements.

Collectively, these savings are valued at around £43 million - an anticipated benefit to programme funding cost ratio of 5:1.

Example: UK - Department of Health estimates that ICT enabled self-care could potentially reduce GP visits by 40%, outpatient visits by 17%, hospital admissions by 50%, length of hospital stay by 50% and number of days off work by 50%.

5. What are the main challenges in deploying these technologies?

The majority of older people do not yet enjoy the benefits of the digital age - low cost communications and online services that could support some of their real needs - since only 15% use the internet. Severe vision, hearing or dexterity problems, frustrate many older peoples' efforts (21% of the over 50s) to engage in the information society.

The market of ICT for ageing well is still in a nascent phase and does not yet fully ensure the availability and take-up of the necessary ICT-enabled solutions:
- Markets do not sufficiently deliver the necessary ICT-enabled solutions. The reasons include:
o *Barriers to innovation* such as *insufficient awareness* of market opportunities and users' needs, lacking effective public policies to stimulate innovation in the public sector;
o *Unclear business models* for industry due to fragmented reimbursement schemes related to ICT and lacking policies for sustained investments, who pays?
o *Many legal* (e.g. privacy, liability) *and technological barriers* (e.g. interoperability, complexity, costs) remain for ICT to deliver its benefits widely;
o *Fragmentation of innovation efforts*, and high costs of technology development and validation, *insufficient attention* is given to the needs of older users when *designing new technologies* and services; approaches like inclusive design or design-for-all are not yet widespread.

For example:
- Despite the fact that the ageing population will soon constitute a mainstream market, its specific needs are not fully taken into account in the design of ICT products and services that still remain complicated to use and enjoy;
- Even when technology exists and can be effectively used, ICT systems often don't talk to each other – or are difficult to assemble - due to lack of interoperability and standardisation. Therefore, services and solutions become abnormally costly and difficult to use for the ageing society and for people with forms of disabilities;

- In many cases the public policies do not provide sufficient incentives for investments in innovation and efficiency increases, for example by allowing efficiency gains to be reinvested for a period of time. Furthermore there is often a split between health care and social care funding which creates both organisational problems and in some cases result in benefits achieved in a different area, than where the investments takes place.

The EU Action Plan for Ageing Well in the Information Society

In response to these challenges and opportunities, the European Commission has launched an Action Plan for Ageing Well in the Information Society[1] with the following measures:

- *Raising awareness*, and building consensus via stakeholder cooperation and the establishment of a best practice internet portal and European award scheme for smart homes and independent living applications;

Status: A best practice portal has been established at http://www.epractice.eu where a number of ICT & Ageing related cases can already be found. A first set of eInclusion awards have been given in 2008, see http://www.e-inclusionawards.eu/. In addition a multi-stakeholder innovation platform has been set up through the AALIANCE project (http://www.alliance.eu) and two ministerial events were held in Lisbon in 2007 and Vienna in 2008. see: http://ec.europa.eu/information_society/activities/einclusion/events/index_en.htm for more details;

- Overcoming *technical and regulatory barriers* to market development, through market assessments, studies and benchmarking and by facilitating the exchange of best practice between Member States;

Status: A major study was completed in 2008 to provide an overview of the usage of ICT products and services by elderly people, see:
http://ec.europa.eu/information_society/activities/einclusion/docs/swa2finalreport.pdf.
Another study analysing the current market conditions and barriers in 10 representative European countries, the US and Japan is under way, see http://www.ict-ageing.eu/.

- *Accelerating take-up* through, for example, a set of pilot projects under the ICT Policy Support Programme and use of Structural Funds;

Status: 10 large pilot projects related to ICT & ageing are being launched with involvement of more than 30 European regions, for further information see:
http://ec.europa.eu/information_society/activities/einclusion/research/projects/index_en.htm#CIP_projects.
Collaboration has been started with DG Regio to disseminate good practice on ICT & Ageing solutions, e.g. through the annual Regions for Economic Change conferences.

- Boosting *research and innovation* to foster the emergence of innovative, ICT-based products, services and systems for Europe's ageing population. This includes a dedicated action in the 7th Framework Programme and EC support to the new Ambient Assisted Living Joint Research and Innovation programme involving 23 European Countries.

[1] http://ec.europa.eu/information_society/activities/einclusion/policy/ageing/action_plan/index_en.htm.

Status: More than 30 ageing related R&D projects have been launched under Framework Programme 6 and 7 until now, for further information see: http://ec.europa.eu/information_society/activities/einclusion/research/ageing/index_en.htm. The Ambient Assisted Living Joint Programme has started operations and a first batch of 21 projects is under way, see http://www.aal_europe.eu for further information.

Between now and 2013, the EU and Member States, and the private sector will invest more than €1 billion in research and innovation for ageing well: some €600m in the Ambient Assisted Living Joint Programme, an expected €400m in the EU's latest research framework programme and so far more than €50m on large scale pilot projects in the EU's ICT Policy Support Programme.

Future policy framework for ICT & Ageing

The ageing of the population will remain a clear societal challenge but will also offer many opportunities for new ICT products and services. New policies which promote introduction of ICT and innovation in the care sector are emerging at national level, e.g. in United Kingdom[2] and Denmark[3], and also at EU level these policies are now being mainstreamed[4].

The EU action plan on Ageing Well in the Information Society launched in 2007 has been confirmed as highly relevant to support the process but needs to be continued and reinforced. Following the results of the public consultation[5] and consultation[6] of the Member States, the following recommendations for future ICT & Ageing policy directions have emerged:

1. The EU Action Plan on Ageing Well in the Information Society should be continued and extended as a priority;
2. Further efforts should be launched to systematically introduce Open Method of Coordination in the field of ICT and Ageing, including development of useful indicators, systematic collection of statistics, benchmarking and policy learning;
3. Further efforts should be invested in development of socio-economic impact assessment indicators and methodologies at European level, with involvement of Member States, Regions and Industry;
4. The current pilot projects under the ICT Policy Support Programme should be extended to allow for further coverage of regions across Europe and scaling up of pilots towards larger numbers of users to address scalability issues;
5. Further work should be invested in developing public procurement guidelines and shared pre-commercial procurement exercises in collaboration between industry and the demand side;
6. Due to the great potential of new ICT to contribute to the field of Ageing, Research, Development and Innovation efforts should be reinforced. This should build on the successful efforts in the EU Framework Programmes and on the innovative AAL Joint Programme as a central element.

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[2] Large scale system demonstrators (Department of Health/Technology Strategy Board) http://www.dh.gov.uk/en/Healthcare/Longtermconditions/wholesystemdemonstrators/DH_084255.

[3] Danish Initiative on Labour Saving Technologies in the Care Sector, http://www.abtfonden.dk/Om_Fonden/~/media/abtfonden/Informationsmateriale/ABT_general_presentation.ashx.

[4] Commission's 2009 Ageing Communication: "a renewed strategy for tackling Europe's demographic challenge", http://ec.europa.eu/economy_finance/thematic_articles/article14761_en.htm.

[5] See http://ec.europa.eu/information_society/activities/einclusion/survey/index_en.htm.

[6] See http://ec.europa.eu/information_society/activities/einclusion/groups/limassol/index_en.htm.

Ageing Statistics in Europe (Source Eurostat 2008)

Older population

	Percentage aged 65+			Percentage aged 80+			Old age dependency ratio (%)	
	2008	2035	2060	2008	2035	2060	2008	2060
EU27	17.1	25.4	30.0	4.4	7.9	12.1	25.4	53.5
Belgium	17.0	24.2	26.5	4.7	7.4	10.2	25.8	45.8
Bulgaria	17.3	24.7	34.2	3.6	7.1	12.8	25.0	63.5
Czech Republic	14.6	24.1	33.4	3.4	7.9	13.4	20.6	61.4
Denmark	15.6	24.1	25.0	4.1	7.7	10.0	23.6	42.7
Germany	20.1	30.2	32.5	4.7	8.9	13.2	30.3	59.1
Estonia	17.2	22.8	30.7	3.6	6.8	10.7	25.2	55.6
Ireland	11.2	17.6	25.2	2.8	5.0	9.6	16.3	43.6
Greece	18.6	26.3	31.7	4.1	7.9	13.5	27.8	57.1
Spain	16.6	24.8	32.3	4.6	7.2	14.5	24.2	59.1
France[3]	16.5	24.4	25.9	5.0	8.5	10.8	25.3	45.2
Italy	20.1	28.6	32.7	5.5	9.1	14.9	30.5	59.3
Cyprus	12.4	19.0	26.2	2.8	5.3	8.6	17.7	44.5
Latvia	17.3	23.7	34.4	3.6	6.7	11.9	25.0	64.5
Lithuania	15.8	24.3	34.7	3.3	6.4	12.0	23.0	65.7
Luxembourg	14.2	21.3	23.6	3.5	5.8	8.9	20.9	39.1
Hungary	16.2	23.1	31.9	3.7	7.6	12.6	23.5	57.6
Malta	13.8	24.8	32.4	3.2	8.3	11.8	19.8	59.1
Netherlands	14.7	25.9	27.3	3.8	8.0	10.9	21.8	47.2
Austria	17.2	26.1	29.0	4.6	7.2	11.4	25.4	50.6
Poland	13.5	24.2	36.2	3.0	7.7	13.1	19.0	69.0
Portugal	17.4	24.9	30.9	4.2	7.6	12.8	25.9	54.8
Romania	14.9	22.9	35.0	2.8	6.2	13.1	21.3	65.3
Slovenia	16.1	27.4	33.4	3.5	8.4	13.9	23.0	62.2
Slovakia	12.0	23.0	36.1	2.6	6.4	13.2	16.6	68.5
Finland	16.5	26.4	27.8	4.3	9.4	10.8	24.8	49.3
Sweden	17.5	23.6	26.6	5.3	8.1	10.0	26.7	46.7
United Kingdom	16.1	21.9	24.7	4.5	6.7	9.0	24.3	42.1
Norway	14.6	22.6	25.4	4.6	7.1	10.0	22.1	43.9
Switzerland	16.4	25.2	28.0	4.7	7.7	11.1	24.1	48.5

TECHNOLOGY ADOPTION BY OLDER ADULTS: USABILITY PLUS X

Anna Elisabeth Pohlmeyer [1,2] and Lucienne Blessing [2]

Despite the prospect that technology can enable prolonged independent living and active aging, this will only come true if older adults accept the according technology and feel motivated to use it. This paper highlights the importance of user-centered design in the realm of gerontechnology in order to ensure technology adoption. It is being argued that simply addressing usability-related issues is not sufficient to evoke the user's interest and willingness to adopt a system. Aspects from user experience research will be introduced and integrated.

1. Two Trends: Converging or Diverging?

1.1. Technology Explosion in an Aging Society

In Europe, we are currently facing two simultaneous trends in society: a demographic shift towards an aging society and a rapid evolution of technological solutions in everyday surroundings. It is one of the greatest challenges of our times to ensure that older adults will be able to maintain physical, cognitive, and social activities. In addition, elderly should be able to prolong an independent living state (if desired) and should be provided with optimal health care.

At the same time, technology is becoming an integral part of our everyday lives: not only at the workplace but also smart home environments, online banking and shopping, the popularity of social media networks and new communication solutions exemplify the variety of applications. Technological development such as the miniaturization through microprocessors, ubiquitous computing as disappearing technology and sensor-aware environments illustrates the less apparent integration of technology in society.

Both trends combined seem like a plausible future scenario: technology assisting older adults in managing an independent and still active lifestyle.

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1.2. Hopes and Fears

There is great hope that technology has the potential to improve and uphold the quality of life of older adults. Possible contexts for this target group range from the workplace (e.g. telecommute) to home environments (e.g. online shopping, information seeking) and the healthcare sector (e.g. tele-monitoring). Communication with friends and family who live at distant places can be facilitated, enrolment in online education facilities becomes an option, access to information, and compensatory solutions for age-related declines (e.g. reminders) are just some areas where older adults could benefit from the use of technology [6]. However, it should also be noted, that despite growing knowledge regarding age-related demands on interactive systems with respect to usability issues [11] and the existence of general design guidelines [6, 11] this knowledge base is not being applied on a regular basis. As a result, to date, older adults still face sub-optimally designed systems. Many elderly underestimate their competence in the use of technology [16] and show low self-efficacy beliefs and sometimes even computer anxiety [10]. This ultimately leads to a less pronounced integration of technology in their lives then what would seem appropriate given the anticipated benefits [5]. Partly, these attitudes are due to a lack of prior experience [14].

Docampo [9] distinguishes two technology generations based on different types of interfaces people encountered: the electro-mechanical generation (born before 1960) and the software generation (born in 1960 or later). Today's seniors belong to the electro-mechanical generation. For that reason many have different mental models when approaching a digital system. It is less *age* per se than prior experience, competence beliefs, cognitive abilities, and education that determine the openness toward new technologies [5, 10, see also 3].

Taken together, the two trends of an aging society and an increasingly technological environment have the potential to converge in a way that will enable older adults to uphold a lifestyle of high quality. Some consequences could be social connectivity and integration (especially cross-generational), medical support, autonomous living, and access to information and education. However, if the solutions are ill-designed or ill-introduced they will not be accepted and the two trends will literally diverge.

2. User-Centred Design for the Elderly

When designing ICT solutions for an aging society, we must bear the big picture in mind as outlined previously (e.g. demographic change). However, in addition, we must also be aware of the details on the small scale level. Designing for a society means designing for the individuals who in the end make the society. Thus, here, details are of interest considering the smallest, but nonetheless the most crucial entity: the user.

2.1. Impairment-Focused vs. Positive Approach

It is a pity that if designers focus too much on age-related declines they sometimes overlook what kind of skills are still maintained up to very high age. As we age, we do eventually encounter cognitive declines [4] and physical impairments [15]. These developments need to be addressed in system design for older users. However, exclusive problem-oriented approaches will unlikely lead to acceptance by the user (in those cases where the necessity of usage is not indispensible). Systems will not be appreciated if they communicate "disability" to others and if they neglect aspects of product appraisal apart from ergonomics. User-centred design should respect the user with all his or

her weaknesses *and* strengths, needs *and* desires. Such a holistic mind-set is in this case also the humanistic mind-set.

2.2. User Experience

In the past decade, the HCI community has increasingly recognized the power of "positive design" [2, 12]. Human-technology interaction is more than just task-fulfilment within a minimum time frame. In addition to instrumental, pragmatic qualities of a system (e.g., usefulness, usability), users also take so-called non-instrumental, hedonic qualities (e.g. aesthetics) into account when evaluating a system. [13]. The inclusion of both types of product qualities has emerged to the evolving research field of *user experience*.

The impression arises that design for the elderly still equates to an attempt of "easy to handle" and "easy to use" products. Far less attention has been devoted to hedonic attributes. However, these aspects might play a key role in technology adoption. So far, this emphasis on ergonomics (cognitive as well as physical) has not been questioned. Indeed, elderly do have a number of amplified needs due to decreased auditory and visual acuity, for example. Yet, these pragmatic attributes do not necessarily have to be a trade-off with respect to other design aspects, such as the visual appeal, the experienced pleasure, or the identification with a product or brand. It is time to consider all facets of a user experience also when designing for an older target group: physical, cognitive, *and* emotional. Again, this calls for a holistic view of the user.

3. Technology Adoption

A prerequisite of successful enhancement and prolongation of active aging through ICT solutions is the acceptance and adoption of such systems through the user. If this is not given, technological solutions, regardless of their theoretical benefit, will not have an impact.

3.1. Technology Acceptance Model

The most influential model in this field is the Technology Acceptance Model TAM by Davis [7, 8]. It is a regression model that predicts actual system use mainly through the user's perceived usefulness and perceived ease of use of the system. The model has been empirically validated numerous times [1, 20] and is meanwhile well established in the community. However, one should bear in mind that the model is based on findings from the work context and not from consumer electronics and that there have been some substantial technological improvements since 1989. Nowadays, users are not grateful anymore just because they are able to use a system. They expect more. We argue that technology acceptance is influenced by pragmatic/ instrumental as well as by hedonic/ non-instrumental attributes.

3.2. Technology Adoption and Aging: Beyond the Instrumental

Recently, we conducted an ethnographic study [for details see 18, 19]: Younger (20-33 years) and older (65-80 years) participants were asked to state general motivating and de-motivating reasons, respectively, regarding the use of technological, interactive products. Results demonstrated a pronounced diversity of technology acceptance criteria. These surpass mere usability-related aspects and can be better summarized as dimensions of user experience. Following a systematic,

qualitative content analysis as proposed by Mayring [17] 32 different categories of reasons were identified and subsequently collapsed to the following eight main categories:
- usefulness,
- ease of use,
- ergonomics,
- quality,
- aesthetics,
- match user-product (identification),
- emotion,
- costs.

To conclude, instrumental along the lines of non-instrumental qualities seem to be of relevance with respect to technology adoption. As TAM [7, 8] tries to anticipate system use through perceived usefulness and perceived ease of use, the results from the current study demonstrate an extension of the list of influencing factors. Surprisingly, subsequent frequency analysis did not show any age differences across the categories. In other words, older and younger adults seem to have the same criteria upon which they base their decision on, whether or not to engage with an interactive product. Usefulness and usability (ease of use) are just two of many. The variety of desired qualities should be taken into account when designing interactive products - for younger *and* for older adults.

Especially in the realm of Ambient Assisted Living, where privacy issues additionally challenge technology adoption, acceptance is an inevitable prerequisite. ICT solutions should be carefully designed for and introduced to older adults.

4. Conclusions

- The user, in particular the older user, should not be reduced to bits and pieces of disabilities. Instead, a *holistic*, here it would even be appropriate to call it a *humanistic*, approach should be standard.

- People don't want less as they age. They might want different things, but not less. Just as younger adults, older adults demanded instrumental as well as non-instrumental qualities of a technological, interactive system in order to be considered worthwhile adopting.

