ICT enabled independent living for elderly

A status-quo analysis on products and the research landscape in the field of Ambient Assisted Living (AAL) in EU-27

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Imprint

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Geographical abbreviations

In this study the following abbreviations for the member states of EU-27 are used[1]:

Abbreviation	Nation
AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EL	Greece
EE	Estonia
ES	Spain
FI	Finland
FR	France
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	The Netherlands
PL	Poland
PT	Portugal
RO	Romania
SI	Slovenia
SK	Slovak Republic
SE	Sweden
UK	United Kingdom
EU	European Union

[1] The abbreviations accord to those used in: Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -50). Report prepared by the Economic Policy Committee and the European Commission (DG ECFIN). Page iv.

1   Introduction

We are living in the midst of an unprecedented transition: the rapid ageing of the inhabitants of the industrialised world, accompanied by a diminishing number of young people. Figures in the Green Paper on Demographic Change launched by the Commission show that by 2030 there will be a shortage of about 20.8 million people of working age in the EU. In 2030 roughly two active people (15-65) will have to take care of one inactive person (65+). And Europe will have 18 million children and young people less than today. This demographic change has, and even more will have, an enormous economic and social impact on various areas. Europe today is still ill prepared to deal with this demographic change and the implications it will have on social, political, and economic structures.

The ratio of old people is rising. Besides labour markets, pension systems and social schemes in general, we have to consider healthcare systems to be heavily affected, as an ageing population will lead to a higher ratio of people with disabilities or chronic illnesses. In the case of elderly people in particular, the increase in multi-morbid disease patterns is well known. In the majority of cases, this involves an extensive care effort: first of all with regard to health costs, caused, for example, by the fact that increasing levels of care are required and more medical services, devices, and pharmaceuticals are needed. Thus, healthcare systems and social care in general – which are typically organised on national level and characterised by national differences in their institutional designs – will have to cope with increasing expenses.

Facing the challenges and opportunities of ageing societies in Europe, there are also chances: technological and socio-economic innovation can enhance the quality of life for older and impaired people, mitigate the economic problems of an ageing population, and create new economic and business opportunities in Europe. It is assumed that new information and communication technologies for elderly people will play an important role in solving some future problems. This assumption constitutes the motivation for the present study.

Europe therefore has to plan how technology can respond to the needs of an ageing society. Computerised systems are already being developed in order to monitor and support a series of daily chores at home and in the surrounding environment. Different areas for activities and application areas for technical support, like homecare, safety, security, privacy, health, wellness, mobility, social interaction, information, life-long learning and more, are currently under discussion. In the area of health care many different ways of technological support are imaginable and partially already under development or even in use, e.g. for the observation of activity patterns, nutrition, sleep or tele-medical support. The application of ICT, combined with intelligent devices and services, will allow the person in question, for instance, to stay in his/her home environment while being medically treated. This individual preference is a widely accepted approach in Europe to support older people to remain self-sufficient in their own homes as long as possible. Consequently, it offers options for cost reduction in parallel with enhanced care quality in some cases.

When it comes to the design and development of new devices and services for independent living, the specific requirements of users have to be taken into account as well. They must ensure and guarantee an accessibility and usability by older people, people with various disabilities as well as other users. Especially elderly people have particular user requirements, e.g. due to their restricted ability to hear, to see or to control ICT equipment.

However, it must be borne in mind that elderly people do not build up a homogeneous group. They differ by age, sex, degree of impairment, biography, income, education, religion, culture, etc. Furthermore, the user's awareness, practical experiences, and expectations regarding technology have to be taken into account, too. That is why standardised technological solutions are not sufficient. Customised and adapted to the particular needs of elderly people, they might, however, enable realistic new business models.

"The use of ICT will contribute significantly to keeping care-related costs manageable, and will also influence the economy through the creation of new market opportunities." – This quote from the tender specifications of this study summarises a core motivation of this study, i.e. the expectation of a considerable reduction of care-related costs – despite the common European demographic trend – and expresses hopes for a new dynamic market, associated with the application of ICT in the health sector.

With regard to individual, economic and social challenges by demographic trends, it is clearly stated that ICT can make key contributions to an independent living of elderly people. This refers to the following points in particular:
▶ ICT can reduce high expenses for health and care services
▶ ICT has the potential to provide individual solutions and hence to meet individual needs
▶ ICT has the potential to improve living standards
▶ ICT opens new business opportunities.

The importance of technical support is especially great for those areas of daily life that cannot be taken over by the family

or other persons. Means and measures that e.g. enable elderly persons to fully participate in society or to master their home situation are mostly connected with ICT. However, sufficient bodies and laws regulating the use of ICT within welfare services are often missing at present. National differences can be especially identified when it comes to financing new, innovative products and services. Here the situation becomes even more complex, heterogeneous and non-transparent, as there often are not any clear and established regulations.

By 2050 about 135 million people in the EU-25 will be older than 65. Nonetheless, the development and delivery of innovative products and services both suffer from a fragmented and heterogeneous market, a lack of Europe-wide standards for ICT products and often enough the absence of a clear national policy support scheme. The market segments for elderly are mainly scheduled in accordance with the requirements and needs of customers or lobby groups. For these interested parties, ICT research projects are out of focus and related integrated research is barely conducted because of difficult funding situations and insufficient ICT know-how. A potential superior implementation of Europe-wide common formalities into national structures and political actions is still lacking. The challenges determining the development, adoption and diffusion of new technologies are different national patterns, regulations and policies, a heterogeneous industrial situation, a set of various payment systems and social approaches. To fully benefit from information and communication technologies, the EU member states need better exploitation plans.

The European Commission has set up several activities under the 6th Framework Programme (FP), which have been continued under the 7th FP to initiate a Europe-wide dialogue among all parties working for an accessible and inclusive information society. These measures served as first input to establish a knowledge base providing a resource for policies and best practices regarding eInclusion and eHealth, and thus to foster research on needs and means for elderly persons. The results and current products already on the market have been analysed for this study. In September 2007 a Joint Programme "Ambient Assisted Living" (AAL JP) was launched[2]. This transnational funding programme focuses on the support of health care and everyday life for elderly people at home. It involves 20 European member states and three associated states. Along with this joint programme, a network of national contact points has been set up with the potential to perform some

international coordination of AAL approaches. Considering the fact that the AAL JP has just been initiated, its impact and success cannot be estimated yet.

Investigations on each European country have been the main basis of this study. This way national approaches and strategies of all member states in the area of independent living for elderly have been taken into account, such as national research funding programmes in the area of independent living for elderly, ICT-based RTD projects with the aim of supporting independent living for elderly, products already on the market, European actors in the area of independent living for elderly, private and public, in research and industry. All this has been supplemented by a literature survey on international scientific publications regarding results of ICT-based programmes or projects in support of independent living for elderly. This desk research comprises mainly web research and an analysis of this information in the context of ICT-enabled independent living.

All these findings have been collected in a database, on which all analyses presented in the successive chapters are based. The main parts of this database comprise European ICT products, national and international research projects and a broad overview of roughly one thousand organisations and companies involved in research and technology developments for ICT for elderly.

This contribution is a re-edited version of the study "ICT-enabled independent living for elderly", which has been prepared on behalf of the European Commission, DG Information Society and Media, Directorate ICT for Citizens and Businesses, ICT for Health Unit and was finished in April 2008. It was supplemented and reorganised afterwards and thus resulted in the present version. Therefore, newer activities centred on issues of Ambient Assisted Living and ICT for Independent Living of Elderly, such as the Ambient Assisted Living Joint Programme and further newer research programmes and initiatives, were disregarded[3]. For a coordinated European procedure, a monitoring of ongoing activities is therefore recommended in order to aggregate results, concepts, solutions, etc.

Chapter overview

Chapters 3 to 6 offer general information and definitions concerning the subject of ICT for elderly people. Chapter 3

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[2] http://www.aal-europe.eu/, last visit 08/19/2009
[3] E.g. the Austrian benefit programme[3] or the British Assisted Living Innovation Platform (ALIP)
     http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/opportunities/current_funding_opportunities/alip.aspx, last visit 09/23/2009.

describes possible future problems arising from the ageing societies in Europe and the "demographic change". It gives statistical data and estimations. The specific needs and demands of elderly people will be discussed in chapter 4. Chapter 5 presents the architecture and structure of the data base underpinning the study at hand and introduces the applied methods for data analysis. There, five AAL research topics are defined that help categorising and characterising research activities. Chapters 6 to 8 provide analyses on stakeholders, products and research activities within the field of ICT for an indepen-

dent living of the elderly. Based on the data analysed during the previous chapters, chapter 9 gives recommendations for additional investigations and political measures designated to improve and increase future AAL products and services. Last, but not least, chapters 10 to 12 contain appendices that give information on AAL-related Research Programmes (chapter 10), mirror the content of the data base underlying the following analyses (chapter 11), and list the titles of further literature used in this study (chapter 12).

2   Management Summary

The following study gives a status quo analysis of the research landscape and the availability of products within the scope of information and communication technologies for use by elderly people. It has been performed on behalf of the European Commission, DG Information Society and Media, Directorate ICT for Citizens and Businesses, ICT for Health Unit and is a condensed edition of a former long version. The study furnished evidence about the extent of ongoing developments in ICT-based solutions which support independent living for elderly. Ambient Assisted Living (AAL) is used throughout the study as an abbreviated term for this thematic area. Resulting from several European funding programmes, AAL has been evolved towards a technical term comprising related approaches.

The present study is the first comprehensive data collection in this field. It comprises about 1000 organisations (private and public) active in AAL all over Europe, 180 AAL products already on the market and about 150 research projects related to AAL topics. Based on this data, an appropriate estimation of central topics, stakeholders, national and European research activities and the orientation of existing products was performed. Besides the data on products and research projects allowing an impression of the status quo, the study followed the hypothesis that organisations active in research projects also furnish information about future developments. Therefore, the study also deploys a classification of relevant stakeholders in AAL.

This study provides analyses based on data collected through internet research, desktop research and interviews. Four general types of information items have been collected: organisations, products, research projects and literature.

The investigations have been undertaken in 27 countries throughout the European Union, documented by the assignment of each item to the executing nation or European

provenance. This assignment has enabled several analyses regarding the amount of activities of the different nations and enabled their comparison.

Besides the national assignment, the database is primarily structured according to the topic addressed by a product, project, etc. Therefore, five general topics have been analysed, reflecting the basic demands of elderly people: "Social Interaction", "Health and Home Care", "Supply with daily goods and chores", "Safety" and more "General" approaches. The products found have also been assigned to specific product groups, classifying their respective application area. All collected data has been condensed into several figures and charts.

Summarising the present study, the following essentials have been derived:
▶ There is an obvious decline from northern to southern nations and from old to new European Union member states.
▶ The national governments serve as main drivers for developments.
▶ The AAL market is still undeveloped.
▶ Most products already available on the market mainly address "Safety and Security", followed by "Communication Devices".
▶ Within the research projects mainly the topic "Health and Home Care" is addressed.
▶ Many relevant partners for an AAL value chain have not been involved yet. This is the case for system providers such as health care services as well as end users and their associations.
▶ Current AAL research projects are dominated by research institutions (i.e. universities and other research institutions).
▶ At present there is a big risk of only technology-driven research.
▶ The only ongoing European consolidation process is pressed ahead by the AAL Joint Programme.

On basis of the information analysed by means of collected data as well as of other underlying literature and our own experiences, as a project funding agency for the German Federal Ministry of Education and Research, the study concludes by the following recommendations:

▶ To jointly initiate a strategic mapping of research topics for all stakeholders by the national governments.
▶ To develop strategies in order to transfer products and solutions between the different nations.
▶ To establish a European competence centre in terms of an independent contact point.
▶ To create approaches how to integrate end users more effectively.
▶ To perform further studies and analyses concerning the individual needs and demands of elderly people.
▶ To foster the development of standards, interoperability and system safety.
▶ To develop test methods to prove the reliability and sustainability of the potential of AAL products and services required.
▶ To increase the awareness of the potential of ICT for AAL with "research-distant" communities.
▶ To analyse main barriers for an AAL market.
▶ To develop business models taking into account the option of large reformation pre-projects with facilitated conditions.
▶ To evaluate the results of the AAL JP projects as soon as they are available.

3 The Ageing Society in Europe

Ageing is one of the greatest social and economic challenges of the 21st century for European societies.

In the following, statistical data from other studies[4] has been collected in order to give an impression of the seriousness of this socio-economic problem. Altogether, only one main statement can be derived from this: During the coming decades it will be impossible to care for all old people in Europe if the existing health care processes and costs should remain the way they are. This is especially evidenced by the ratio between working people and elderly people, which is expected to be one working person for one senior citizen by the year 2050. Therefore, new solutions have to be found. In this context, ICT might be one input technology. That is why this study focuses on this kind of technology.

Even today, Europe has the highest proportion of population aged 65 or more world-wide; only Japan has a similar age structure[5].

It is common knowledge that mainly two developments are causing this ageing process: low fertility rates and an increasing life expectancy, both as a result of crucial social, technological and medical developments. This has been especially true for the last few decades since World War II. From then on, life expectancy has increased from approximately 50 years to more than 75 years. This process is still ongoing. Figure 1 and Figure 2 show male and female life expectancy at birth for every member state of EU-27 for 2004. The corresponding estimates for 2050 are given as well.

In 2004, the average life expectancy for women was 81.5 years and 75.2 years for men. However, there obviously are differences between all member states. For women, the spectrum ranges from 75.4 years (Romania) to 83.4 years (France) while for men, it ranges from 64.9 years (Latvia) to 78.1 years (Sweden).