- Designing for technology adoption includes more than just considering usability-related aspects. In addition to a variety of *needs*, there is a substantial variety of *wants*. Increased attention should be paid to what makes the *x-factor* in the equation of technology adoption = usability + x.

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AMBIENT ASSISTED LIVING: RESOURCES AND BARRIERS

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1. Introduction

Ageing in situ with the support of technology has become a popular research field and has resulted in products from various technology disciplines [3] with different technological impacts [16]. Improving the quality of life of old people is one of the aims most referred to - concerning the implementation of technology in old age. The growing population of older people in industrial countries and changes of family structures, demand affordable solutions in order to encourage the social participation of old people and to satisfy their needs of ageing in situ. Technology can be a significant resource for older people if the users perceive a device or system as being helpful and not stigmatising or too complex. Technology acceptance not only depends on needs and attitudes of older people but also on age, gender, level of education and health, and social and cultural conditions [8]. Contrary to stereotypes, old people are willing to use new technologies but acceptance and use are only achieved if adequate training is provided and if the end-users experience subjective benefit from the technology [14].

Recently, motivational factors in particular awoke interest in research studies. Findings suggest that perceived benefits and costs play a major role and correlate highly with usability [10, 11]. Nevertheless, there is a lack of literature about motivation and needs in old age. Consequently, fundamental research in these concerns in gerontology is required. Related to old age, loss of social contacts and loneliness are discussed with regard to modern technology. On the other hand, it is possible that technology enhances social life and encourages old people in their social participation. Thus, competence in using technology will become extremely relevant for successful ageing and well-being [6]. Older people will be confronted with a wide range of new devices, systems and interfaces in the future. This new complexity demands a high level of cognitive functions, flexibility and the willingness to learn of the end-users.

Identified resources and possible barriers resulting from homes with complex and smart technology are discussed from a psychological point of view below. Firstly, cognitive theories and learning aspects are considered. Furthermore, the importance of social relationships is emphasised by the approach to successful ageing. Finally, ethical aspects are highlighted with regard to a more realistic view of older people and by illustrating the importance of needs and attitudes concerning the use of technology in old age.

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2. Cognitive functions and the importance of training in old age

Besides multi-morbidity and fundamental health changes in old age, cognitive functions begin to decrease with age. Yerkes [17] showed that a decline of cognitive functions was already evident by the age of 30. Although these results have to be interpreted in connection with the selection criteria used during military recruiting in the 1930s, this idea of ageing going hand-in-hand with deficits continued. Ageing is still seen as a physical, psychological and cognitive declension. Since a much more sophisticated view was needed, a different picture of intelligence and cognitive functions was generated and was able to distinguish between *crystallized* and *fluid intelligence*. Whereas the former refers to the knowledge and life experience of a person and takes them into old age, fluid intelligence subsumes measureable cognitive functions such as reasoning, concentration or memory and tends to decline across the lifespan [7]. Nevertheless, cognitive functions such as attention or memory have a certain amount of plasticity and need daily training to inhibit a decline.

Further, it is well known that actions are unlearned if they are no longer exercised. Concerning the scenario of smart homes, this approach is also linked with the theory of learned dependence [1]. The phenomenon of learned dependency was observed in health care settings and family systems. Claims for independency and autonomy as well as resources and competences of older persons are often ignored by caregivers and family members. If assistance and support is provided in situations where a person would be able to cope on his/her own, it becomes redundant for that person to carry out this activity any longer. Due to lack of training, the person will unlearn certain activities in this situation and will lose more and more independence. .

Since studies going beyond pilot testing are not available, it is an unknown variable as to how users would decide with regard to the amount of activities they would be willing to do independently or with technological assistance. For example, some users will experience a robotic vacuum cleaner as very helpful, whereas others regard this part of housekeeping as relevant for their daily routine and a symbol of fitness and autonomy. Eventually, the implementation of ambient-assisted living in the future would possibly influence the discussion of prevention and health promotion strategies since training of cognitive or physical functions would be less implemented in daily life routine.

3. Successful ageing

One of the most contradictory models of successful ageing is the *Activity Theory* by Tartler [15] and the *Disengagement Theory* by Cumming and Henry [5]. Although both theories are already obsolete and replaced by more recent ones, they started a discussion about the influence of social contacts and role functions on well-being in old age. The Theory of Activity proposed that social relationships and role functions are essential for psychosocial well-being in old age. On the other hand, Cumming and Henry argued that old people move towards social isolation. Retreat is seen as a natural process which is necessary in old age. Both the above-mentioned theories have provoked intensive discussions in gerontology. Apart from the contrary point of view, these two theories dealt with the aspect of social relationships and networking. Carstensen [4] strengthens this aspect in her *Theory of Socio-emotional Selectivity* even more by differentiating two main goals of social relationships across the life span: whereas information and knowledge seeking are the main goals of social relationships at a younger age, old people maintain their social relationships for emotional regulation and consequently have fewer but more intensive social contacts. Intimacy becomes more important than a high number of different contacts in order to obtain relevant information.

Not only do theories of ageing deal with social contacts, but also concepts of the quality of life in old age. A World Health Organisation (WHO) working group developed a quality of life module for use with older adults [13]. By interviewing focus groups, six aspects in addition to the main quality of life questionnaire could be found:

1. changes in sensory abilities,
2. autonomy,
3. past, present and future activities,
4. social participation,
5. death and dying,
6. intimacy.

These results emphasise the importance of intensive social contacts and support the theory of Carstensen. Whether ambient-assisted living including information technologies could assist old people in maintaining their social contacts remains unclear since most systems are still on a prototype level and have not been evaluated long-term.

The mostly cited theory of successful ageing is the concept of Baltes and Baltes [2] and their model of *Selective Optimisation and Compensation*. Age-releated changes and losses make it necessary to select certain areas and activities in life in order to make optimisation and compensation possible. The concept postulates that only high effort allows the continuation of certain activities in old age. According to this model, technology could play a significant role in compensating restricted functions and resources. Smart home technology could mainly compensate losses in instrumental activities of living (IADL) such as reminders to take medicine, managing financial affairs or organising meals by contacting delivery services. On the other hand, this support would probably inhibit persons from managing things on their own and eventually from training abilities that are still functioning properly.

4. Ethical considerations

Ambient-assisted living is mostly linked with monitoring and surveillance systems. A balance between security management and 24-hour surveillance without privacy is difficult to achieve. Again, long-term evaluation of such systems is not available to properly discuss user acceptance and the impact on the daily life of older people. Informed consent, well-prepared information about the used technology and its consequences are necessary to allow serious decision-making However, it is not clear which level of monitoring older people are willing to accept if independent living is to be prolonged by monitoring systems.

Further, especially within the context of monitoring, informed consent is a difficult topic with regard to patients with dementia. In order to achieve high compliance, it is necessary for users to be well informed about the technology. Depending on the dementia stage, informed consent cannot be guaranteed and significant others will take decisions. Another aspect concerns the interdependency of quality of life: it is well known that patients take decisions in order to unburden their relatives. For engineers, it is important to integrate ethical aspects in the study design and to be aware of the relationships and dynamics within the social network of the end-users.

Social participation with the help of technology is definitely a benefit but there is a risk of neglecting real social contacts, especially if people have restrictions in mobility. The perception of older people with regard to the quality of virtual communication should be evaluated in order to develop areas in the system which enhance real face-to-face communication. Finally, the needs of

old people always have to be taken into consideration as technological assistance and support will only be accepted and used if old people perceive the technology as being useful. If the use of a technology provides no benefits or creates new problems, it will be rejected [9].

Above all, the most challenging aspect will be to develop individual technological solutions which account for the heterogeneity of the older population: different physical and psychological health status, different needs and interests, different family and social network structures and different biographies.

5. Outlook

Besides all the discussions about theoretical approaches, it is necessary to investigate the attitudes of old people to identify their needs concerning ambient-assisted living. Ethical considerations have to be included in order to guarantee that needs are not only created by engineers and dominated by financial interests but that technology is developed to support and assist in already known needs and problem scenarios. This does not conclude that technology just satisfies the need for fun and entertainment (e.g. games, gadgets) or addresses aesthetical demands.

The above considerations show that an interdisciplinary approach will lead to the most satisfactory technical solutions for older people. The short overview about psychological theories and models which could explain or predict acceptance of ambient-assisted living has certain limitations. From the psychology aspect, simple interventions or guidelines are expected for a better understanding of the use of technology and its acceptance. Indeed, there is a variety of psychological approaches but new questions require new research and ongoing controlled testing alongside the evaluation of existing models, so-called evidence-based research. Although we already know a lot about human behaviour and experience, this knowledge has to be applied to new hypotheses and scenarios. Thus, multidisciplinary research is needed in order to study technology acceptance with the help from different disciplines that can contribute scientific knowledge and methodology [12].

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CompiSternli – KIDS TEACHING ELDERLY PEOPLE

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CompiSternli are children who offer computer and mobile phone courses to elderly people. One child introduces the basics to one elderly person. The course speed is determined by the elderly person. The project has now been running for one year throughout Switzerland.

1. Initial Situation

1.1. Elderly persons

A large number of elderly people have still not yet had the chance to access and use information and communication technologies (ICT). Very few are willing to take the first step, which is perceived as being too large or insurmountable. Many are therefore afraid to have a go and think they will embarrass themselves during the learning process. Many beginner courses require a certain basic level of knowledge. The methodical and didactical adaptation of courses in line with the abilities of the target group are often therefore neglected, which is why many courses do not achieve the desired result – or even exacerbate the defensive attitudes of the participants.

However, children enjoy passing on their knowledge to other people, and elderly people appreciate the patience displayed by children. They receive personal training. The child holding the course guides the elderly person through the world of computers or mobile phones, starting with the very basics. The child knows from its own daily experiences what learning means and what it can effectuate. It displays a great deal of patience, imagination and humour while conveying the subject matter. For elderly people, the relationship to the child is often the most important aspect. The result is that they approach the subject of ICT, which is so foreign to them, in a relaxed and laid-back manner.

Our target audience includes “seniors” as well as persons who wish to catch up and take their first steps into the world of telecommunications (housewives for example).

1.2. Initial situation of the children

New forms of media need to support a wide range of needs and are often blamed by the press for many problems in modern society: children and young people grow lonely, are no longer able to deal with

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one another in a respectable manner; they send SMS, surf the web or chat, instead of playing with the neighbour's children. The precise effects this has on school life and society are well known: it is however something that is difficult to deal with. Schools often react with radical measures: mobile phones are banned. Many parents are unaware of what their children actually get up to on the computer and generally look the other way. This obvious helplessness of us grown-ups with regard to ICT is also a contributory factor. Various different kinds of media surround our children and shape their everyday lives. Children are quick to take up on these, often without a second thought.

Communication between different generations becomes increasingly rare, and mutual understanding therefore disappears. Grandparents often live in a different location to their grandchildren. Children no longer write letters of their own accord, and the older generation does not know how to write e-mails or send SMS. Establishing contact becomes increasingly difficult.

1.3. The basic idea

We think it is important that the participating children take responsibility. They need to learn to stand up for themselves and take responsibility for their actions. When holding lectures, it is important that children are allowed to participate and have their say. Young people should have the opportunity to show what they can do. We want to provide them with the opportunity to increase their self-esteem in a way that is beneficial to them.

We do not use overhead projectors during lessons, and we rarely use ex-cathedra teaching methods. We show that computer and mobile phone courses also have to be appealing with regard to how they are taught and the methods used.

2. Computer Project

2.1. Organisation

The association CompiSternli is looking for people who are willing to expand the project in their own communities/towns. These persons will be responsible for their local projects, and deal with coordination, logistics, PR work and some of the fundraising activities. Ideally, they will train the children themselves. Local schools provide rooms in which to hold the courses.

CompiSternli determines the required standards. Project managers and team leaders are prepared for their activities during an internal training session, and the training courses for the children are completed in accordance with a predefined curriculum. The project managers receive a detailed training plan as well as all the necessary documentation and templates.

2.2. Training courses for the children

The children participate in the project for a whole year, and receive training themselves during the first six months. This is completed in the form of a weekly one-hour training course, during which they will get to know how computers work in a fun and exciting way. However, the roles are changed regularly from the very beginning: the children learn how to pass on the knowledge they have acquired. In doing

so, they may only use verbal communication, not their hands. They are also often required to work in small groups or in pairs. This is done in order to counteract the well-known cliché that using the using the computer is a lonely activity and stunts communication skills.

At the same time, the kids learn the most important rules regarding respectful behaviour and use these during role-playing. They learn how to speak loudly and clearly; they look at the person when speaking to them and are polite and courteous. The children also get to know the course schedule, so that they will be able to work with their "pupils" independently later on.

The courses for the elderly persons always take place in groups. This allows us to maintain responsibility over the children and offer support whenever necessary, in order to ensure no excessive demands are placed on the children.

2.3. Training courses for the elderly persons

The courses for the elderly persons are 7 hours long (one hour per week). The objective is to help the elderly person discover and experience the Internet. The basics are taught first of all: using a mouse and keyboard as well as basic vocabulary. As soon as they are able to control the computer themselves, they start to learn how to navigate the Internet. The more proficient "pupils" also learn how to write and read e-mails. Once they have completed this course, they should feel confident enough to visit a standard computer course. When beginning the course, 50% of the participants had never owned a computer. The other half did have one, however, this was usually a really old one passed down from their daughter or son. It is important for them to own their own computer with all of the usual functions and programmes.

Training the elderly
Source: Marcel Giger, snow-world

2.4. Experiences

The courses offered are greatly appreciated by both the children and the elderly persons. Two aspects, above all, are important for the children: they are allowed to pass on their knowledge and act as a "teacher". And: they are allowed to work with the computer and find out how it works.

For the elderly persons, the low initial requirements of the courses and the contact with the children are important incentives for participation. They appreciate the one-to-one support that is provided by the children in a relaxed and straightforward manner.

The main difficulty faced by the project is finding suitable participants who are willing to assume responsibility for the local activities. The combination of ICT expertise and teaching skills is not easy to find.

It is not always easy to explain something without using your hands

3. Mobile Phone Project

3.1. Organisation

Groups of young people as well as school classes can register to participate in the “Mobile” project. Approximately 6 hours are required to train the children (3 x 2 hours). During the training course they acquire the technical skills and they learn how to deal with elderly persons. Swisscom supports Compisternli and also provides free mobile phones for use during the training courses. The participating groups receive the mobiles in advance, so that the children can use them to practise specific activities. The children are not, however, allowed to use the devices themselves during the courses to demonstrate anything. They have to give their explanations verbally.

3.2. Training courses for the elderly persons

The courses for the elderly persons last approximately one hour. Making a call, saving and retrieving numbers, adjusting the volume: these are the topics conveyed by the children. The older pupils often enjoy using the mobiles a great deal. They ask their young “teachers” to show them how to write “a little letter” (SMS)…

The kids explain how to save a number.

3.3. Experiences

“Daniela explained the functions of the mobile phone excellently. She did this so well, that I am now able to use the different functions of the mobile myself”; the mobile phone training course is greatly appreciated by the elderly people. The intensive support and comfortable learning atmosphere are very important to the elderly persons. One of the young “teachers” really enjoyed “showing the older man how to use the mobile, seeing how much he enjoyed it and the progress he made”.

4. Additional Offers

4.1. Holiday courses

Elderly persons can register for the special holiday weeks in Davos. The children and elderly persons stay in the same hotel. During the mornings, the children provide one-to-one training to the elderly persons on the computer. This is followed by a group training programme in the afternoons. The older pupils therefore have the opportunity to get to grips with the new technologies during the entire week.

4.2. CompiSternli club

CompiSternli kids can become club members. This gives them the opportunity to increase their technology skills and social competencies. The children have shown that they are capable of assuming responsibility. The CompiSternli club was founded in cooperation with Microsoft Switzerland. Microsoft Switzerland will also provide club members with the possibility to participate in regular events (training courses, tours, etc.) as well as access to Microsoft Switzerland.

4.3. CompiSchule Competence Centre

The CompiSternli Competence Centre, the CompiSchule (CompiSchool), is due to be opened in Davos in spring 2010. This will allow CompiSternli to expand its range of offers for elderly persons. The courses are didactically and methodologically geared towards the needs of elderly persons, and personal support plays an important role. Children and young people are used as co-leaders for courses that take place outside of normal school hours. The CompiSchule is developing into a place where children and young people can acquire important competencies, which will be helpful later on during their working lives. They are allowed to take responsibility. The CompiSchule also provides elderly persons with access to the world of new technologies. It provides them with an introduction, and this foundation can then be used to develop and expand their knowledge further.

5. Support

Five foundations [1] have provided financial support in order to ensure the basic range of offers (computer and mobile phone courses) can be provided for the next three years. Swisscom and Microsoft Switzerland also support and promote our project. The project will never be able to support itself financially; we will therefore always be reliant on financial support for the continued existence and further development of the project.

6. Summary

The range of offers is very much appreciated, by the participants as well as outsiders. The project received the “Ritter der Kommunikation” (Knights of Communication) award from the Swiss Federal Office of Communications in 2007. This prize is awarded to projects that provide an important contribution towards the development of an information society for all. CompiSternli triggers what we might call the “Wow” effect. This is extremely helpful, as it can be a real door opener. The system of conveying knowledge using children works, and it is a win-win situation for all those involved. The children and the elderly persons benefit, both from the technical aspects and the social ones.

Henry Ford’s (1863-1947) idea guides us through the project: “Anyone who stops learning is old, whether at twenty or eighty. Anyone who keeps learning stays young. The greatest thing in life is to keep your mind young”.

[1] Avina-Stiftung, Teamco-Foundation, Ernst-Goehner-Stiftung, Stiftung Mercator Schweiz and MBF foundation

THE NEED FOR INTEROPERABILITY AND STANDARDS IN AAL

Ger van den Broek[1]

1. Introduction

Ambient Assisted Living (AAL) is a very broad application domain with the intention to allow persons to live longer independently, taking their chronic diseases, impairments and abilities into account, and give them adequate support while maintaining their privacy and dignity. The AAL domain concentrates on innovative utilisation of ICT, new ways of user interaction or new types of value chains for independent living services.

The idea of Ambient Assisted Living also has links to Ambient Intelligence which refers to electronic environments that are sensitive and responsive to the presence of people. Ambient Intelligence is based on ubiquitous computing and intelligent social user interfaces. Such an environment would ideally consist of many invisible, unobtrusive, distributed devices throughout the environment or incorporated into appliances, furniture or building and that communicate with a variety of services. The environment would be tailored towards the user's needs, could recognize the user, would adapt to the user and the situation and would anticipate the user desires as far as possible without conscious mediation with the user.

2. Needs

The needs can be divided across two categories of users: the person needed support (elder or disabled person) and persons delivering care (informal and professional care givers).

Needs from persons needing support will evolve during time (due to specific episodes like rehabilitation after hospital treatment or degeneration in time) and differ on location (at home, visiting or on the move), and should be offered in an easy to use way. Some of them are:

- A safe environment to live;
- Provision of food while taking dietary requirements into account;
- Contact to friends and family to maintain a social network;
- Stimulation of physical, social and mental activity to keep physical and cognitive abilities;

[1] Philips Research Europe, ger.van.den.broek@philips.com, Member of the AALIANCE project (www.aaliance.eu).

- Healthcare at home to avoid travelling to the hospital, support in rehabilitation, guidance and monitoring of medication intake and integrative care for chronic diseases;
- A integrated planning and calendar system to organise the care at home by care givers;
- Planning and organising transport to go shopping, visiting family and friends and other activities away from home;
- Organising appropriate response when things go wrong.

Some needs from informal care givers like friends and relatives, and professional care givers like home care nurses are:

- Process events such as warnings related to trends requiring analysis and follow-up or alarms requiring acute action in efficient way;
- Support communication and data exchange between multiple care givers, integrative care approach;
- Plan care actions at the homes in efficient way, taking travelling into account;
- Automatic data collection to reduce administrative burden.

3. Diversity of products and services

To cope with these needs AAL solutions need components, products, services from different market segments and offered by a diversity of vendors to work together. Currently those components, products, and services are stand-alone offerings, in the future they should be able to work together or have integrated services built on top of them. Market segments that are relevant at this moment are:

- Home automation and control;
- Household appliances;
- Medical devices;
- Consumer electronics;
- Health information technology;
- Telecommunications.

These all have different standards, different terminology, different products, and address very different markets in terms of price sensitivity, distribution channels, market „players“ etc.

4. The need for collaborative integrated services

An example of a challenge for a future system would be: “Who can design a system that combines fall detector, vital signs, medication monitor, detects an emergency, establishes contact to a service centre via a TV set or phone, switches off a cooker, calls for an ambulance, open the door when it arrives and informs a designated person?”

This example shows the need for collaborative integrated services:

- A fall detection system detects that a person has fallen down;
- Vital signs like blood pressure, heart rate and blood oxygen saturation (SpO2) are measured;
- The medication intakes from the last day are recorded;
- A service centre is contacted and tries to communicate with the person and calls an ambulance;
- Hazardous devices like a cooker are turned off;

- The door is opened when the ambulance arrives;
- A designated person gets phone call (in case of emergency service) about the event and is informed about the hospital where the patient will be taken to.

The example above shows the way of thinking and the opportunities, when we are able to develop collaborative integrated services. However, it will take a lot research and agreements on standards to achieve this.

Interoperability challenges to cover are:
- The diversity of market segments within AAL;
- A multitude of relevant standards and norms;
- Rivalling standards;
- Integration with healthcare IT;
- Product labelling.

5. Interoperability levels

In this context we consider the following levels of interoperability:

Physical or environmental interoperability to ensure that products to fit together and fit into the environments and relates to mechanical fit like connectors, EMC regulations, frequencies related to wireless protocols and the protocols for transmission like IEEE 801.11 and 801.15 families. In this area CENELEC and TAHI play an important role.

Technical or syntactically interoperability refers to a safe and secure transmission of data. The focus of technical interoperability is on the conveyance of data, not on its meaning. Technical interoperability encompasses the transmission and reception of information that can be used by a person but which cannot be further processed into semantic equivalents by software. Despite this also on this level certain computational operations can be performed. Examples are the use of a "check digit" to determine the integrity of a specific unit of transmitted; another example is encryption and decryption to ensure a secure transmission.

Semantic interoperability allows meaningful exchange of data between systems and service so they are able to understand each other's data. To maximize the usefulness of shared information and to apply applications that reason about the data, a higher level of interoperability is required. This is called semantic interoperability which has been defined as the ability of information shared by systems to be understood so that non-numeric data can be processed by the receiving system. Semantic interoperability is a multi-level concept with the degree of semantic interoperability dependent on the level of agreement on data content terminology (ontology's, vocabularies, coding systems) and the content of archetypes, data models and templates used by the sending and receiving systems.

Process interoperability is a concept that has been identified as a requirement for successful system implementation into actual work settings. It deals with methods for the optimal integration of computer systems into actual work settings of humans and includes the following: explicit user role specification, useful, friendly, and efficient human-machine interface and data presentation/flow supports work

setting. In the context of aggregated services it deals with service components of different service and how they complement or depend on each other.

The first two levels are well understood but need agreement on standards and development effort. The last two levels still need a lot of research.

6. Need for standards related to interoperability levels

Standards are considered here in a general, functional sense as "technical specifications". From an institutional perspective one can distinguish four types of standards: official standards which are mandatory to use, voluntary standards, proprietary standards defined by industry, and open standards.

There are also barriers related to the deployment and adoption of standards, some examples are:

- Focus on internal efficiency: An important barrier seems to be that AAL application, product and service providers focus on their own needs; they may find their internal process efficiency more important than commonly used standards to enable an integrated use of their services in a larger context.
- Standards not designed to user needs: It may be that available standards are not sufficiently designed to fulfil user needs.
- Ignorance about standards: system and service providers may not be aware of existing standards.
- Implementation/transition costs: Costs of becoming acquainted with the complex specifications and documentations of standards or the costs of hiring experts may appear to be too high, particularly with regard to sometimes incompatible updates.
- Migration costs: The costs of migrating from proprietary solutions to other applications that support fairly common standards may be too high. For example there may be a need to convert massive amounts of data before new software compliant with standards can be implemented.
- Lack of financial incentive to electronically exchange data with other AAL application and service providers, which would make the benefits of commonly used standards more obvious.
- Lack of certification: When a certification authority for the relevant standards is lacking, potential applicants may lack trust that the standards work properly so that benefits of implementing them outweigh the costs.

The Interoperability working group of the German BMBF/VDE Innovation Partnership on AAL is non-profit working group addressing issues of Interoperability in AAL[2]. The group consists of experts from different domains: Home/building automation, medical IT, household appliances, consumer electronics, network technology, AAL middleware platforms, sensor networks, robotics, cognitive systems, standardization and certification. They have conducted a very detailed study covering the very broad area of AAL in detail. Despite the very large number of standards they have identified they also detected areas for which no standards exist like: Remote Maintenance of AAL Systems, Connecting to Medical Sensors, AAL Terminology, vocabularies, ontology's, AAL Middleware / Service Execution Environment, Emergency Calls and Connection to Call Centres.

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2 The group will publish (in German) their findings in two books on "Interoperability of AAL System Components" Part 1: State of the Art (Autumn 2009) and Part 2: Roadmap (Spring 2010). It would be a great benefit if something similar would be available in English.

7. Beyond standards

Except the development and agreement upon standards there is more to do. The Continua Health Alliance has selected three domains (aging independently, chronic disease management and health & wellness) where they want to establish an eco-system of interoperable personal health systems that empower people and organisations to better manage their health and wellness. To achieve this they want to:

- Empower individuals and patients to better manage their health by providing them with information regarding their fitness and health through personal medical devices and services.
- Allow relatives and professional care givers to more accurately monitor and coach chronic disease patients and elderly individuals living independently.
- Enable medical and fitness device manufacturers to rapidly develop interoperable devices and services using industry developed connectivity standards.
- Enable health care providers to offer better quality care through personalized health solutions assembled from a rich marketplace of interoperable health care devices and services.

Considering the CONTINUA association's scope this can be considered as a subset of the scope for AAL and they want to tackle the problem by:

- Developing design guidelines (based on existing standards) that will enable vendors to build interoperable sensors, home networks, tele-health platforms, and health and wellness services.
- Establishing a product certification program with a consumer-recognizable logo signifying the promise of interoperability across certified products.
- Collaborating with government regulatory agencies to provide methods for safe and effective management of diverse vendor solutions.
- Working with leaders in the health care industries to develop new ways to address the costs of providing personal tele-health systems.

It should be noted however that the area on independent living is still much oriented to health related topics (safety and assistive related topics are still lacking) like: Assistance with daily health and monitoring tasks, Medical reminders, Activity prompts, Monitoring and early warning using bio-sensor data collection, Automated dietician, Emergency response, Real-time alerts and communication.

8. Next steps

To improve interoperability of AAL components, products and services a number of steps should be taken:

- Increase the knowledge about existing standards, translating the book from BMBF/VDE Innovation Partnership on AAL in to English or even better make it available as a searchable database which is also maintained.
- It might be a challenge to have a comparable approach to CONTINUA for other segments within the AAL scope. The development guidelines and the testing and certification activity would be of great value.
- At the moment CONTINUA concentrates mainly on the syntactical interoperability, except for using some standards for the exchange of health data. To achieve our goals we have to proceed to the

semantic and process levels as well and extend beyond the health domain to include the other market segments involved in AAL.

- Stimulate research to develop standards for the AAL context in the semantic and process interoperability levels.

Taking these steps will allow device suppliers and service providers to implement collaborative interoperable systems, comparable to the example above, offering large added value to the users of AAL systems. The increased efficiency will help to manage the issues of cost control and shortage of staff in an aging society as well to improve quality of live for the people needing support and care.

PROJECTIONS OF FUTURE LONG-TERM CARE EXPENDITURE IN AUSTRIA (2008-2030) WITH SPECIAL CONSIDERATION OF ASSISTIVE TECHNOLOGIES

Clemens Buchinger and Ulrike Schneider

This article presents findings from cost projections for long-term care (LTC) in Austria based on a macrosimulation model, spanning the years 2008 to 2030. Most importantly, we deliver first-time estimates for the cost-saving potential of assistive technologies (AT) in home care. Previous international studies reveal that AT's potential to substitute or supplement personal care is highly task-specific and also depends on the characteristics of the specific devices. Accordingly, findings on the economic benefit of AT are mixed. There is some promise but no clear evidence that AT will be both efficient and cost-effective.

The macrosimulation model developed to project future long-term care expenditure in Austria is based on a number of assumptions and delivers cost estimates for differing scenarios. Depending on our assumptions regarding the health status of future generations of older people, the supply of informal care and the unit costs of care, we project LTC costs in Austria will increase by 70% between 2008 and 2030 in the lower bound scenario and by 240% in the upper bound scenario. In order to explore the cost-saving potential of AAL technologies we assume that one in three older beneficiaries of the public long-term care allowance – who live in private households and need between 30 to 40 hours of care per week – will be equipped with a telemonitoring system. We also assume that this system reduces the individual demand for outpatient care by two hours per week. This would moderate the increase in costs of LTC services until 2030 by 6.1 percentage points to the effect of a € 231 million in total savings over the period 2008 to 2030. On average, the product would pay off after 3.8 years on average.

1. Challenges of Population Ageing

The marked and continuous increase in life expectancy is a major driving force of population aging in all industrialized countries. At the same time, recent evidence for Europe from the Lancet study (see Jagger/Gillies et al. [7]) shows that a significant part of the remaining years from the age of 50 onwards are likely to be troubled by health problems and functional limitations. These developments raise questions about the sustainability of pension, health and long-term care (LTC) systems in the EU and other OECD countries. Projections of costs and revenues related to population aging are an important prerequisite for answering such questions.

In addition to other variables that influence the aggregated costs of LTC services – such as demographic changes, the prevalence of being dependent or the regional availability of these services – technological progress seems to be an important issue concerning the development of LTC costs. Following the arguments of Pickard [12] and Mühlberger [11], a shortage of formal and informal care providers will occur in future decades. Thus an evaluation of the economic effects gained through the implementation of AAL products, especially regarding their capability to substitute or complement personal care, appears essential.

Against this backdrop, the aim of this article is to estimate the present and future costs of LTC in Austria until 2030, based on a disaggregated macrosimulation model using different scenarios. Furthermore, this investigation evaluates the monetary effects of implementing AAL technologies into care settings. The discussion is structured as follows: Section two describes the Austrian context of long-term care and summarizes previous studies of AT and their usage in LTC settings. Section three describes the projection model, the methods employed and outlines the assumptions and differing scenarios. The last section presents the results of the projections, including the key finding on the cost saving potential of AT in long-term care.

2. Long-term Care and AAL-Technologies in Austria

2.1 Long-term Care in Austria

In Austria, long-term care is still considered a primary responsibility of families. About 80% of older dependent persons receive help from family members or their extended social network (see Klimont/Kytir et al. [8]). In the majority of cases, the care arrangements do not even involve any care professional or support service. However, the country has taken major steps in offering public support to persons in need of long-term care and their families (Federal Ministry of Social Affairs and Consumer Protection [5]):

In 1993 a law was passed which introduced a universal tax-funded care allowance system. This system grants universal (non-means tested) benefits to persons who need at least 50 hours of care per month. Benefits are scale-graded, starting with a monthly allowance of € 154 for the lowest level of care need and reaching about € 1.655 for those in the highest (seventh) category of need. Those in need of round-the-clock care and living in private households are eligible for a further benefit, which was introduced in 2008 in order deal with the growing number of illegal care workers in the country. This benefit amounts to € 550 to € 1.100 per month. In addition to care allowances, long-term care policies also concern access to professional long-term care services, quality-of-care regulation and information and referral services.

Responsibilities of public authorities for long-term care have been established on the federal and provincial level. Most importantly, the nine provinces are in charge of securing access to long-term care services, which is achieved in a variety of ways, including government aids to nursing homes or contracts with providers of home care services (see Trukeschitz/Buchinger [13]). The cost projection for long-term care in Austria presented in section five accounts for this political context. A major part

of the data for the projection has been collected on the provincial level. Also, we conducted separate projections for each Austrian province, and finally collated these to obtain results for the entire country.

2.2 National and international evidence from the implementation of AT into LTC

Regarding the implementation and usage of new technologies in long-term care settings, a number of interesting aspects can be identified in the relevant literature. One of these is the analysis of the effectiveness of AT and their capability to substitute personal care. Mann et al. [10] separated 104 home-based frail elderly persons from New York into a treatment group which had access to AT, and a control group which received only usual care services. Based on bivariate analysis he finds no significant differences in the overall total costs, while the decline in the functional status was greater for control group participants.

Agree/Freedman [1] used data from 10,028 disabled persons aged 65 and over to study the use of personal care in conjunction with technical equipment. They show that the capacity of equipment to substitute or supplement personal care is highly task-specific and depends on the characteristics of the devices. Furthermore their results suggest that simple technologies substitute personal care, whilst complex technologies supplement it. Based on the information of a literature survey, Blaschke et al. [3] divided the new technologies of care into Assistive Technologies (AT) and Information and Communication Technologies (ICT). Summarizing findings from empirical studies they conclude that there is some potential, but no clear evidence that AT will be both efficient and cost-effective.

The costs of implementing different forms of AT into varying types of properties and their ability to amortize was analyzed by Lansley et al. [9]. To this end 8 disability profiles and 3 care settings (including the necessary adaptations) were defined, combined and observed over a period of ten years. This study finds that adaptations and AT can be cost efficient for many older disabled people and that the pay-back periods vary around 2.5 years from the date of investment. Based on the data of 2,638 frail elderly people, Hoenig et al. [6] examined whether the use of AT is associated with fewer hours of help from caregivers. According to the results of bivariate analyses and multivariate regressions, dependent people without this equipment reported about 4 more hours of help per week than people using AT.

Using qualitative analysis, additional quantitative data and secondary research, Waibel [14] analyzed the Austrian socio-economic framework for AAL technologies for elderly people. He shows that while a variety of AAL technology-based products are available, their diffusion remains limited. Legal and bureaucratic complexities of R&D funding, expectations that health and care services have to be free of charge and other factors obstruct the successful implementation of these technologies. Bechtold et al. [2] studied requirements for successful R&D of ATs in Austria. They identify the lack of coordination between many involved agencies and an overly theory-driven R&D as the primary challenges and propose to agree on common key terms and concepts, and to rely on problem-oriented approaches in order to overcome these problems.

3. Model, Methods, Data and Scenarios

In order to project the full costs of long-term care to elderly dependent persons for Austria up to the year 2030, we developed a dynamic macrosimulation model, which follows the UK Personal Social Services Research Unit's LTC projection model (see Comas-Herrera/Costa-Font et al. [4]). Following the Austrian legal framework, our model is disaggregated to the level of the nine provinces.

The projection required three steps: Firstly, the number of elderly people over 65 years in need of long-term care had to be projected, accounting for demographic trends, the household context of older people and the age-specific prevalence of long-term care dependency. Secondly, we explored regional differences and future trends in the provision and unit costs of long term care services. Finally, supply and demand had to be combined and the full costs of long-term care had to be calculated and projected as the sum of nine individual evaluations.

As a data basis in the quantitative analyses we use various statistics from the National Statistic Agency (e.g. population forecast, micro census) and recipient statistics for the care allowance (*Bundespflegegeld*) provided by the Association of Austrian Social Insurance Providers (*Hauptverband der österreichischen Sozialversicherungsträger*). In order to identify and forecast trends in data we primarily employed time series methods, such as Double Exponential Smoothing. Qualitative data has been collected via 13 expert interviews, which focused on the regional provision of LTC services as well as on the development and implementation of AAL products in Austria. Supplementary information relating to new technologies was gathered at the 1st AAL Forum in Vienna in October 2009. This information underlies our assumptions regarding the future supply of LTC services on the provincial level and the implementation of new technologies.