It is expected that by 2050 the average life expectancy will increase even further. Although demographic data on this score may differ from country to country or even from region to region, they nonetheless display the same common trend: while the total population in each country decreases, the percentage of elderly people increases remarkably (Figure 3 and Figure 4). Again, this shift is different for every member state and gender. For women, it is foreseen to range from 82 years (Romania) to 87.9 years (France). For men, this spectrum is slightly different and will range from 74.3 years (Latvia) to 82.8 years (Italy and Austria respectively).

The bar chart in Figure 3 shows the number of inhabitants for 2004 and the respective estimates for each member state by 2050. Among the member states of EU-27, the population sizes vary a lot. The total number of inhabitants ranges from very small territories like Malta with 0.4 million inhabitants to Germany with 82.5 million inhabitants. Apart from a few exceptions like Bulgaria, the estimates for 2050 show an overall decrease in population.

Figure 4 presents estimated population changes from 2004 to 2050 as percentages for each country. For that purpose, the population differences have been taken as total numbers and been converted to percentages of the population for 2004. In this ranking the often-dramatic cut becomes even clearer.

The former socialist member states in particular show a significant decrease in population, such as Bulgaria (-33.8%), Romania (-22.7%) and Latvia (-19%). The average fertility rate for all member states of EU-27 however (i.e. 1.48 children per woman in 2003[6]) does not explain these extraordinary changes. In fact, other important factors underlie the expectations for future population sizes, such as emigration from economically rather weak to stronger countries (measured by GDP).

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[4] The investigation on demographic data has not been part of the study. The data included in this chapter has been taken from other sources and has been composed for this contribution in new diagrams. The data has mainly been taken from: European Economy, Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -50). Report prepared by the Economic Policy Committee and the European Commission (DG ECFIN). Other references will be mentioned throughout the text.

[5] Börsch-Supan, Axel et al.: Health, Ageing and Retirement in Europe. First Results from the Survey of Health, Ageing and Retirement in Europe (SHARE). Published by the Mannheim Research Institute for the Economics of Aging (MEA), April 2005 (http://www.share-project.org/, last visit 08/19/2009).

[6] Europe Press Release: Europe's changing population structure and its impact on relations between the generations (http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/05/96&format=HTML&aged=0&language=EN&guiLanguage=en, last visit 07/09/2009)
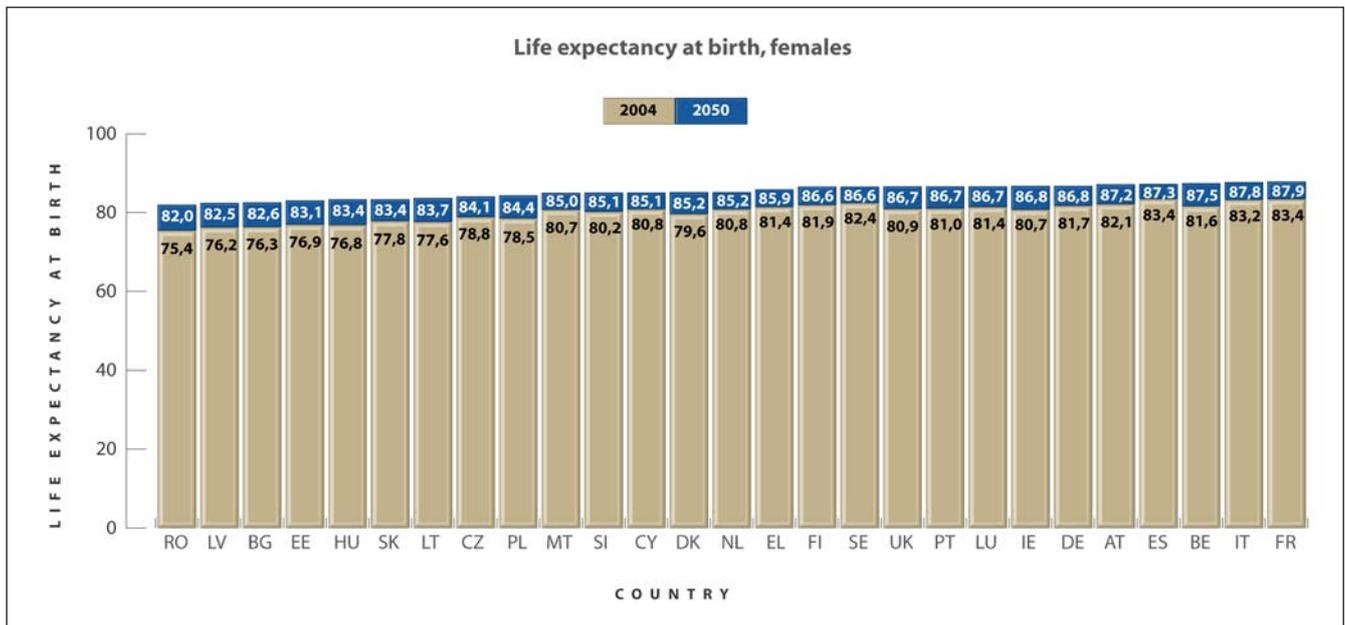
Figure 1: The life expectancy at birth of female persons in all member states of EU-27[7]
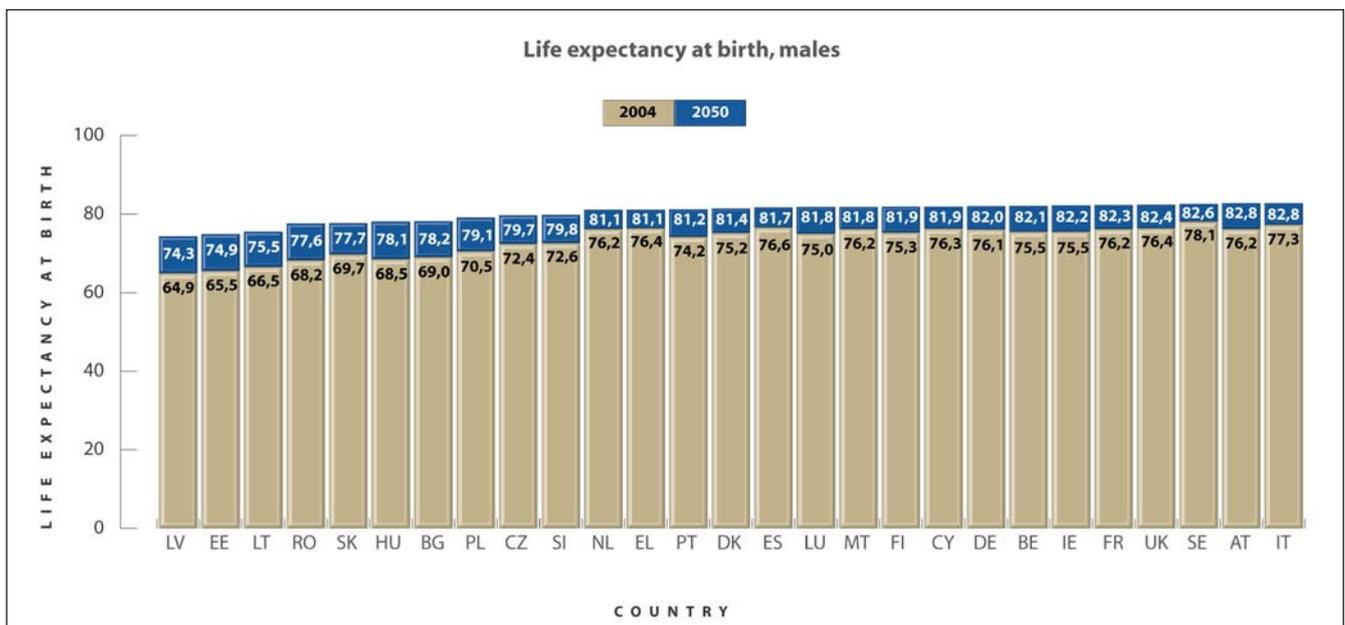
Figure 2: The life expectancy at birth of male persons in all member states of EU-27[8]