For the purpose of analyzing the variation and sensitivity of projected LTC expenses vis-à-vis key underlying assumptions we constructed three scenarios (summarized in table 1), which combine different assumptions concerning morbidity, the rise in unit cost and the development of informal care[1].

Table 1: **Scenarios and assumptions**

	worst case scenario	**baseline scenario**	**best case scenario**
Morbidity (gains in life expectancy: delay in onset of dependency)	2 years : 1 year Expansion of morbidity	1 year : 1 year	0.75 years : 1 year Compression of morbidity
unit cost rise	2.5 % p. a.	2% p. a.	1.5% p. a.
informal care	+20% in residential care	no change	-20% in residential care

Source: own illustration

The aim of the baseline scenario was to project the monetary dimension of LTC assuming that past trends would continue in the future and no exogenous shocks would occur. Thus we fixed the increase in unit costs at 2% p.a., assured that gains in life expectancy and the delay in the onset of disability

[1] Care provided by non-professionals, such as the children or spouse of the frail elderly person

developed in step with each other and excluded changes in the provision of informal care. The worst case scenario assumes a 2.5% increase in unit costs, an expansion of morbidity and a rise in the number of persons in residential care by 20%. The increase in morbidity is expressed by delays in the onset of dependency by just one year after a two-year increase in life expectancy. Contrarily, the best-case scenario assumes a compression of morbidity, a lower growth in unit costs and a decrease in residential care of 20%.

An additional AAL scenario serves to explore the monetary effects of AAL technologies in LTC. This scenario starts from the assumptions of the baseline scenario and focuses on older persons with dependency level three (equivalent to 30 to 40 hours of care needed per week), living in private households and receiving outpatient care as AAL potential users. Although it would also be possible to take residential care into account, our interviews with experts revealed that these institutions are already well equipped and technological progress takes place continuously through the replacement of older devices. Since the costs of this process are covered by higher daily rates or building subsidies, and as there appears to be no significant gap in the implementation of new technologies, we did not consider residential care in our AAL scenario.

Among the different possibilities to implement new technologies, an age-based adaption of private homes, including a telemonitoring video system that allows the supervision of vital or household parameters and supporting older people performing certain daily activities such as shopping has been chosen. Against the background of low acceptance of AAL-based products among potential users we assume that only a third of households sheltering a dependent older person with dependency level three adopt (new) AAL products. In the year 2008 this would mean that 13,727 persons would receive such a system. The costs of this type of AAL adaption were quantified with
€ 10.000 and running costs of € 40 per month, the expected time span for the use of the device was taken to be 8 years. In the absence of empirical data it is assumed that this adaption reduces the need for professional mobile care services by two hours per week. Compared to the results of Hoenig et al. [6] which imply a reduction of 4 hours care per week following the use of AAL based products this seems to be a conservative assumption.

4. Results and Conclusions

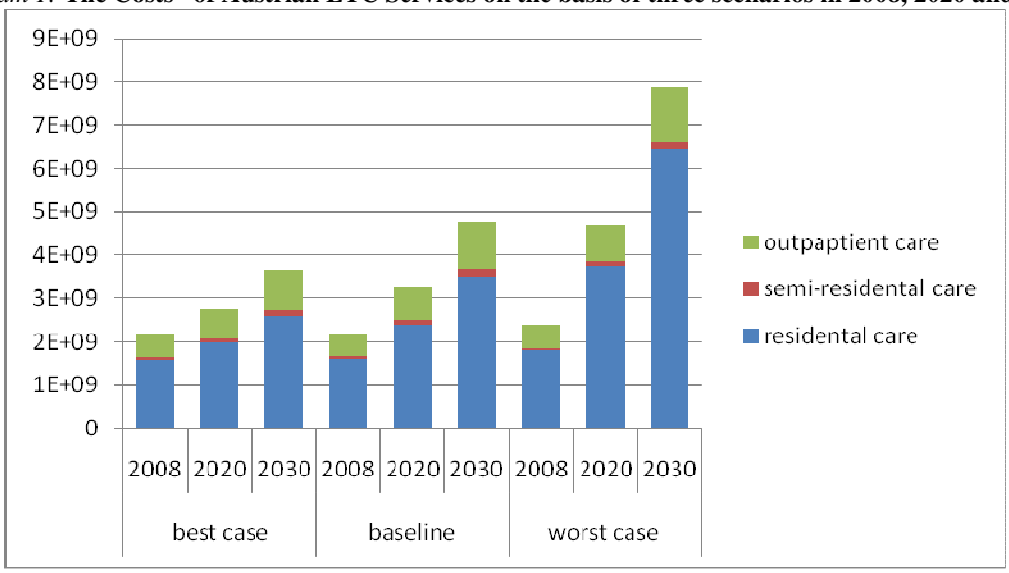
The projection of elderly dependent persons in Austria, which built the first step of our cost projections, yields an increase between 21.2% (best case), 43.3% in the baseline scenario and 53.9% (worst case) up to the year 2030. In absolute values the macrosimulation suggests that the number of elderly dependent persons in Austria will rise from 297.330 in the year 2008 to 377.196 (best case), 426.053 (baseline) and 457,567 (worst case) in 2030. Considerable variations can be observed on the regional level. In the baseline scenario the model estimates the highest growth rates in Vorarlberg (99.7%), Salzburg (91.8%) and Upper Austria (63.1%), while the increase in the number of older persons in need of care is lowest in Carinthia (15.6%), Vienna (38%) and Burgenland (44.5%).

The second step of our LTC cost projection comprised the analysis of present and future provision of LTC services on the provincial level. In the base year 2008, service use was highest in Vorarlberg where 88.5% of the dependent older people were supported, followed by Upper Austria (64.87%) and Vienna (62.19%). Burgenland (28.2%), Lower Austria (35.45%) and Styria (36.21%) display the

smallest shares of LTC service users among their older dependent populations. The projection for the year 2030 is based on development plans and appraisements from local authorities as expressed in 10 expert interviews. The highest increase of supply and use of LTC services between 2008 and 2030 is projected for Carinthia (+39.1%), Styria (+20.1%) and Vienna (+17.9%), whereas the share of service users will decrease slightly in Salzburg (-0.8%). In 2030 supply and use of LTC services will again be highest in Vorarlberg, followed by Upper Austria (74.11%) and Vienna (73.29%), while the lowest proportions can be observed in Burgenland (31.95%), Lower Austria (37.30%) and Styria (43.80%).

Finally our model yields an increase in the Austrian full costs of LTC services (see diagram 1) of 122.9% from 2008 to 2030 in the baseline scenario. The increase will be 69.53% in the best case scenario and 240.8% in the worst case scenario. In absolute values, the costs will increase from approximately € 2,100 million in the year 2008 to € 3,643 million under best case scenario, € 4,876 million under the baseline scenario and € 7,881 million under the worst case scenario.

Diagram 1: **The Costs[2] of Austrian LTC Services on the basis of three scenarios in 2008, 2020 and 2030**



Source: own illustration and calculation

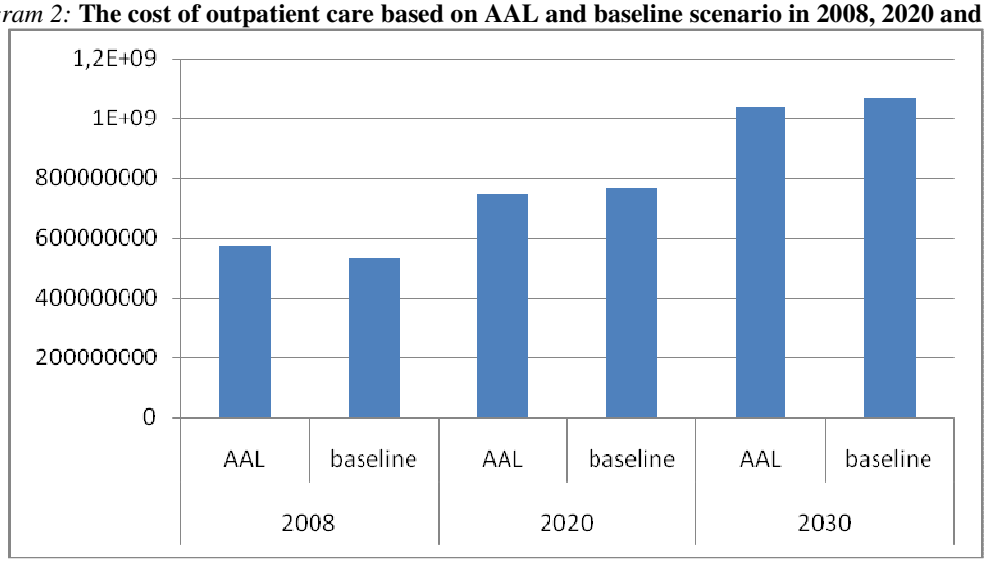
Diagram 1 also shows that the largest part of the full costs can be attributed to residential care, which varies between 70.7% (best case) and 81.6% (worst case) in the year 2030. The share of outpatient care comprises between 15.9% (worst case) and 25.1% (best case), while semi-residential care accounts for the remaining approximate 2.5% (worst case) and 4.2% (best case). Furthermore the model suggests average annual building costs of € 10 million (best case), € 108 million (base case) and € 324 million (worst case) in residential care and € 6.9 million (best case), € 2.5 million (baseline) and € 3.1 (worst case) million in semi-residential care.

Our AAL scenario results in an increase of long-term care costs by 116.8%, which implies that the implementation of AAL technologies into households of elderly dependent persons would moderate the cost increase by 6.1 percentage points. Diagram 2 displays the difference between the costs of

[2] Costs are defined as full costs comprising running and building costs.

outpatient care according to the AAL and the baseline scenarios over the projection period. In the base year the implementation costs lead to an increase of 8.8% higher costs for outpatient care in the AAL scenario compared to the baseline scenario. By reason of a lower demand for outpatient care of AAL equipped households this costs decrease slightly over time in the AAL scenario. Comparing the results from the baseline scenario with the cost projection resulting from our AAL scenario, the implementation of such products would thus reduce the total costs over the years 2008 to 2030 by at least € 231 million. On average, the required investment would amortize itself after 3.8 years.

Diagram 2: **The cost of outpatient care based on AAL and baseline scenario in 2008, 2020 and 2030**



Source: own illustration and calculation

In conclusion we can say that an implementation of AAL technologies into the households of frail elderly people might be one opportunity to limit the increase of future LTC costs. At the same time, we consider it important to stress that our assumptions are rather conservative and that a reduction in the demand of formal care services is only one possible economic effect of AAL technologies in long-term care. Larger effects might result if other positive effects of AAL technologies – such as the prevention of accidents or a delay in the use of residential care – would be taken into account. Unfortunately, empirical evidence in this field of research is still in short supply and most studies are partly representative at best.

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ACTIVE AGEING IN THE COMMUNITY – AAL AND MOBILITY[1]

AALIANCE Project

Social participation decreases with age, fundamentally because of three factors: intrapersonal, interpersonal and structural factors.

The first category includes all personal factors, attitudes and other variables that are inherent to the individual person and make the participation in, and enjoyment of, leisure activities more difficult. Such factors include health, financial circumstances, individual aspirations or disillusionment for life.

The second group includes all circumstances derived from contact with family, friends, neighbourhoods that frame the practice of leisure activities. Examples of such circumstances are the loss of loved ones, distance from children or the fact that an elderly person often cannot find someone to share an activity with.

The third group represents external or environmental factors that influence leisure activities.

Any activities aimed at minimizing any of these factors will promote the social interaction of elderly within their community.

Despite all these factors, participation levels can be significantly increased with adequate *motivation and support*. Thus, elderly people can be supported in finding and carrying out work, establishing and maintaining contacts with other people, and, in general, can be helped to spend time participating in different leisure activities.

Promotion of social participation of elderly people can be undertaken in many ways. First of all, *communication* services should provide new and easy-to-use facilities so as to help seniors enhance their social relationships. This is a way of raising self-esteem and increasing the sense of control and autonomy. A second way is that the elderly should be provided with necessary *information* about leisure activities that are adapted to the needs of the person and able to attract his or her attention and create interest. This can include outdoor activities and volunteering activities. Finally, *mobility* is essential for general independence and to ensure good health and quality of life.

1. Going outdoors with AAL

Mobility is essential for general independence and ensuring good health and quality of life. For

[1] Excerpt from the AALIANCE Ambient Assisted Living Roadmap (2009). Available on www.aaliance.eu.

older people, mobility represents more than having a means of transport, but it is also a symbol of freedom, independence, self-reliance and having some control of their lives.

Mobility is more than merely moving from one place to another; it can benefit elderly people in several ways. It provides the elderly with the possibility of travelling to achieve access to desired people or places. Psychologically, movement in itself or "getting out" induces feelings of independence and increased self-esteem. Finally, it can help elderly people become involved in more local community activities.

Although there is a tendency for seniors to move around in their own car, there are numerous reasons to maintain and improve public-transport systems and raise the awareness of alternative transport options among older people. However, using public transport can be stressful for older people: ticket machines are often complicated to use and there is a vast amount of customer information to take in.

Activities aimed at improving the mobility of the elderly can make public transport more accessible:
- physically, by making it easier for elderly people to actually get on a bus;
- practically, by providing the right information for moving around a city by public transport and by providing the means of finding the way through a city using for example a GPS-based system.

2. Supporting individual physical mobility

Walking is sometimes overlooked as a means of transport, despite the fact that it is fundamental to any journey. Everyone has to walk, even if it is just from the front door to the car or bus stop, around the house, or around a museum. As people become older, or if they develop impairments, they become at greater risk in pedestrian environments, finding them increasingly difficult to negotiate. There are often design conflicts involving street furniture, signage, lighting, rest areas, amenities, vehicles and road-crossing to consider, but also information about location (positioning), finding the right way and accessible routes. Geo-referencing and route guidance using satellite, wireless or mobile-phone technology can help pedestrians, not only by providing relevant and useful information, but also by giving reassurance in complex, busy or unfamiliar surroundings.

Technologies for older pedestrians

Localization/positioning (i.e. Where am I? What is near me?) and *navigation support* (Where can I go? How do I get where I want to go?) requires:
- Satellite-technology (GPS/Galileo) combined with a suitable receiving device for outdoor mobility;
- Wireless technologies (e.g. WLAN, Bluetooth, RFID, Near-field communications NFC) for indoor navigation;
- Mobile communcations (4G);
- Digital mapping for pedestrians and other information delivered in a variety of formats to suit the individual;
- Web-services providing personalised services from differerent service providers;
- Sensor Networks (including wearable sensors, accelerometers or pedometers).

Roadmap of technologies for pedestrian support

Innovative technology	Short term (2010)	Mid term (2015)	Long term (2020)
4G mobile technology	Mobile devices designed with older people in mind e. g. simplified layout, large keypad and screen, availability of alternative output modes		
Satellite technology	Improvements to accuracy of GPS GLONASS available	Galileo available. Seamless switch between satellite, mobile and wireless technologies	
Digital maps for pedestrians			Comprehensive coverage of urban areas with detailed, regularly updated digital maps Delivery to hand-held devices via range of suitable outputs
Web-services	More personalized services available	Distributed computing systems linking different content providers	
Near-field communication	Technology mature by 2010	Widespread deployment in transport applications	
Wireless networks	Technology mature and reliable	Deployment of systems, indoor and outdoor. Systems and people communicate via personal wearable devices (PWD), e. g. smart jewellery, or smart phone/hand-held devices	
Sensor networks		Deployment of systems. Systems and people communicate via personal wearable devices (PWD) or smart phone/hand-held devices	

3. Ambient Assisted Driving

In rural areas where public transport is not available or is not provided in an acceptable quality, driving with a private (or rented) car is essential for independent living. Driving a private car is often considered as more comfortable and safer and faster than public transport.

Systems for younger or older drivers are not distinguished here because both groups will benefit from them. Older drivers often show decreasing motoric, sensorial and mental capabilities, as shown in the figure below, but they use specific strategies to reduce the load caused by the driving process such as avoiding unknown areas or driving at night or in bad weather conditions. On the other hand, it is also well known that older drivers have an increased rate of fatal accidents compared with middle-aged drivers.

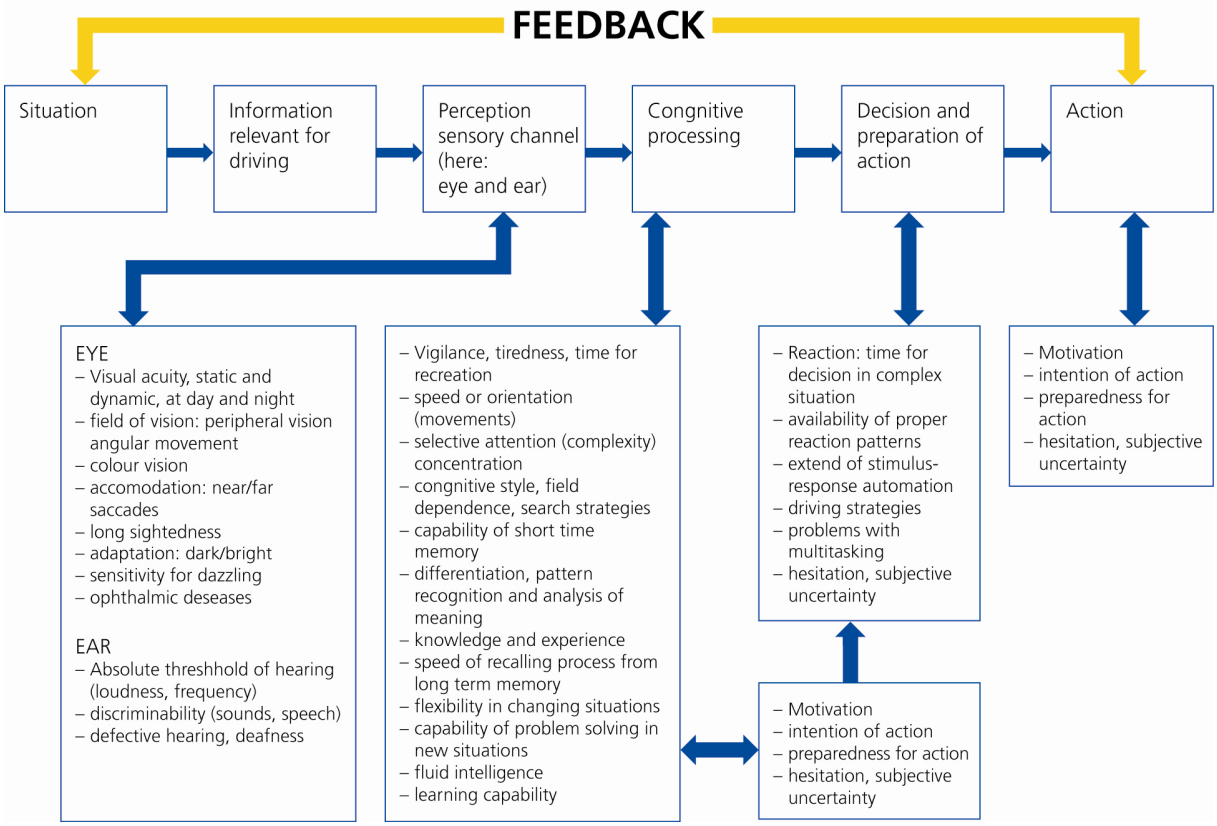

Figure: Problems of older drivers in perception, cognition and action[2]

For many years, European governments, private organizations and motor industries have been working hard to make driving more comfortable and, especially, safer - for all road users independent of age. This includes measures concerning infrastructure, legislation and education and in particular technical improvements to vehicles. Many other active safety systems are now under development, mainly concerning the longitudinal and lateral control of the vehicle. Communication between one car and another car and from car to infrastructure to exchange information which might not be available in a single car will play a prominent role. These systems will be introduced step by step and in the future they will grow together to form an Integrated Safety System. As a private car is only one participant in traffic, many developments aim at reducing the risk to so-called "vulnerable road users" like cyclists and pedestrians.

The following applications were rated by experts on behalf of the EU regarding their potential impact on traffic safety:
Priority of vehicle-based autonomous systems:
- ESP (Electronic Stability Programme);
- blind-spot monitoring;
- adaptive head lights;
- obstacle & collision warning;
- lane-departure warning.

Priority of infrastructure-related systems:
- eCall (emergency calls including precise coordinates of the location);
- extended environmental information;

[2] Schlag, B. & Schade, J. (2008): Traffic and Transportation Psychology. In: K. Button & P. Nijkamp: Transportation Dictionary

- RTTI (Real-time Travel and Traffic Information for drivers);
- dynamic traffic management;
- local danger warning;
- speed alert.

3.1. Enabling technologies

The following sensors or systems are crucial for many of the assistance systems referred to in the previous section. Some of them like wheel-speed sensors or steering sensor are available in nearly every car and some of them are available in high-priced cars or will be available also in low-cost cars as soon as an interface between OEM and aftersales systems is established (GPS, Digital Map, GSM):

- Long Range Radar/LIDAR;
- camera with object detection, classification and recognition;
- short-range radar with narrow/wide angle;
- vehicle-to-vehicle communication;
- wheel speed sensors;
- steering sensor;
- GPS;
- GSM;
- digital map;
- traffic detection;
- road weather detection;
- incident detection.

3.2. Systems with special benefits for older drivers

Older drivers will have the same benefit from these passive and active safety systems as other drivers or other road users. There are also several products or systems which are especially useful for them as they are aimed directly at the deficiencies of this older user group.

Such systems are improving safety, vision and driver-system-interaction:

- tyres with flat running capability (available);
- night-vision systems. Available systems extend the range of vision at night. Advanced versions provide object classification and can therefore warn of relevant objects like pedestrians and cyclists;
- advanced front light (available; systems with extended functionality under development);
- blind-spot detection (available; performance will be improved);
- head-up displays show driving relevant information as a virtual image several metres in front of the car, making it easier for the driver to keep his or her eyes on the road and to see the information that is displayed faster (available; systems with extended field of view and luminance range under development);
- speech input for operation of suitable functions (available; natural dialogue under development);
- improved navigation (matching of navigation hints and external world).

Systems improving driving activities:

- cruise control with extended range (urban area, stop & go, traffic jams);
- detection of driver impairment due to health or drug problems;
- detection of driver inattention (gaze direction) and potentially mental distraction;
- obstacle & collision warning;

- crash mitigation/avoidance systems;
- lane-detection/lane-departure warning/lane-keeping support (available for standard situations; extended functionality under development);
- parking assistance which support or even perform the parking process (informing systems on the market in large quantities; systems with lateral control available by leading OEMs; with lateral and longitudinal control in research vehicles available but still problems with detection of all kinds of obstacles and with legislation/responsibility).

Systems improving comfort and wellbeing:
- identification of driver and passenger for adaptive functions;
- improvement of thermal comfort (individual, faster reaction);
- improvement of acoustic comfort (active noise reduction, intercom between front/back seats);
- physical-training devices;
- in-car illumination adaptable or adaptive to driver/passenger mood.

4. Public transport

Transport - the ability to get from A to B - is fundamental to independent living. Public transport must be accessible and easy to use, especially for older people, many of whom do not have access to - or do not want to drive - a car. This refers not only to the vehicles, but also to the transport infrastructure such as stations, airports and ticket machines and on-street approaches. Pre-trip planning should be quick and simple, and on-trip planning should be available so that people can make adjustments to their journey for whatever reason (social, emergency or change of plan).

There are many different modes of public transport (bus, train, metro/subway, air, taxi, ferry), and it is vital that integration of the services (usually a political issue) and integration of information (usually a business issue) takes place where possible. Such measures enhance the convenience and simplicity of using public transport, which in turn (and in combination with measures such as travel training) increases user confidence.

The aim is to provide a seamless journey, with full information about facilities, travel times, and any potential barriers to accessibility. Provision of a comprehensive multi-modal public-transport system that is easy and reliable to use is a great aid to social cohesion as it provides better access to services and better support for local communities.

Travel information technologies

Travel information (e.g. timetables, amenity information and physical access information):
- use of web-based technologies to supply on-trip information to mobile devices;
- improved information in vehicles, at stations, etc.;
- information delivered in a variety of formats to suit the individual;
- information delivered at home;
- real-time information with a short response time.

Many of the same technologies that are beneficial to pedestrians are also beneficial to public-transport users, although they might use different functionality and perform different tasks. Apart from mobile communications and web-based technologies there are others which might especially be beneficial in a public transport context:

Smart cards

Smart cards have been around for several years now. However, until recently they were not widely used in transport. Smart cards enable customization of service delivery to individuals based on the user´s needs, for example how a person prefers to use a ticket machine. They are commonly used to store value (as cash replacements) and are therefore used in ticketing systems e.g. Oyster card in London. Smart-card schemes now exist throughout Europe for transport and other applications. (In the Netherlands a nationwide public transport smart card is introduced.) Future developments will include wider use of vicinity cards (up to two metres range from the reader), and an increase in the amount of information carried.

Verbal communication with information systems

This future technology will become available when computers will be able to translate human speech. In other words, people will be able to communicate verbally with vehicles or information screens.

Intelligent-agent technology

Intelligent-agent technologies can be used to create ambient intelligent infrastructures or environments, in which people are immersed in networks of invisible but powerful communicating technologies that can adapt themselves to the needs of individuals, and can serve them by taking instruction and performing tasks. Agents are embedded in everyday objects e.g. people, vehicles, infrastructure and buildings. The networks can provide personalized services and information based on needs, context, habit, etc. Hand-held devices or personal wearable devices (e.g. watches and bracelets) would communicate with wall-mounted displays. The networks are unobtrusive, personalized, adaptive, anticipatory and most importantly they are designed to respond to the needs of individuals. A “pervasive” intelligent environment can support ageing populations providing independence and easy seamless access to services.

Roadmap of technologies to be used in public transport

Innovative technology	Short term (2010)	Mid term (2015)	Long term (2020)
4G mobile technology	Mobile devices designed with older people in mind e. g. simplified layout, large keypad and screen, availability of alternative output modes		
Web services	More personalized services available	Distributed computing systems linking different content providers	
Smart cards	Largely mature technology in 2008. More deployed systems in 2010	Greater use of vicinity cards. More applications on cards. Cards store large amounts of data	
Human-computer verbal interaction		Technology mature	Use in transport domain has begun
Ambient intelligent environments		Deployment of systems. Systems and people communicate via personal wearable devices (PWD) or smart phone/hand-held device	

ANNEX

SPEAKERS AND CHAIRS
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Helmut Hlavacs

Holly B. Jimison
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AMBIENT ASSISTED LIVING JOINT PROGRAMME
AAL JP:
THE FIRST CALL FOR PROPOSALS AAL-2008-1

The first call aimed at launching European collaborative projects providing innovative ICT based solutions for elderly persons with identified risk factors and/or chronic conditions. The call envisaged the development of new solutions with a holistic approach, which includes prevention, management, support services and the social and socio-economic environment related to chronic conditions.

Funded projects must have a clear European dimension with high relevance for and maximum impact on the development of ICT. The call was published on 25 April 2008 and closed on 21 August 2008.

This list gives an overview on all 23 projects that are funded under the first call. All projects started in 2009 and run between 30 and 36 months.

Please visit www.aal-europe.eu to learn more details and to catch the latest information on the projects.

a^2e^2	Total Funding: € 2.6 million
Adaptive Ambient Empowerment of the Elderly Coordinator: Ute Ritterfeld, University of Amsterdam, VUA (NL) Partners: Amsta (NL), Hospital IT AS (NO), VTT Technical Research Centre of Finland (FI), Mawell Ltd (FI)	
a^2e^2 stands for an innovative ICT solution designed to prevent or/and manage elderly individuals' chronic diseases through an increase in physical activity, resulting in better physical and mental health, ultimately improving the quality of life of its users.	

AGNES	Total funding: € 2.6 million
User-Sensitive Home-based Systems for Successful Ageing in a Networked Society Coordinator: John Waterworth, Umeå University (SE) Partners: CanControls (DE), Research and Education Laboratory in Information Technologies-Athens Information Technology (GR), Graz University of Technology (AT), Universidad Nacional de Educación a Distancia (ES), ModernFamilies (AT), KMOP (EL), Onda Communication S.p.A. (IT), Fundacion Instituto Gerontologico Matía (ES), Skellefteå Kommun (SE)	
The vision is to provide a user-sensitive ICT-based home environment that supports a person-centric care process by detecting, communicating, and meaningfully responding to relevant states, situations, and activities of the elderly person with regard to mild cognitive impairment or dementia.	

ALADDIN	Total funding: € 1.4 million
A Technology Platform for the Assisted Living of Dementia Elderly Individuals and their Carers Coordinator: Maria Haritou, NTUA (GR) Partners: Aethia (IT), ATOS Origin (ES), Badalona Serveis Assistencials (ES), Psychiatric Hospital Of Attica (EL), Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (DE), Institute of Communication & Computer Systems (EL), The National Hospital for Neurology & Neurosurgery (UK), Universita di Bologna (IT)	
The aim of the project is to utilise state-of-the-art in ICT in order to develop an integrated solution for the self-management of dementia patients, and develop innovative tools to support this procedure. This solution can be conceived as an integrated platform enabling distant monitoring of patient status and facilitating personalised intervention and adaptive care.	

AMICA	Total Funding: € 1.8 Million
Autonomy, Motivation & Individual Self-Management for COPD patients Coordinator: Luis Felipe Crespo, Universidad de Cádiz (ES) Partners: Foundation for Biomedical Research Management of Cadiz (ES), Forschungszentrum Informatik (DE), Institute of Communication and Computer Systems (EL), Innovaciones Sociosanitarias S.L. (ES), MSC Gleichmann (ES), Vitaphone GmbH (DE)	
AMICA aims at providing medical management and medical care to patients suffering from Chronic Obstructive Pulmonary Disease (COPD) and to address these challenges by developing and assessing long-term COPD management solutions based on innovative Information and Communication Technologies.	

BEDMOND	Total Funding: € 1.3 Million
Behaviour Pattern Based Assistant for Early Detection and Management Of Neurodegenerative Diseases Coordinator: Alberto Martínez, Fundación ROBOTIKER (ES) Partners: AIT Austrian Institute of Technology GmbH (AT), Center for Usability Research and Engineering (AT), Fundación Instituto Gerontológico Matía (ES), Meticube - Sistemas de Informação, Comunicação e Multimedia, Lda. (PT), Ibernex Ingeniería (ES)	
BEDMOND is an assistant for the health professional, a daily behaviour information provider to early diagnose mild cognitive impairment (MCI) stages as a first step of neurodegenerative diseases, focused in elderly people while living at home.	

CAPMOUSE	Total Funding: € 1.3 million
Development of a Non-Invasive Capacitive Sensor Oral Mouse Interface for the Disabled Elderly Coordinator: Tomas Brusell, Brusell Dental AS (NO) Partners: HMC International NV (BE), Pensionärernas Riksorganisation (SE), Lots Design (SE), Stinct (SE)	
With a non-invasive modus operandi, CAP MOUSE will use external capacitive sensors mounted on a CAP MOUSE headset to scan tongue movement and feed the signal into a processing unit that extracts and translates features from the signal into e.g. mouse clicks and commands of the integrated Mobile Device, thereby replacing the keyboard, the remote control and other electronic devices.	

CARE	Total Funding: € 1.7 million
Safe Private Homes for Elderly Persons Coordinator: Ahmed Nabil Belbachir, AIT Austrian Institute of Technology GmbH (AT) Partners: Budapest University of Technology and Economics, Biomedical Engineering Knowledge Centre (HU), Oy Exrei Ab (FI), SensoCube GmbH (DE), Senioren Wohnpark Weser GmbH (DE), Yrjö ja Hanna Ltd (FI)	
CARE targets the automated recognition and alarming of critical situations (like fall detection) using optical sensor and real-time processing while preserving the privacy and taking into account system dependability issues, especially ensuring reliability, availability, security, and safety from a holistic point of view.	

CCE	Total Funding: € 2.2 million
Connected Care for Elderly Persons Suffering from Dementia Coordinator: Dr. Ranjit Bassi, Building Research Establishment (UK) Partners: Budapest University of Technology and Economics, Biomedical Engineering Knowledge Centre (HU), Building Research Establishment (UK), Centrihealth (UK), Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (DE), Hereward College (UK), Innomed Medical Inc. (HU), MedCom GmbH (DE), Hungarian Association of Home Care and Hospice (HU), Philips (NL), Peverel (UK), User Interface Design GmbH (DE)	
The project supports the development of an open, standardised, integrated European platform to deliver connected ICT-based assistive living solutions for the elderly.	

DOMEO	Total Funding: € 2.0 million
Domestic robot for Elderly Assistance Coordinator: Vincent Dupourque, Robosoft (FR) Partners: Université Pierre et Marie Curie – Paris 6 (FR), Centre Hospitalier Universitaire de Toulouse (FR), Országos Orvosi Rehabilitációs Intézet / National Institute for Medical Rehabilitation (HU), Vienna University of Technology (AT), Budapest University of Technology and Economics (HU), Meditech (HU), Thales Alenia Space (FR)	
The project will design and demonstrate the technical efficiency and the medical relevance of an open integration platform for eldercare robots configuration and deployment in real-world environment and for everyday life requirements.	

eCAALYX	Total Funding: € 2.7 million
Enhanced Complete Ambient Assisted Experiment Coordinator: Mª Carmen Margelí, CETEMMSA (ES) Partners: Telefónica Investigación y Desarrollo (ES), Instituto de Engenharia de Sistemas e Computadores do Porto (PT), University of Plymouth Enterprise Ltd (UK), University of Limerick (IE), Fundació Hospital Comarcal Sant Antoni Abat (ES), Fraunhofer Portugal (PT), Corscience GmbH & Co KG (DE), Ev. Krankenhaus Witten GmbH (DE)	
eCAALYX will develop an efficient AAL solution for several chronic conditions that can provide reliable long-term and maintenance-free operation in non-technical environments, thus, ready for real-world deployment.	

EMOTIONAAL	Total Funding: € 2.7 million
The Emotional Village: Integrated Preventive AAL Concept For the Rural Aging Society in Europe Coordinator: Dr. Hans-Otto Maier, BBRAUN Melsungen AG (DE) Partners: Opsolution NanoPhotonics GmbH (DE), German Retail Federation/ EHV Hesse-North e.V. (DE), University of Marburg (DE), University of Kassel (DE), Diaconia University of Applied Sciences (FI), Vitaphone GmbH (AT), German Aerospace Centre (DE), Protestant University of Applied Sciences (DE), Activesoft LTD (FI)	
EMOTIONAAL specifically targets at elderly persons living in rural areas and offers them an integrated seamless solution including social services and new technologies to support self care, prevention and assistance to carry out daily activities, health and activity monitoring and enhances safety and security.	

H@H	Total Funding: € 1.4 million
Health@Home Coordinator: Luca Fanucci, Consorzio Pisa Ricerce (IT) Partners: Caen Aurelia Space (IT), Caribel Programmazione Srl (IT), Centro Andaluz de Innovación y Tecnologías de la Información y las Comunicaciones (ES), Consorzio Pisa Ricerche (IT), Fondazione Gabriele Monasterio (IT), Mediasoft Ltd (SI), Hospitales Universitarios "Virgen del Rocío" (ES), Zdravstveni dom Koper (SI)	
The H@H addresses elderly citizens affected by Chronic Heart Failure (CHF), providing them with wearable sensor devices for monitoring of cardiovascular and respiratory parameters and, at the same time, enabling the medical staff to remotely supervise their situations and taking actions by involving public/private healthcare organizations.	