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[7] European Commission: Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -50). Report prepared by the Economic Policy Committee and the European Commission (DG ECFIN). Page 27. Data on Bulgaria and Romania has been added on the basis of current numbers to be found on the website of Eurostat (http://ec.europa.eu/eurostat).

[8] European Commission: Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -50). Report prepared by the Economic Policy Committee and the European Commission (DG ECFIN). Page 27. Data on Bulgaria and Romania has been added on the basis of current numbers to be found on the website of Eurostat (http://ec.europa.eu/eurostat).

The population changes in economically richer countries are not as clear as for the weaker countries. Some of the richer nations will face a decrease in population, such as Germany (-6%) and Italy (-7%), while others such as France (+9%) and Sweden (+13%) expect an increase in population. Most strikingly, the top four countries will face a very marked population change, i.e. Malta (27%), Cyprus (34%), Ireland (36%) and finally Luxembourg, which tops the ranking with +42%. Emigration from weaker to stronger countries is one main explanation for these crucial changes among the member countries of EU-27. However, in many possible immigration countries this does not outbalance the weak fertility rates, which are therefore currently facing a negative growth, such as Germany. As the countries at the top are rather small (Luxembourg, Cyprus, Malta), this phenomenon seems to further imply that the total number of immigrants into these countries will be rather small, too.

While Figure 3 and Figure 4 give an overview of total population sizes in general, Figure 5 provides a deeper insight into the population structure with respect to elderly people. This group of elderly includes every person above the age of 65 (65+). Due to their high life expectancy and low fertility rates, the age structure of all European societies will experience a decisive shift towards an overall older population. Between 2004 and 2050 this part of the population will grow in all European countries as a result of sweeping measures, from 30% in Latvia to more than 219% in Ireland (Figure 5).

This unprecedented demographic change will have a great impact on social and economic issues and can, for example, be illustrated by a comparison between people older than 65 and those of working age (i.e. 15 and 64, resp.). This so-called "old age dependency ratio" has received major attention in recent years because it helps translate the social age structure into the related tax and contribution burden of social expenditure, such as pensions, health and long-term care[9].
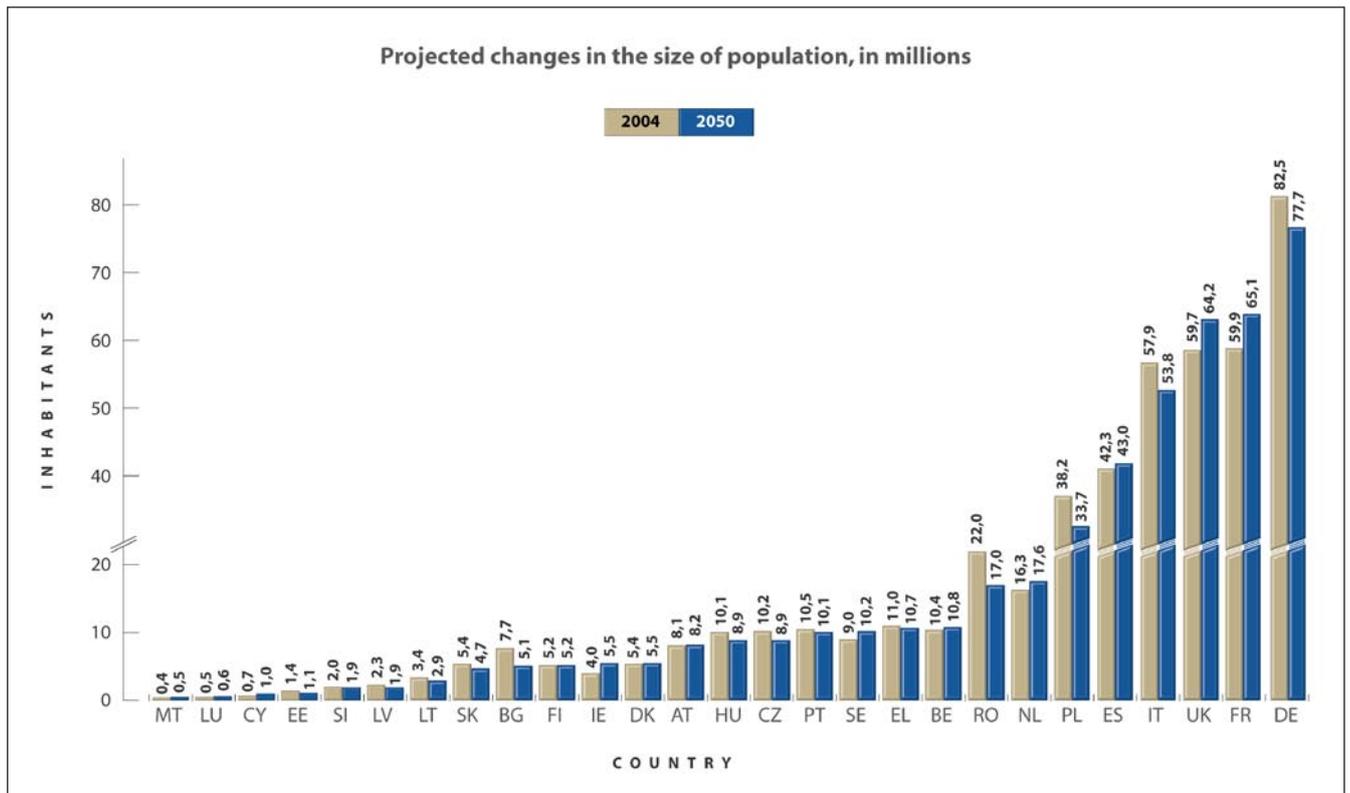
Figure 3: Projected changes in the size of population in EU-27 from 2004 – 2050 in millions (estimation)[10]

[9] SHARE-report: Health, Ageing and Retirement in Europe. First Results from the Survey of Health, Ageing and Retirement in Europe. April 2005 (http://www.share-project.org/, last visit 08/19/2009).

[10] European Commission: Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -30. Data on Bulgaria and Romania has been added on the basis of current numbers to be found on the website of Eurostat (http://ec.europa.eu/eurostat).
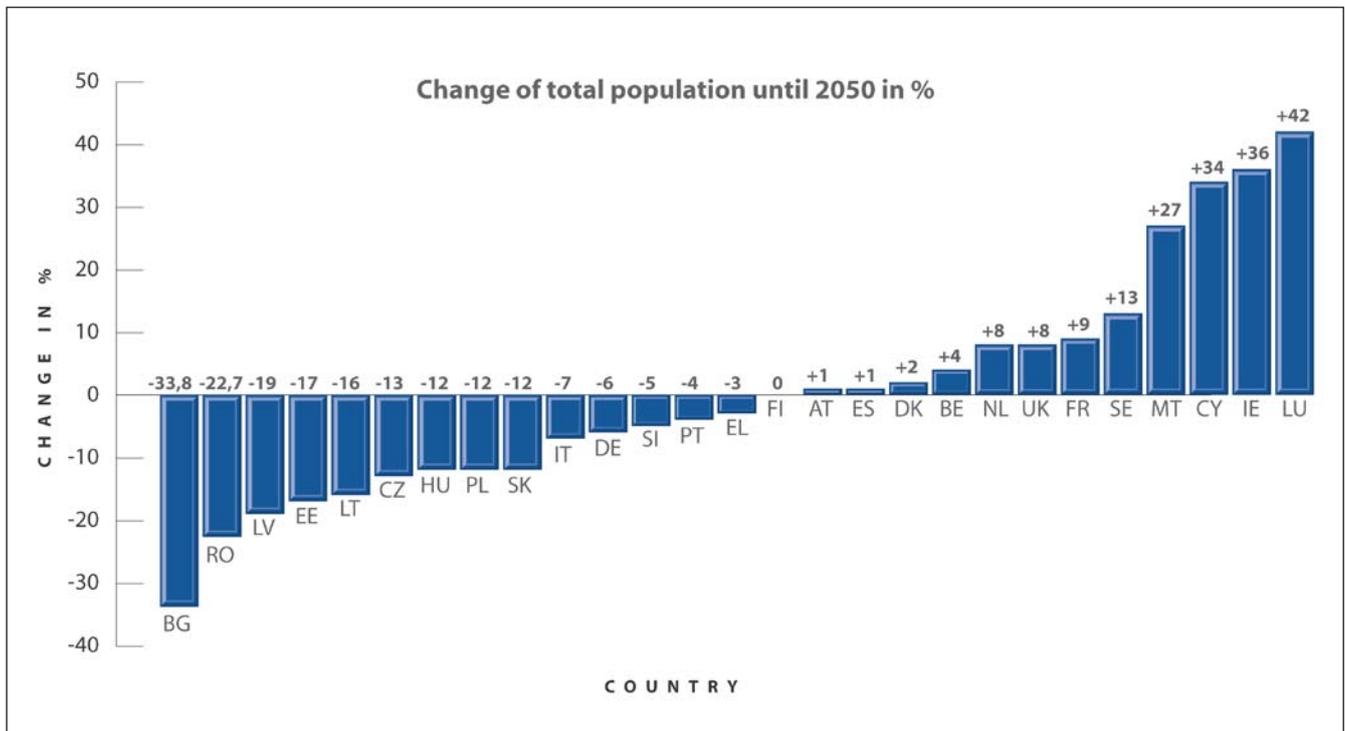
Figure 4: Changes in total populations of EU-27 as a percentage between 2004 and 2050 (estimation)[11]
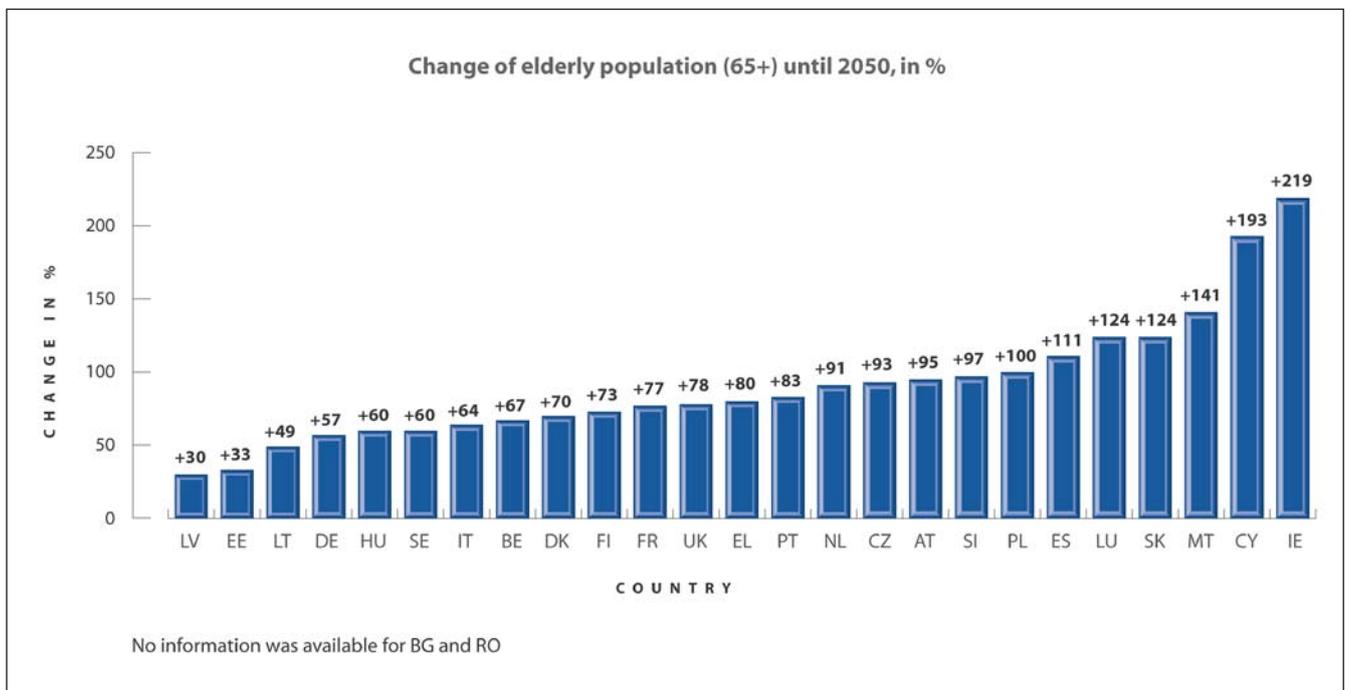
Figure 5: Changes of elderly population (65+) in EU-27 until 2050 (estimation, in %)[12]

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[11] This figure has been created on the basis of the numbers given in figure 3.
[12] European Commission: Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -50). Report prepared by the Economic Policy Committee and the European Commission (DG ECFIN). Page 30. Data on Bulgaria and Romania has been added on the basis of current numbers to be found on the website of Eurostat (http://ec.europa.eu/eurostat).