Happy Ageing	Total Funding: € 0.9 million
A Home Based Approach to the Years of Ageing Coordinator: Fiorella Marcellini, Istituto Nazionale di Riposo e cura per Anziani V.E. II (IT) Partners: Fundació Privada Cetemmsa (ES), Speed Automazione Srl (IT), Global Security Intelligence Limited (UK), AB.ACUS SRL (IT), Institute of Sociology, Hungarian Academy of Sciences (HU), The Association of Catholic Organisations of Senior Citizens in the Netherlands (NL)	
The HAPPY AGEING project approaches main limitations due to chronic diseases, low vision or malnutrition and dehydration and manages the individual needs of dietary control, safety and wellbeing. The HAPPY AGEING system will be composed of three modules, including a lifestyle monitor for recording main activities, a navigation assistant to support user's mobility in close environment and a personal assistant to support performing distinct actions.	

HELP	Total Funding: € 2.5 million
Home-based Empowered Living for Parkinson's Disease Patients Coordinator: Luis Pablo del Arbol Perez, Telefonica Investigacion y Desarrollo (ES) Partners: Hahn-Schickard-Gesellschaft für angewandte Forschung e.V. (DE), Nevet Ltd (IL), Mobile Solution Group GmbH (DE), SALIWELL Ltd (IL), Telefonica Investigacion y Desarrollo Sociedad Anonima Unipersonal (ES), Telecom Italia S.p.A. (IT), University and Hospital of Palermo (IT)	
The project integrates a complex system that dynamically monitors and treats Parkinson's Disease patients. The system comprises a non-invasive intra-oral drug delivery device, a pump to deliver rescue medication, a PAN (Personal Area Network) to gather user's environment information, a telecommunication and services infrastructure to transfer information between the user and an automated system and a remote point-of-care unit to supervise the patients.	

HERA	Total Funding: € 1.2 million
Home Services for Specialised Elderly Assisted Living Coordinator: Heidrun Häfele, Telekom Austria TA AG (AT) Partners: Alcatel Lucent Deutschland AG (DE), Forschungsinstitut des Roten Kreuzes (AT), DIAGNOSTIC AND THERAPEUTIC CENTER OF ATHENS- "HYGEIA" SOCIETE ANONYME (GR), Paris Descartes University (FR), SingularLogic S.A (GR), SOLINET GmbH Telecommunications (DE)	
The HERA project aims at providing a platform with cost-effective specialised assisted living services for the elderly people suffering from mild Alzheimer or cardiovascular diseases with identified risk factors, which will significantly improve the quality of their home life, extend its duration and at the same time reinforce social networking.	

HMFM	Total Funding: € 1.5 million
Hear Me Feel Me - Compensating for Eyesight with Mobile Technology Coordinator: Minna Isomursu, Technical Research Centre of Finland (FI) Partners: Fundación ROBOTIKER (ES), Organización Nacional de Ciegos Españoles (ES), Nokia Corporation (FI), ToP Tunniste Oy (FI), Caritas Foundation (FI), Finnish Federation of the Visually Impaired (FI), Oulun 6. Joutsen apteekki (FI), National Center for Scientific Research "Demokritos" (GR)	
The HMFM project explores services related to medication and medicine related information and services, and to health monitoring and diet information. Enabling technologies for the services will be mobile devices and near field communication (NFC) technology.	

HOPE	Total Funding: € 1.1 million
Smart Home for Elderly People Coordinator: Dimitrios Kilias, RTEL SA (GR) Partners: Unita Operativa Geriatria & Laboratorio di Recerca Gerontologia-Geriatria - IRCCS Casa Sollievo della Sofferenza, San Giovanni Rotondo (IT), CETEMMSA Technology Centre (ES), Andalusian Centre of Innovation, Information and Communication Technologies (CITIC Foundation) (ES), KMOP Organization (GR), Integrated Information systems SA (GR), TRACS SRL (IT), FORUS SRL (IT)	
The Hope project addresses elderly people that suffer from Alzheimer's disease to achieve a richer lifestyle. An ICT system will enable persons to perform activities they were not able to do before and which are important for their daily personal life. The proposed system provides a basis for integrating further services, e.g. control of the home environment.	

IS-ACTIVE	Total Funding: € 1.3 million
Inertial Sensing Systems for Advanced Chronic Condition Monitoring and Risk Prevention Coordinator: Paul Havinga, University of Twente, CTIT (NL) Partners: University Hospital Elias (RO), Inertia Technology (NL), Northern Research Institute Tromsø (NO), Norwegian Centre for Telemedicine, University Hospital of North Norway (NO), PROSYS PC (RO), Roessingh Research & Development (NL)	
The IS-ACTIVE project emphasises the role of the home as care environment, by providing real-time support to patients in order to monitor, self-manage and improve their physical condition according to their specific situation. The project addresses all development phases of a prototype wireless sensing platform, from hardware platforms and software packages to algorithms and user interfacing and aims to introduce the platform 2 years after the project end.	

PAMAP	Total Funding: € 1.8 million
Physical Activity Monitoring for Aging People Coordinator: Didier Stricker, Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (DE) Partners: Foundation Alfred de Rothschild (FR), Intracom Telecom S.A. (EL), Trivisio Prototyping GmbH (DE), Université de Technologie de Compiègne (FR)	
PAMAP will develop an unobtrusive and fully mobile system that enables the accurate monitoring of the physical activities of aging people. The system will be based on a set of tiny MEMS sensor units and dedicated software for professional and private use. It will rely on a sounded bio-mechanical model of the human body, measure accurately the motions and efforts of the upper and lower limbs, thanks to an appropriate parameterization.	

REMOTE	Total Funding: € 2.2 million
Remote Health and Social Care for Independent Living of Isolated Elderly with Chronic Conditions Coordinator: María García Robledo, SIEMENS S.A. (ES) Partners: Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V. (DE), Fundación para la Investigación Médica Aplicada (ES), Foundation for Research and Technology - Hellas (EL), MEDEA SRL (IT), Netscouts gemeinnuetzige GmbH (DE), Norwegian Centre for Telemedicine (NO), Ortholine LTD (IS), Saliwell Ltd. (IS), TSB Soluciones S.A. (ES), Universidad Politecnica de Madrid (ES)	
REMOTE will advance the Software Architecture in fields of tele-healthcare by enhancing the elderly's home with audio-visual, sensor/motoric monitoring and automation abilities to trace vital signs, activity, behaviour and health condition, and detect risks and critical situations, as well as provide, effective and efficient support at home.	

RGS	Total Funding: € 1.8 million
Rehabilitation Gaming System Coordinator: Dr. Paul Verschure, Universitat Pompeu Fabra (ES) Partners: Fundación Privada Tic I Salut (ES), Guger Technologies OEG (AT), University Hospital Düsseldorf, Heinrich-Heine-Universität Düsseldorf (DE), Hospital del Mar i de la Esperança (ES), Hospital Vall d'Hebron (ES), Tyromotion GmbH (AT)	
The Rehabilitation Gaming System consortium will develop and test a virtual reality based system that will allow an elderly person who suffered a stroke, to take advantage of a novel ICT based product to manage their chronic condition. RGS deploys an individualized and specific deficit oriented training that combines movement execution with the observation of a correlated action by virtual limbs that are displayed in a first-person perspective.	

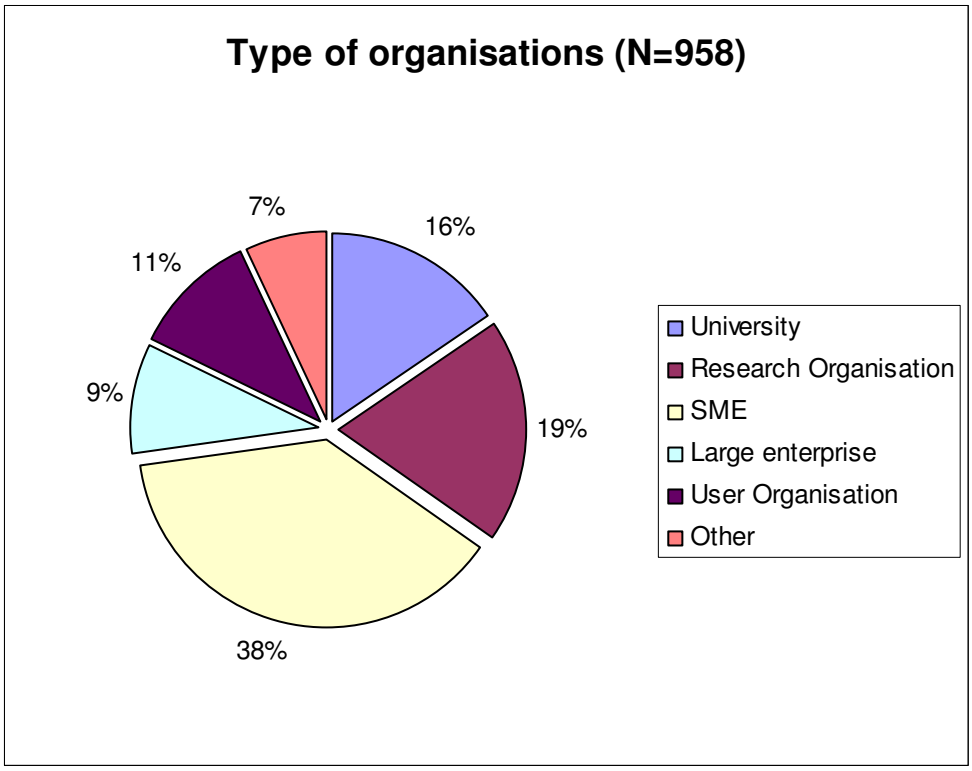
ROSETTA	Total Funding: € 2.3 million
Guidance and Awareness Services for Independent Living Coordinator: Irek Karkowski, TNO Defence, Security and Safety (NL) Partners: Avics B.V. (NL), CPS Europe BV (NL), EATON ELECTRIC bv (NL), Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. - Institute ESE (DE), I+ S.r.l. (IT), Landsbond Christelijke Mutualiteiten (BE), Novay (NL), TNO Defence, Security and Safety (NL), Vilans (NL), VU medisch centrum (EMGO Instituut) (NL), Westpfalz-Klinikum GmbH (DE), Stichting Zorgpalet Baarn-Soest (NL), CIBEK technology + trading GmbH (DE)	
ROSETTA will help community dwelling people with progressive chronic disabilities (i.e. Alzheimer's Disease and Parkinson's Disease) to retain their autonomy and quality of life as much as possible and to support their (in)formal caregivers by developing and providing an ICT system that offers activity guidance and awareness services for independent living.	

SOFTCARE	Total Funding: € 0.7 million
Kit for Elderly Behaviour Monitoring by Localisation Recognition and Remote Sensoring Coordinator: Irene Larroy, Centre de Recerca i Investigatió de Catalunya S.A. (ES) Partners: Capex Health Ltd. (UK), Forschungsinstitut des Wiener Roten Kreuzes (AT), Ceit Raltec (AT), Meshworks Wireless Ltd. (FI)	
The proposed SOFTCARE technology will use behavioural patterns recognition and ZIGBEE sensing nodes to create an integral system for home monitoring which will greatly expand upon existing home-based health monitoring system, as it will take into account more than one chronic condition.	

Statistics of the first AAL Call

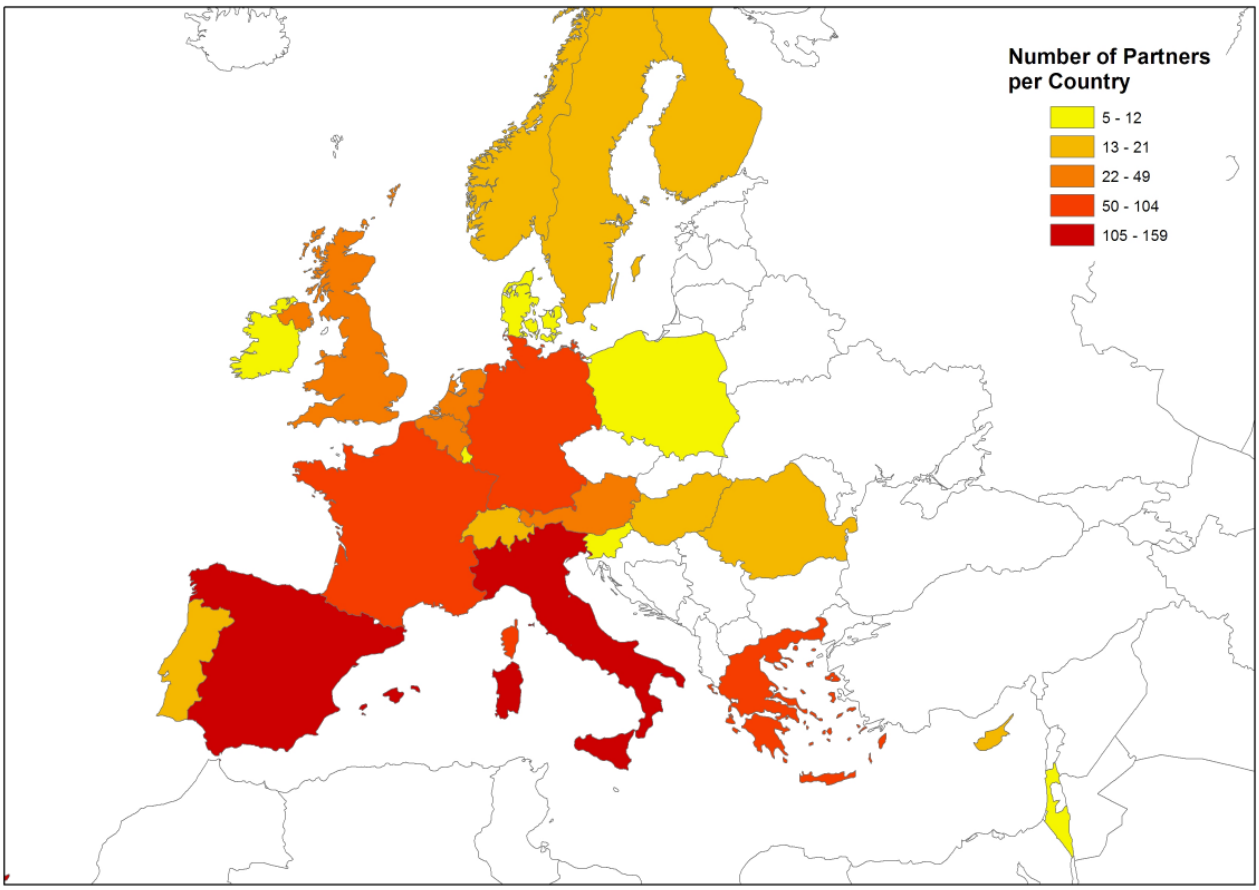
The high participation of commercial partners and user organisations in call 1 fully meets the programme's objectives.

Participating Organizations



The first call for proposals of the AAL JP was well accepted by the AAL community: 117 transnational project proposals involving 958 organisations of all 23 AAL partner states were received.

Number of Partners per Country



BENEFIT PROJEKTE 2008 -
BENEFIT PROJECTS FUNDED IN 2008

Open Call 2008

Avatars@Home	Austrian Research Centers GmbH – ARC
Stimulierungsprojekt	**Avatars@Home: Avatar-Interfaces for the Assistive Home ("face-lifting" user dialogues in smart home environments)**
Diese Studie soll Wissen über die Akzeptanz und Eignung von fotorealistischen Avataren zur Gestaltung der Benutzerschnittstelle von AAL Umgebungen generieren. Eine Usability Studie sowie die Evaluation dieser Gestaltungsmöglichkeit mit BenutzerInnen (60-75 Jahre, ohne und mit Diagnose MCI) wird qualitative und quantitative Daten liefern, um zukünftig Smart Homes benutzerInnenfreundlicher und attraktiver zu gestalten.	
This study aims to generate new knowledge about the effects of using photo-realistic avatars as part of the user interfaces for Ambient Assisted Living environments. A usability study and evaluation of the acceptance and suitability of users between the ages of 60-75 with and without diagnosed Mild Cognitive Impairment will produce qualitative and quantitative data to make smart home environments more usable and accepted by the target group.	
Projektpartner:	CURE – Center for Usability Research and Engineering

Compliance Betreuung	The Compliers Group Austria GmbH
Stimulierungsprojekt	**Bedienbarkeit und Akzeptanz von Compliance Messgeräten zur kontinuierlichen ärztlichen Betreuung und Verlängerung der Verbleibquote von Senioren in häuslicher Umgebung**
Anwendungsorientierter Einsatz innovativer IKT Geräte erlaubt zur Therapie die Compliance-Messung verbunden mit entsprechender Betreuungsdienstleistung. Der erwartete Nutzen für SeniorInnen als End-AnwenderInnen besteht in einer kontinuierlichen ärztlichen Betreuung im häuslichen Umfeld, einer Verlängerung der aktiven Lebensphase, der Verbleibquote in häuslicher Umgebung sowie Unterstützung in der hilfsbedürftigen Phase.	
For the first time, an innovative RFID/NFC-based information technology system allows the correlation of real time medication compliance measurements and online transferred data outcomes. This is important to maintain continuous health care support at home for elderly, functionally disabled patients with chronic diseases giving them the opportunity to stay in their familiar surroundings. The system also assists family members and nursing services.	
Projektpartner:	Wiener Gebietskrankenkasse

IU - Integratives Umfeld für aktives Altern	Abteilung Bauphysik und Bauökologie, Institut für Architekturwissenschaften, Fakultät für Architektur und Raumplanung, Technische Universität Wien
Stimulierungsprojekt	**Integrative räumlich-technologische Rahmenbedingungen für aktives Altern**
Die wissenschaftlichen Grundlagen für ein aktives Altern im gewohnten Wohnumfeld unter Einbeziehung intelligenter Technologie werden erarbeitet. Momentan gibt es keine aktuelle Untersuchung, welche Wohnumfeldrahmenbedingungen erfüllt sein müssen, dass technologische Interventionen sinnvoll zum Einsatz kommen können.	
The proposed research aims at the understanding of the interrelation between people, intelligent environments, and smart technologies as an indispensible prerequisite for the successful integration of information and communication technology towards the accommodation of active ageing. The research involves: *i)* the collection and analysis of pertinent data concerning risk levels and occurrence of accidents; *ii)* specification of integrated solutions that combine *a)* intelligent spatial and architectural factors; and *b)* smart technological tools and devices in order to ensure and prolong safe, secure, and active living and ageing conditions in familiar surroundings.	

PDR-Eval	Austrian Research Centers GmbH – ARC / Bereich Biomedical Engineering
Stimulierungsprojekt	**Evaluation of a Personal Drug Reminder**
Im Rahmen des Projekts *PDR-Eval* wird die Akzeptanz und die Nutzbarkeit einer Mobiltelefon-basierten Anwendung (Verwendung von NFC-Technologie) zur Unterstützung von älteren Menschen bei der Einnahme von Arzneimitteln evaluiert werden.	
Within the project *PDR-Eval,* we want to evaluate the acceptance and usefulness of a mobile phone based application using NFC technology in order to enhance the compliance of drug intake for elderly people.	
Projektpartner:	VAMED KMB

Tendenzen 2020	WPU Wirtschaftspsychologische Unternehmensberatung GmbH
Stimulierungsprojekt	**Entwicklungstendenzen in den Wirkfeldern des aktiven Alterns und des resultierenden Konsumverhaltens bis zum Jahr 2020**
Diese Foresight Study zeigt Entwicklungstendenzen bei den Wirkfeldern des aktiven Alterns (u.a. Mobilität, Bequemlichkeit, Sicherheit, Freizeit, Networking, Fitness, Haushalt, Gesundheit) und daraus resultierend Änderungen im Konsumverhalten bezogen auf das Jahr 2020 auf. Diese Studie realisiert das Ergebnis in einem dreistufigen Szenario-Workshopprozess mit „aktiven SeniorInnen“, Vertreterinnen der Wirtschaft und Wissenschaft.	
This Foresight Study will make predictions about the scope in the main fields (mobility, convenience, security, spare time, networking, fitness, household, and well-being) of active ageing in 2020 based on the paradigm of “Ambitious Ambient Living”. It will identify the main development tendencies. Results are created in a three-step workshop process with representatives from economy, science and senior citizens by methods using scenario techniques and innovation management.	

WAAL 2009	Austrian Research Centers GmbH – ARC
Stimulierungsprojekt	**Workshop-Reihe AAL 2009**
In der Workshopreihe WAAL 2009 werden in vier Workshops und einer Podiumsdiskussion aktuelle Fragestellungen zur Entwicklung und Anwendung von AAL-Technologien behandelt. Die Themen sind: „Soziale Interaktion älterer Menschen“, „IKT-gestützte häusliche Pflege“, AAL in der institutionellen Pflege und der „Business Case AAL“. Zu den Workshops werden die entsprechenden Stakeholder eingeladen, u.a. auch Menschen im Alter und deren Interessensvertretungen.	
A series of workshops and panel discussions will cover actual topics on the development and application of AAL-Technologies. The subjects are: “social interaction of elderly people”, “ICT based home care”, “AAL within institutionalised care” and “the business case AAL”. Relevant stakeholders will be invited to each of the workshops, including elderly people and representatives of their interests.	

ATTEND	Institut für Computertechnik, TU Wien
Humanressourcenprojekt	**AdapTive scenario recogniTion for Emergency and Need Detection**
Ziel des Projekts ATTEND ist die Erforschung und prototypische Entwicklung eines Systems, das alten Menschen länger eine autonome und/oder betreute Lebensführung in der eigenen Wohnung erlaubt. Es handelt sich um ein intelligentes, adaptives Netzwerk aus Sensoren. Diese Sensoren beobachten und klassifizieren das Verhalten der BenutzerInnen mit kombiniert statistischen und symbolischen Ansätzen und alarmieren bei Problemen eine Betreuungseinrichtung.	
The aim of the project ATTEND is the investigation and prototypical development of a comprehensive system which allows elderly persons to live longer autonomously and/or to be cared for in their own flat. The system comprises an intelligent, adaptive network of sensors. The sensors observe and classify the user’s behaviour utilising combined statistical and symbolic approaches in order to trigger an alarm in case of detected problems.	
Projektpartner:	CEIT RALTEC

2. Ausschreibung / 2nd Call for Proposals

AID	TELEKOM AUSTRIA TA AG
Kooperatives Forschungs- und Entwicklungsprojekt	**AID - Interactive Awareness Displays for Elderly People**
Das Projekt AID hat es zum Ziel, ein zentrales Kommunikationsterminal für den Heimbereich älterer Menschen in Form eines Touchscreens zu entwickeln, um die Kommunikation mit Angehörigen zu erleichtern/fördern. AID integriert verschiedene multimediale Kommunikationskanäle (Display zu Display, PC zu Display, Mobil zu Display) und soll Benutzungsbarrieren abbauen und den Zugang zu ICTs erleichtern.	
AID’s project aim is to develop a communication terminal for elderly people using a touch screen interface to facilitate access to communication services. AID displays are placed in the home environment of the target group and are designed to stimulate communication with relatives and friends. AID integrates text messages, e-mail, and display to provide communication as well as information services.	
Projektpartner:	USECON Forschungsinstitut des Roten Kreuzes CURE – Center for Usability Research and Engineering

MuBisA	CogVis Software and Consulting GmbH
Kooperatives Forschungs- und Entwicklungsprojekt	**Multivariate Bildfolgenerkennung für selbstbestimmtes Altern**
Das Ziel dieses Entwicklungsprojektes ist die Einführung der robusten bildbasierten Ereigniserkennung im Heimbereich. Verschiedene Methoden der Bilderkennung werden zur Unterstützung der Routinetätigkeiten des täglichen Lebens für unselbständige Menschen zusammengeführt. Es wird ein System entwickelt, dass ein breiteres Spektrum an Sicherheitsfunktionen im Vergleich zu bestehenden Systemen bietet. Dieses System beinhaltet eine rein visuelle und selbständige Sturzerkennung für Patienten, die frühzeitige Erkennung von Bränden in Wohnungen sowie eine Kontrollfunktion für die Medikamenteneinnahme. Damit kann die Lebensqualität von alten, kranken oder dementen Menschen erheblich verbessert werden und ihnen möglichst lange selbständiges Leben ermöglicht werden.	
The goal of this project is a reliable and automated computer vision system to enable an independent lifestyle for the elderly and disabled. In contrast to other projects, the system relies solely on computer vision techniques. The daily lives of the people involved will not be affected and it overcomes many problems of existing systems. The main goal is the robust detection of elderly people who fall. Since the detection set-up consists basically of IP-based cameras and a central storage and calculation server, the system is open and flexible in relation to other applications: fire, smoke and water detection and assistance for medication are introduced in a second step.	
Projektpartner:	e-nnovation IT-Systeme GmbH TU Wien – PRIP Fond Soziales Wien/IT AKH Wien Samariterbund Wien

GEN_TT	BEST AGE Consulting GmbH und FH Technikum Wien
Stimulierungsprojekt	**Ist ein „Haus der Generationen“ – Drehscheibe der Anbieter und Nachfrager intergenerativer IKT Produkte - sinnvoll und machbar?**
Das „Haus der Generationen“ führt KundInnen der BEST AGER Generation (aktive ca. 60 bis 75 – Jährige) und IKT-Anbieter zusammen: Damit erhalten die BEST AGER jene Produkte, die sie wirklich wollen und die Anbieter können ihre IKT Produkte so gestalten, dass sie von den BEST AGERN gerne akzeptiert werden: eine echte WIN - WIN Situation für alle. Die Sinnhaftigkeit und Machbarkeit dieser Idee wird in der gegenständlichen Studie untersucht.	
The “House of Generations” pools the interests of “BEST AGERS” (active people aged approx. from 60 to 75) and ICT-vendors. The outcomes are products which really match the needs of “BEST AGERS” (demanding but loyal customers) as well as - for the entrepreneurs - substantial increase of ROI: a win-win situation for all stakeholders. The feasibility of this idea is investigated in a comprehensive study.	

Lebensqualität im Alter	Institut für Erziehungswissenschaften, Forschungsschwerpunkt Innsbruck Media Studies, Leopold Franzens Universität Innsbruck
Stimulierungsprojekt	**Lebensqualität im Alter – Grundlagen und Anwendungen des Lernens und Lebens mit assistiven Technologien**
Die internationale Tagung Lebensqualität im Alter befasst sich mit Grundlagen und Anwendungen des Lernens und Lebens mit vernetzten assistiven Technologien. Dazu werden auch interessierte Einzelpersonen und Vertreter von Seniorenverbänden, Daseinsversorgern, Pflegeheimen, Beratungsstellen, Verwaltung, Wissenschaftler und Wirtschaftsunternehmen eingeladen.	
The international conference deals especially with the basics and application of learning and living with connected assistive technology. It addresses interested individuals, representatives of senior alliances, local providers, nursing homes, information centres, administration, research and companies.	
Projektpartner:	Meditrainment Consulting GmbH

MiAZen	LifeTool gemeinnützige GmbH
Stimulierungsprojekt	**Machbarkeitsstudie über ein interdisziplinäres Kompetenzzentrum „IKT-Lösungen für Menschen im Alter“ (Arbeitstitel, z.B. auf LOIs „BTS- Beratungsstelle Technologie für SeniorInnen“)**
Menschen im Alter sind ein Wachstumsmarkt. Dieser gestaltet sich allerdings auf Grund der Vielzahl an unterschiedlichen Bedürfnissen sehr heterogen, was wiederum die erfolgreiche Entwicklung von zielgruppenspezifischen Angeboten erschwert. Ziel ist es daher, das Konzept eines interdisziplinären Kompetenzzentrums mit Schwerpunkten in der Forschung, Entwicklung, Beratung, Evaluation und Distribution von IKT-Lösungen für Menschen im Alter einer Machbarkeitsprüfung zu unterziehen.	
Elderly People are a growing market in which requirements greatly differ. Heterogeneous market needs result in difficulties for successful application developments for these specific target-groups of the elderly. This identifies the need for the concept of an interdisciplinary competence centre focussed on research, development, consultancy, evaluation and distribution around ICT-solutions for elderly people and requires a feasibility study to be undertaken.	
Projektpartner:	• Kompetenznetzwerk Informationstechnologie zur Förderung der Integration von Menschen mit Behinderungen • Syncare Consulting GmbH

Windows Wide Open	Brigitte Eisinger, Consultants for IT & telecommunication
Stimulierungsprojekt	**Windows Wide Open – Gegen die Vereinsamung älterer Menschen - MACHBARKEITSSTUDIE**
WindowsWideOpen (WWO) ist ein internetbasierendes audiovisuelles Kommunikationssystem für Ältere, das audiovisuell und interaktiv in beide Richtungen stattfindet und altersgerecht ohne Maus und Tastatur bedient wird. Die Machbarkeitsstudie beschreibt das WWO-System in detaillierten Funktionen und untersucht Akzeptanz und Bedürfnisse bei der Pflege und Betreuung in den eigenen vier Wänden.	
WindowsWideOpen (WWO) is a web-based, audiovisual communication system supporting elderly people, working audio visually and interactively in all aspects. It can be handled easily without using a computer mouse or a keyboard. The feasibility study describes the WWO system in its detailed features and examines the acceptance of and the patient's needs during attendance in the privacy of their homes.	
Projektpartner:	Volkshilfe Österreich coop 50 plus

3. Ausschreibung / 3rd Call for Proposals

AMASL	Universität Wien, Institut für Distributed and Multimedia Systems
Kooperatives Forschungs- und Entwicklungsprojekt	**Ambient Assisted Shared Living**
Das Ziel des Projektes AMASL ist es, ein professionelles, multimediales Kommunikationssystem für alleinlebende, ältere Menschen zu erstellen. Ältere Menschen sollen möglichst realistisch in das Leben ihrer möglicherweise entfernt lebenden Verwandten optisch und akustisch integriert werden, so als ob es sich um denselben Haushalt handeln würde.	
The proposed project AMASL aims to create a professional multimedia communication system for elderly people currently living alone in their homes with no one to talk to. Elderly people should experience the realistic impression of living in the same household as their relatives who possibly live far away.	
Projektpartner:	Kapsch Carrier Com KCC Forschungsinstitut des Roten Kreuzes

EinfachWir	iPodion GmbH
Kooperatives Forschungs- und Entwicklungsprojekt	**EinfachWir – Das Mitmach WEB**
Das eingereichte Projekt wird Interfaces und Benutzungsparadigmen für EinfachWir entwickeln. EinfachWir wird ein hochinteraktives, zielgruppengerechtes und zielgruppengetriebenes SeniorInnenportal, das von AnwenderInnen selbst gestaltet und mit Leben erfüllt wird; zusätzlich stehen qualifizierte Experteninformationen zur Verfügung. Das Portal wird so gestaltet, dass es auch für computerunerfahrene Menschen und Personen mit kognitiven und körperlichen Einschränkungen einfach verwendbar ist.	
The proposed project will develop interfaces and paradigms for the EinfachWir portal. EinfachWir will be a highly interactive, user-oriented, and user-driven web-portal for senior citizens, the content of which will be created by the users themselves; in addition, professional information will be provided by experts. The design and layout of the portal will be shaped in such a way that it can be easily used by people with little or no experience with computers and people with a cognitive or physical handicap.	
Projektpartner:	querform.at - projekte & design OG TU Wien, Institut ‚integriert studieren‘

Health@Home	FH Technikum Kärnten Gemeinnützige Privatstiftung (FHK)
Kooperatives Forschungs- und Entwicklungsprojekt	**Heimbasiertes Krafttraining für ältere Personen als Fortsetzung der Herz-Kreislauf Rehabilitation**
Das Projekt umfasst die Entwicklung und Erprobung eines innovativen, altersgerechten, kraftbasierenden Trainingssystems für den Heimbereich zur Erhaltung und Steigerung der Lebensqualität älterer Personen. Ein Forschungsprototyp soll in einer Pilotstudie mit 70-90 End-AnwenderInnen getestet werden, um die Einsetzbarkeit des Systems nachzuweisen und überprüfen zu können.	
This project consists of the development and testing of innovative, age-based, strength-based training systems for home usage to maintain and improve the quality of life of elderly persons. An R&D prototype is planned to be tested in a pilot study with 70-90 end-users to verify and validate the implementability of the system.	
Projektpartner:	Institut für Bewegungstherapie Graz Eggenberg (IFB) Ilogs – information logistics GmbH (iLogs) Austrian Research Centers GmbH (ARC)

VITALIshoe	CEIT RALTEC GmbH
Kooperatives Forschungs- und Entwicklungsprojekt	**IKT-unterstütztes smart-textile basiertes System zur Aktivitätssteigerung und Sturzprophylaxe**
Im Rahmen des Projektes VITALIshoe wird für den älteren Benutzer ein smart-textilebasiertes und computer-gestütztes System zur eigenständigen Balance-, Sturzrisiko- und Aktivitätskontrolle und dazugehörigem Trainingprogramm realisiert, das eine gezielte und professionell unterstützte Steigerung des physischen Aktivitätslevels, mit den dadurch verbundenen positiven Konsequenzen auf den Lebensalltag, zur Folge hat.	
Within the project VITALIshoe, a computer and smart textile based system will be developed that allows the unassisted control of balance, risk of falls and activity levels, and provides the user with an appropriate exercise program. This project aims to increase the physical level of activity in a well directed and professional way and thereby enhances the quality of daily living for elderly people.	
Projektpartner:	MASSIVEART Gmbh FH Technikum Wien

VitaSmart	BEKO Engineering & Informatik AG
Kooperatives Forschungs- und Entwicklungsprojekt	**Smart Home Companion für Vitalmonitoring**
Generelles Ziel von VitaSmart ist die Entwicklung von $Smarty_{Vital}$, einem Smart Home Companion für Vitalmonitoring. Aufbauend auf dem Prototyp des Smart Home Centers von BEKO zielt SmartyVital auf eine kontextuelle Personalisierung und situationsgetriebene Unterstützung von Smart Home End-AnwenderInnen im Bereich Vitalmonitoring.	
In the project VitaSmart, our aim is the development of $Smarty_{Vital,}$ a Smart Home companion for vital monitoring. Based on the prototype of BEKO's Smart Home Centre, we are developing a contextualised personalisation model to support the elderly.	
Projektpartner:	Research Studios Austria Forschungsgesellschaft mbH – Studio Smart Agent Technologies

Balance 60+	Institut Sports-Engineering & Biomechanics an der Fachhochschule Technikum Wien
Stimulierungsprojekt	**Durchführbarkeitsstudie zur Entwicklung des idealen Trainings- und Analysegerät zur Sturzprävention bei älteren Menschen**
Der Fokus des gegenständlichen Projektes liegt in der Verfassung eines Konzeptes für ein ideales Individualtrainings- und Analysegerät zur Sturzprävention älterer Menschen, unter Berücksichtigung der bisherigen Erkenntnisse auf dem Gebiet der Analyse koordinativer Fähigkeiten. Parameter zur Validierung der Körperbalance, als wesentlicher Aspekt der Sturzprävention, und die dafür geeignete Messtechnik zur Erfassung, sollen definiert werden.	
The main focus of this project is to create a concept for an ideal analysis and training device which improves body stability and prevents elderly people from falling. Therefore the parameters for a validation of the body balance must be defined and methods to measure those will be screened. In addition, the concept will contain considerations on how technical equipment meets the special needs of elderly people, e.g. design, safety systems.	