In 2004 the proportion of elderly people averaged 24.3% for all member states of EU-27. This already high ratio is foreseen to increase even more within the next few decades. According to the baseline projection of Eurostat, this percentage will almost double by the year 2050 (Figure 6)[13]. Assuming an old age dependency ratio of 50.42% in 2050, this will mean that social benefits needed by a single elderly person will have to be generated by one single working person only, whereas this relation used to be one elderly person to about three working persons in 2004. Thus, the increase of elderly people in society by number and percentage will place a heavy financial burden on social costs (e.g. pensions, health and long-term care systems). Different national authorities have already become aware of these problems, which for example can be shown by the estimated public spending on health-

care. In Figure 7 the healthcare expenditures for all member states (as % of GDP) are compared to the prognosticated values for 2050.

Apart from Bulgaria, the public spending on healthcare as a percentage of national GDP will clearly increase in all member states from 2004 to 2050. The spectrum thereby ranges from an estimated change of 0.6% in Portugal to 2.3% in the United Kingdom. However, one must take into account the fact that the healthcare systems may differ greatly among the countries of EU-27, from completely tax-financed to greatly privatised systems. At any rate, the figure yet displays an overall trend to higher rates of public spending on healthcare within the time period in question.
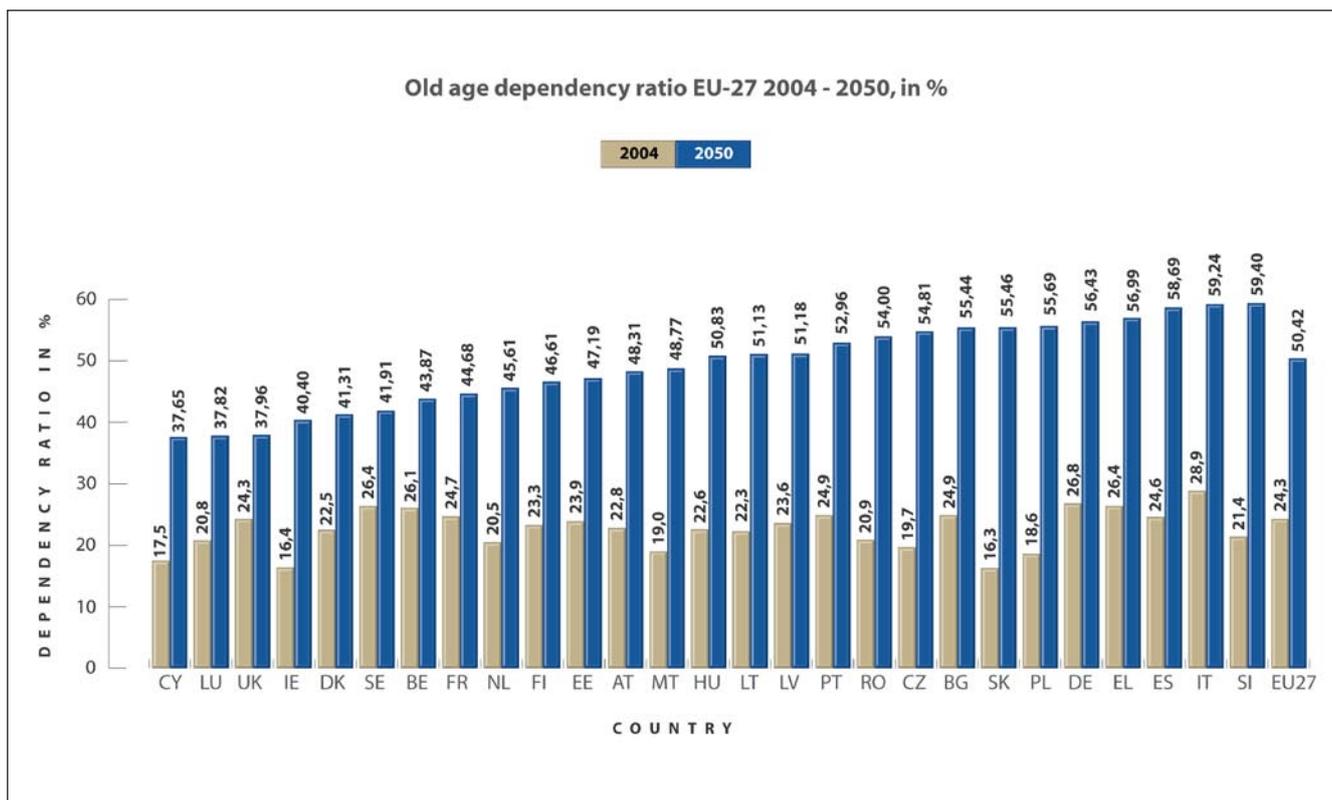
Figure 6: Old age dependency ratio for EU-27 from 2004 to 2050 (estimation, in %)[14]

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[13] http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdde511, last visit 08/19/2009.

[14] European Commission: Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -50). Report prepared by the Economic Policy Committee and the European Commission (DG ECFIN). Page 49. Data on Bulgaria and Romania has been added on the basis of current numbers to be found on the website of Eurostat (http://ec.europa.eu/eurostat).
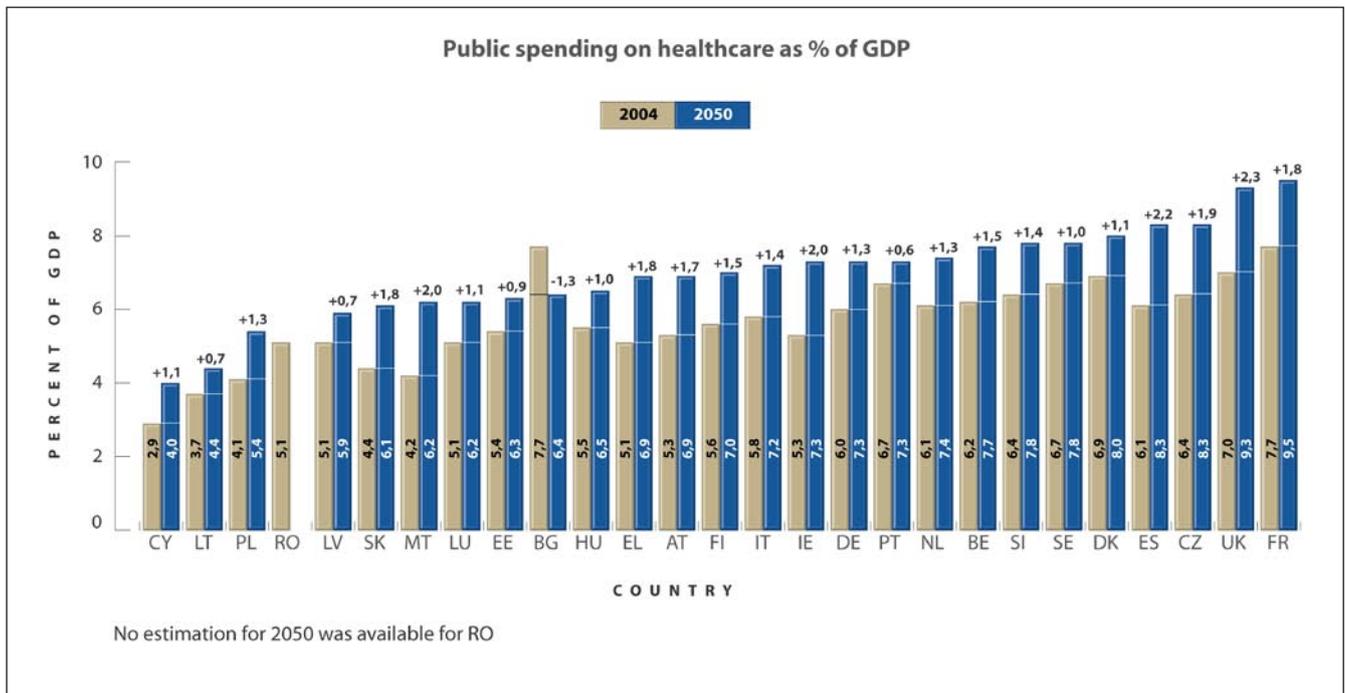
Figure 7: Public spending on healthcare by member states of EU-27 (in % of GDP)[15]

4 Needs regarding Independent Living of the Elderly

The goals for using and applying ICT in the healthcare sector are quite different and depend on the different interests of various stakeholders in a corresponding value chain. To mention just a few, one can distinguish between the interests of governments, care service providers, medical institutions, research facilities and, not to forget, the elderly people themselves. Later in this study, existing stakeholders will be classified and introduced. First of all however, the group of elderly people shall be singled out for further consideration.

The starting point of this study is one important premise: Elderly people want to stay and live in their homes as independently and as long as possible. This premise is not to be discussed here; an excellent summary is to be found for

example in Mollenhaupt 2005 and Malanowski 2008[16]. It is assumed that technology can support living independently at home and to overcome problems that occur in daily life. However, the problems and needs of elderly people who live at home have still not been evaluated sufficiently. To understand these needs, it first of all is crucial to explore the acceptance of technical systems by this customer group.

Ageing affects all domains of an individual's life and causes age-specific barriers, such as limitations of mobility, visual and hearing impairments and a high disease susceptibility, especially for chronic diseases (diabetes, Parkinson's disease, dementia, cardiovascular diseases). With technological advances and improvements in medical care and public health

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[15] European Commission: Special Report No 1: The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, healthcare, long-term care, education and unemployment transfers (2004 -50). Report prepared by the Economic Policy Committee and the European Commission (DG ECFIN). Page 122. Data on Bulgaria and Romania has been added on the basis of current numbers to be found on the website of Eurostat (http://ec.europa.eu/eurostat).

[16] Mollenkopf 2005, S. 28. The need of elderly people to lead an independent life is extensively discussed in the following report by the European Commission: Malanowski, Norbert; Özcivelek, Rukiye and Cabrera, Marcelino: Active Ageing and Independent Living Services: The Role of Information and Communication Technology [A report by the European Commission, Joint Research Centre, Institute for Prospective Techno-logical Studies]. Luxembourg, 2008. Especially the term "Active Ageing" here refers to policies that "enable people, as they grow older, to lead independent lives (socially and economically) and to make a full range of choices in the way they shape their lives in all of its spheres" (p. 9).

policy, the average life expectancy becomes higher. Yet this does not mean that people are necessarily healthier. Especially older people suffer from multiple coexisting medical conditions. The terms "co-morbidity" and "multi-morbidity" are used to describe this phenomenon[17, 18, 19]. Multi-morbidity serves as a key term for the definition of geriatric patients. It helps to indicate the biological age of a patient[20]. Multi-morbidity may be understood as a challenge to adequately develop sophisticated technologies and systems able to deal with more complex disease patterns, patients' needs and care processes. In general, supporting systems can connect to neighbours, family members and service institutions, such as food services or emergency services. These systems are also able to monitor the patient's health state continuously in order to achieve both a higher quality of medical data and better safety because of automatic emergency calls. Moreover, they are often capable of communicating with providers of ICT-related tele-care, tele-therapy, or tele-rehabilitation services[21].

On average, elderly people have an increased demand for support and care in everyday life. This affects all the different activities a person carries out in his or her everyday life, such as washing dishes, going for a walk, driving a car, meeting and communicating with people, shopping, feelings of safety as well as contacting supportive civil services. To be independent in this sense means being able to perform all necessary activities despite such age-specific constraints, even with the support of technology. Nonetheless, the individual interpretation of "independent" differs much in relation to his or her health problems and other affected and unaffected skills. Just to be a little bit more mobile, to do only a certain part of everyday chores, to have access to automatic emergency calls may often be sufficient enough to increase an individual's overall feeling of safety and may thus raise the self-confidence to stay in one's own apartment. Even in case technological solutions coincide with daily monitoring, these technologies might still be accepted because the persons concerned may feel more independent by their usage. Some empirical results substantiate such assumptions. To give a concrete example: At the Charité hospital in Berlin Professor Steinhagen-Thießen supervises a project where patients suffering from the effects of strokes are rehabilitated by the support of software training programmes enabling continuous motion monitoring. As could be shown

throughout this project, the patients surprisingly favoured the software over a constant presence of a physical therapist, as they then often experienced feelings of shame. The software records the patients' motions in detail in order to be analysed later. The software thus allows people to feel more independent from the therapist, especially as it could also be used at home. Its application could thereby help increase the patients' compliance and the quality and scheduling of monitoring.

The main concern of how to support independent living for elderly relates to the way in which the well-being of elderly persons can be guaranteed despite possible age-specific constraints. This problem calls for holistic concepts focusing on the individuals' life quality. In order to facilitate a better understanding of the individual requirements of elderly, the German company VDI/VDE-IT, together with the European Executive Board of the AAL Association, developed a model which classifies needs of elderly people for their well-being in accordance with important stakeholders (Figure 8)[22].

A basic difference has been drawn between factors of the individual's domestic environment (@home) and its outer surroundings. All specific needs of elderly more or less belong to either one side.

Health and Wellness

It is assumed that health and wellness (well-being + fitness) are basic needs of people in general and of elderly people in particular. Wellness and health are interlinked very closely. Wellness comprises fitness as an activity to improve one's physical status. One approach to enable living at home as long as possible is to support wellness activities. Personal wellness is an individual motivation and could e.g. be supported by activity planning, recording, feedback and linkage to health factors (weight, blood pressure, cholesterol levels, etc.) In fact, wellness can also be considered as a kind of prevention. In this sense, it constitutes a part of health care in the domestic area.