Psychologie und Gerontotechnik	Universitätsklinik für Neurochirurgie, Medizinische Universität Wien
Humanressourcenprojekt	**Psychologische Einflussfaktoren auf das Nutzungsverhalten und die Akzeptanz von Gerontotechnik am Beispiel der tiefen Hirnstimulation**
Das Projekt soll die psychologischen Einflussfaktoren auf Akzeptanz und Nutzungsverhalten eines Patientensteuergerätes vor und nach einem Training bei älteren Menschen mit tiefer Hirnstimulation evaluieren. Das Gerät erlaubt den Patienten eine aktive Beeinflussung ihrer Therapie, wird aber in der Praxis nur wenig genutzt. Durch Einbeziehung der Psychologie soll die Schnittstelle Alter und Technik optimiert werden.	
The current project aims to evaluate the psychological factors underlying the acceptance and usability of a therapy controller prior to and after patient education. Elderly parkinsonian and tremor patients use this controller after deep brain stimulation allowing fine tuning of neurostimulation. However, in practice, patients rarely use this device. The overall goal is to include psychology at the interface between ageing and technology.	
Projektpartner:	Institut für klinische, biologische und differentielle Psychologie, Universität Wien

Voice-over-IP-Widget	Gierlinger Pucher GesbR
Konzeptinitiative	**Browser basierte Internettelefonie für soziale Netzwerke**
Ziel dieses Projektes ist die Konzeptionierung und Entwicklung einer browserbasierten Telefonielösung (Voice over IP (VoIP) Telefonie), welche ohne Installation von Software die Sprachkommunikation von einer Webseite aus ermöglicht. Da diese Applikation in jegliche Webseite eingebunden werden kann, ist die Integration in Soziale Netzwerke ein angestrebtes Ziel.	
The aim of this project is the conceptual design and development of a browser-based telephony solution (voice over IP (VoIP) telephony) offering voice communication from a web page without the installation of software. As this application might be embedded in any web page, the integration in social networks is an aspired aim.	

PROJECTS PRESENTED AT THE YOUNG RESEARCHERS' AND PHD WORKSHOP

Leopold Hayer[1]

Young Researcher / PhD student	Project
Aquilano, Michela ARTS Lab, Scuola Superiore Sant'Anna per gli Studi Universitari e di Perfezionamento, Pisa Italy	**AAL Solution for Night Monitoring in Nursing Homes** In order to support the monitoring and improve the quality of assistance in nursing homes, an AAL system, based on a ZigBee sensor was developed and tested. Following benefits of this AAL solution came out: modularity, low invasivity, reliability of the recognized events, easiness to be used from sociomedical staff.
Bordoni, Alberto The Laboratory for ICT Technologic Transfer (T3Lab) in Bologna Italy	**Casattenta (Aware Home)** The aim of "Casattenta" (Aware Home) project is to build a wireless network that integrates ambient sensors with biomedical sensors, in order to monitor critical situations in houses inhabited by elderly people. Moreover, the system is aimed at providing communication between elderly people and the outside world by Internet video-chat.

[1] Leopold Hayer holds a Master's degree in sociology, and is library and information expert.

Buiza, Cristina Instituto Gerontológico Matía - INGEMA, Donostia - San Sebastián Spain	**Tele-Monitoring Tools for the Improvement of Assistance in Alzheimer's Disease** The research project seeks to develop new technologies for the classification of the different stages in Alzheimer's disease. The expected results are in brief: a) the improvement of the early diagnosis of Alzheimer's disease and of the treatment provided by health care professionals; b) the possibility of Alzheimer's patients to stay at their homes as long as possible through the help of tele-monitoring devices; c) the upgrading of the assistance provided to patients suffering from Alzheimer's disease in sociosanitary centres; and finally, d) the improvement of patients' and caregivers' quality of life.
Conci, Mario Faculty of Cognitive Science, Trento Italy	**Mobile Phone Acceptance by Older People: Building and Validation of a Theoretical Model** In this work the adoption and use of mobile phone by older people is investigated, considering both utilitarian (perceived usefulness) and hedonic (enjoyment) constructs. The findings show a significant influence of intrinsic and extrinsic motivations on mobile phone adoption. Particularly, older people think that mobile phone is useful and increases self-actualization; it is still perceived as an alien device, though, manifested in a strong need for external support in its usage.
Cottone, Riccardo The Laboratory for ICT Technologic Transfer (T3Lab) in Bologna Italy	**Casattenta (Aware Home)** See project description above (Bordoni, Alberto).
Etxeberria, Igone Instituto Gerontológico Matía - INGEMA, Donostia - San Sebastián Spain	**Tele-Monitoring Tools for the Improvement of Assistance in Alzheimer's Disease** See project description above (Buiza, Cristina).
Floeck, Martin Institute of Automatic Control (IAC), University of Kaiserslautern Germany	**PAUL, the Personal Assistant Unit for Living** PAUL is a tablet-PC-based multi-purpose AAL interface featuring VoIP communication, a video entry phone, the control and visualization of the home automatic components, a web browser. A background task is health-monitoring by recording actvity and inactivity patterns. Should unexpectedly large deviations of the actual pattern be detected, an alarm will be triggered.

Gulyás, Máté Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics Hungary	**BPMA and DiScA: Blood Pressure Monitor and Dietetic Scale & Recipe Book Assistants** The BPM Assistant helps the patients monitor their blood pressure easily at regular intervals, prevents false hypertension alerts, rules out the white-coat hypertension, and improves the compliance of the patients. BPMA allows also remote monitoring and management which enables the medical staff to adapt drug dosages to the current condition of the patient. DiScA, the dietetic scale and recipe book assistant measures, calculates and keeps track the nutrition contents of the consumed food with the help of an electronic recipe book and the nutrient tables of the ingredients, stored in a PostgreSQL database.
Hamilton, Peter Fachhochschule Technikum Wien Austria	**Safe Private Homes for Elderly Persons [CARE]** A biologically-inspired neuromorphic vision sensor will be integrated in the Everon system from EXREI for seamless analysis and tracking of elderly persons' behaviour at home. This real-time information can be exploited for incident detection, and instantaneous alarming the concerned parties.
Heine, Thomas Institute of Physical and Theoretical Chemistry, Tübingen University Germany	**Netcarity** This contribution focuses on the state of the art microsystems technology solutions for robust fire detection as well as fall detection as piece of a holistic AAL approach.
Helfenbein, Tamás Department of Control Engineering and Information Technology, Budapest University of Technology and Economics Hungary	**Modern Motion Sensor Development** The motion detection sensor which uses both camera and infrared technology can more robustly detect motion in indoor environments. Using wireless technology sensor can send alert signal and/or images to the user in case of motion is detected. Due to the reliability, small size, ease of application, low power consumption and networking capabilities it can be suitable for security, homecare and AAL applications.
Jagos, Harald CEIT RALTEC, Schwechat Austria	**Development of a Wearable Measurement System to Identify Characteristics in Human Gait - eSHOE** The idea is to integrate a gait monitoring system into a shoe insole. One of the projects superior goals is to conclude, from the detected gait parameters, the risk of falling among elderly people.

Kaiser, Iris Medical University of Vienna Austria	**Gerotechnological Aspects in Health Care: on the Example of Patient Controllers for Deep Brain Stimulation** The aim of the study is to discuss gerotechnological issues on the example of DBS controllers. The present study forms the initial point for future studies that include the patient's perspective and points out possible usability flaws of DBS controllers to create new impulses for industrial design and to increase the use and acceptance in patients.
Klooster, Jan-Willem van 't Telemedicine Group, Faculty of Electrical Engineering, Mathematics and Computer Science, University of Twente, Enschede The Netherlands	**On the Requirements Elicitation for Home Care ICT Services** In the requirements elicitation process, end-users were involved using a holistic patient model, the ICF (International Classification of Functioning, Health and Disabilities). This model reflects on the social aspects of health, as it positions persons in their bio-psycho-social context: it not only covers the status of the body functioning and structure, it also considers activities and social participation. The model also provides guidelines for using its classification and aids in developing services for the assessed subject through identifying problems in the complete health status.
Konstantinidis, Evdokimos Lab of Medical Informatics, Medical School of the Health Sciences Faculty, Aristotle University of Thessaloniki Greece	**ICT for Independent Living** The research work is towards a service that can provide senior citizens greater support towards their independent living. The heart of this service is an integrated ICT platform which combines state-of-the-art cognitive exercises against cognitive decline with physical activity in the framework of an advanced ambient assisted living environment.
Krukowska, Marta School of Computing, University of Dundee Scotland	**Email Work Flow Management for the Ageing Workforce** The aim of this project is to bring together the research on e-mail productivity and workflows with human-computer interaction research and the development of assistive technology to assist the ageing population. Main objectives include: identifying bottlenecks and barriers in the use of email workflow, supporting older users through prediction using templates derived from workflow analysis, developing an appropriate email user environment and evaluating the developed system with people from different age groups.

Lablans, Martin Institut für Medizinische Informatik und Biomathematik, Universitätsklinikum Münster Germany	**AAL Box: Improving Social Interaction of the Elderly** The project aims to create a piece of equipment called AAL box meant not only to monitor its user's health, but also to promote integration into social life and facilitate communication among existing and new contacts. For this purpose, the device maintains communication to relatives and friends as well as proposes activities and events that help establishing more intensive social contacts. These proposals take into account the current medical condition, thus adding to a healthier life.
Lazelberger, Erich Austrian Institute of Technology GmbH Austria	**Camera System for Personal Safety** This research work is about a closed circuit television system in combination with a biometrical algorithm for face recognition called triple eye cam which is able to identify persons to support elderly people's safety. The objective is to realize a system comprising a biologically-inspired stereo vision sensor, a smart camera, a server connection, an infrared floodlight and a pan/tilt unit for the biometrical identification of persons.
Lilgenau, Anneliese Institut für Pflegewissenschaft, Universität Wien Austria	**Ambient Assisted Shared Living for the Elderly (AMASL). Evaluating the User Perspective. A Siscussion about Methodological and Ethical Issues** The aim of the interdisciplinary project is to include elderly people into the lives of their relatives and friends. Technology should therefore be used to create an Ambient Assisted Shared Living (AMASL) space. To evaluate the technical solution of ambient assisted shared living an extended field study will be carried out over a few months to derive in depth results about user acceptance and the effects of the technical solution on well-being, social integration and communication.

Matolin, Daniel Austrian Institute of Technology GmbH Austria	**3D Surveillance System without Complex Peripheral Hardware Based on a Bio-Inspired Image Sensor Technology [CARE]** The dissertation deals with a new kind of image sensor consisting of a pixel which combines a temporal change detector with time-based photo-measurement. The change detector autonomously recognizes temporal changes of illumination, which significantly reduces the effort in application for person detection in the observed scene.
Nieke, Philipp Department of Biomedical Engineering, University of Applied Science Technikum Vienna Austria	**Interoperability in Ambient Assisted Living (AAL): Standardization of Sensor-Data Based on ISO/IEEE 11073** This study shows that it is possible to apply the standard to existing sensor-networks by designing the agent with appropriate mapping methods between manufacturer- and ISO/IEEE 11073 nomenclature. Therefore certain software-modules make the application of the standard independent from the sensors and sensor data protocol. The flexible bodywork of the designed agent allows its usage for specific sensor networks from different manufacturers without great effort, whereas the "once-implemented manager" can be applied for any ISO/IEEE 11073-10471 Independent Living Activity Hubs.
Nijhof, Nienke Universiteit Twente, Enschede The Netherlands	**Dementia and Technology** The purpose is to explore the possibilities for technology interventions for dementia to make founded decisions for the use of technology in the healthcare. In different projects will be used to look at the self-care, quality of life, assistance for family caregivers, feeling of safety and work satisfaction for the person with dementia, the family caregivers and the professional caregivers. Within this research there also will be looked at the possible financial advantages with technology for people with dementia. Due to the different projects there will be input for a business model.

Oberzaucher, Johannes CEIT RALTEC, Schwechat Austria	**Extramural Gait Analysis with an In-Shoe Measurement System** The goal is to realize a system for a gait classification by in-shoe measurement and automated computer-aided interpretation of spatiotemporal gait-parameters. By using different classification-methods it will be evaluated if it is possible to use the extracted gait parameters to classify whether a person has an increased risk of falling or not.
Oppenauer, Claudia Department of Clinical, Biological and Differential Psychology, Faculty of Psychology, University of Vienna Austria	**Psychological Variables in Technology Acceptance of Older Adults by Means of Internet Use** A prevalent approach to explain technology use is the Technology Acceptance Model (TAM). Studies indicate that the Selection, Optimization and Compensation (SOC) model by Baltes and Baltes which describes a successful coping strategy in old age is able to explain technology adaption in older persons. Consequently, an extended TAM version including health and psychological needs and SOC strategies is evaluated in an online survey dealing with internet use among German language 60+ years adults.
Páli, Viktor Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics Hungary	**MeReA - Medication Reminder Assistant** The goal is to develop an open source program to solve the problems of purchasing and taking various medicaments by patients who often live with limited abilities. MeReA aims to provide them with all the necessary and important information in due time and through the proper channel. Since it is deemed important to study the long-term tendencies from a medical doctor's point of view, MeReA will allow also such examinations in addition to the medication reminder function.

Sack, Martijn Department of Distributed and Mulitmedia Systems, Faculty of Computer Science, University Vienna Austria	**AMASL - Ambient Assisted Shared Living** AMASL is based on the integration of technologies as audio-video systems, sensors/actors, and distributed systems knowledge. The outcome of the project AMASL aims at three classes of applications: first, elderly people should be socially included; second, relatives or care taking organizations should have the possibility to provide help for daily routines; third, there should be audio-visual support in case of emergency, which can be used by authorized people such as care takers and relatives.
Salminen, Juho Lahti School of Innovation, Lappeenranta University of Technology Finland	**Applying Collective Intelligence for Idea Evaluation at the Front End of Innovation** Principles of collective intelligence were applied in an idea evaluation tool, a prototype of which was then tested in a case organization. The prototype was able to evaluate ideas effectively and it was highly accepted in the organization. A similar tool could also be applicable for capturing the ideas and knowledge of elderly people in order to increase the usability of solutions developed to improve their quality of life.
Soutschek, Stefan Department of Psychiatry, University of Erlangen-Nürnberg Germany	**InformARTik: Technology, Art and Communication** "InformARTik" focuses on intuitive interfaces between elderly people and the integrated technologies. The aim is to utilize artwork as access to modern communication technology and additionally to use it as transportation vehicle for clinical relevant data. Within this project new and innovative methods are developed to direct the attention especially of elderly people to clinically relevant areas, to impart knowledge and to offer screening and diagnostic instruments.
Spiegl, Werner Department of Computer Science, University of Erlangen-Nürnberg Germany	**Speech Controlled Home Assistance System for Elderly People** To elongate the independency of elderly people at home a home-assistance system comes in handy, which integrates available technology in the accommodation to support seniors in their everyday life. The core of the proposed home assistance system is a dialog system, which allows a comfortable and intuitive interaction through spontaneous speech.

Storf, Holger Fraunhofer-Institute for Experimental Software Engineering, Kaiserslautern Germany	**Behavior Monitoring in Ambient Assisted Living** One part of behavior monitoring is the detection of short-term deviations from the typical behavior of the assisted person which may indicate a critical emergency situation. Another important part of behavior monitoring is the detection of long-term deviations in the persons behavior which may indicate typical diseases of elderly persons. Therefore it is important to detect characteristic activities in the person's life like the so called Activities of Daily Living (ADL).
Szabó, Tamás Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics Hungary	**BPMA and DiScA: Blood Pressure Monitor and Dietetic Scale & Recipe Book Assistants** See project description above (Gulyás, Máté).
Sznyida, Róbert Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics Hungary	**MeReA - Medication Reminder Assistant** See project description above (Páli, Viktor).
Tomasi, Lorenzo The Laboratory for ICT Technologic Transfer (T3Lab) in Bologna Italy	**Casattenta (Aware Home)** See project description above (Bordoni, Alberto).
Törne, Mari Satakunta University of Applied Sciences Finland	**Liberty and Absence of Grounds for Disqualification in Life - Safe and Changeable Kitchen** This research project aims to respond the needs of society that supports everyone for independent and unrestricted life in every stage of life span. The focus of this research project is developing changeable kitchen that is suitable for elderly people and people with different disabilities.
Tóth, András Institute for Applied Telecommunication Technologies, Bay Zoltán Foundation for Applied Research, Budapest Hungary	**Personal Electronic Nurse - Medical Monitoring System** The primary goal of this study is to establish real time monitoring of the patient's vital signs in a system called the Personal Electronic Nurse (PEN). The biomedical data for each patient, are preprocessed on the PEN Mobile Device and transmitted to a Data Collection System using wireless communication and embedded technologies. The other goal of the system is to monitor patients' activity.

Urdaneta, Elena Instituto Gerontológico Matía - INGEMA, Donostia - San Sebastián Spain	**Tele-Monitoring Tools for the Improvement of Assistance in Alzheimer's Disease** See project description above (Buiza, Cristina).
Yin, GuoQing Institute of Computer Technology, Faculty of Electrical Engineering and Information Technology, Vienna University of Technology Austria	**ATTEND** Within the scope of the project ATTEND a system will be developed that comprises an intelligent, adaptive network of sensors, which are to be installed in the living environment of the user in order to thoroughly observe his behavior. The system is intended to increase comfort, security and social inclusion of the customer and ideally also help with the early detection of upcoming medical problems. In case of an emergency the system can contact primary and secondary users (family, neighbor, care giver) via external interfaces.
Zakraoui, Jesia Institute "integrated study", Vienna University of Technology Austria	**Agent Assisted Web Accessibility Enhancement for Ageing Population** The major contributions of the thesis are the formalisation and conceptual integration of three resources: the concept of an automatic generation of User's context, User Interface and Interaction Modalities ontologies. These resources serve as a basis knowledge for User interface adaptation and the concept of ontology-based communication among a set of agents.

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