One aim of health care is the prevention or early detection of specific diseases (e.g. arthritis, osteoporosis, fractures as

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[21] Mollenkopf DZFA, S. 4.

[22] For further information on the AAL Joint Programme, please consult the related website: http://www.aal-europe.eu/, last visit 08/19/2009.
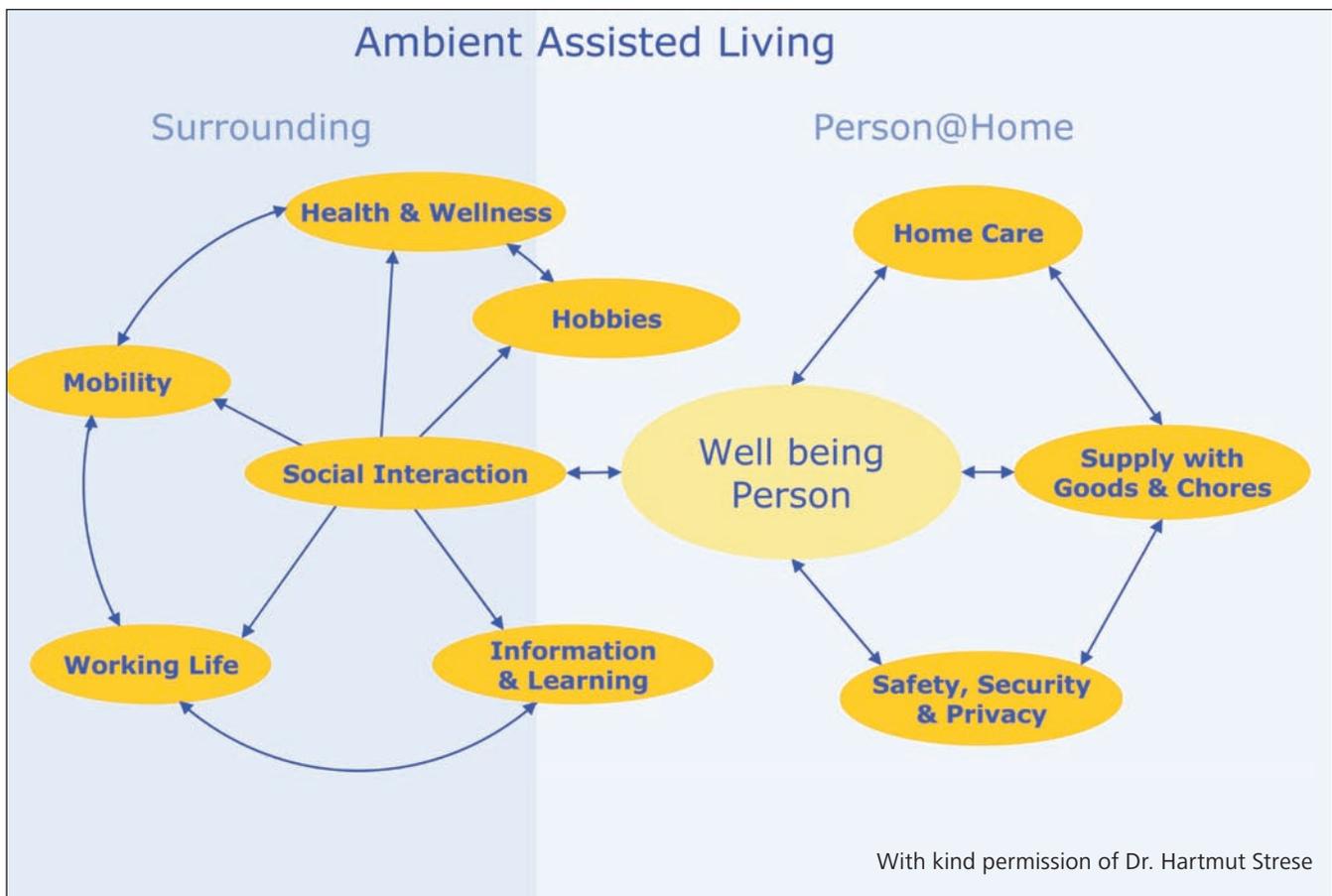
Figure 8: A multi-factor model displaying the needs of (elderly) persons for continued well-being

a consequence of fall, heart disease/stroke, cancer, diabetes, depression, dementia, sclerosis, asthma, sleep apnoea). Physical health barriers like pain, mobility impairment, adverse drug reactions, fall-related injuries or sensory loss have to be overcome.

Home Care

Today, family care is the predominant model of support for older people. The trend to single-generation and single-households leads to a crisis of family support. Considering the anticipated demographic changes, there will be a tremendous lack of formal infrastructure available to provide support in future. Nonetheless, to enable independent living for elderly people means for them living within their familiar homes as long as possible. The gap might be compensated by home care solutions and assistive technology. But elderly persons do not adapt to new environment as easily as younger people. They feel best at the place they have been living for years, surrounded by things, persons and places they are familiar with. For the overall well-being of an elderly person, it is therefore not favourable to bring him or her into a new, unfamiliar or

even anonymous living environment. Certain technologies may help to maintain an independent and autonomous life of elderly persons within their domestic area even though they may face certain health barriers.

Chores & Supply with Goods

During the last 100 years, there has been enormous progress in technical aids for homework. It is reflected in the creation and development of domestic electrical devices, such as washing machines, fridges, dryers, flat irons. For other strenuous chores like window cleaning, there are currently no technological solutions on the market. It is important to mention the fact that elderly people have a stronger need for more appropriate equipment in the household. They often need more devices that are lightweight, easy to handle, and provide good support in everyday life.

Problems of elderly people in performing everyday tasks have been reported, as e.g. the hanging of curtains (55%), the fixing of household devices (51%), the cleaning of windows (45%), ironing (34%) and making the bed (34%). Moreover,

lifting and carrying of minor loads (i.e. less than five kg) and even walking might cause problems, too. The supply with daily goods is also an important problem for older people (e.g. shopping).

Safety, Security and Privacy - Peace of Mind

It is very important for elderly persons to have control of and clear visibility of whatever occurs within the domestic environment. The reliability of assistive technologies in the everyday living space is crucial, but always has to respect privacy. They have to address specific fears of elderly persons in order to increase their particular sense of security and should thus concern typical fears of burglary, leaving the house at night, falling, forgetting to lock the door or to switch off the cooker.

In this context, certain ethical aspects should be taken into account as well. These especially concentrate on the confidentiality of information and the way information is handled. It shall be understood that the autonomy and freedom of action of users must always be guaranteed under any circumstances.

Mobility

For elderly persons mobility is essential to maintain an altogether autonomous living. This includes freedom of moving, the ability to reach things or to train the body. It furthermore is an essential need for a person's well-being and independency to be able to move between places without any physical hindrances. That is why it is necessary to remove all barriers and to provide assistive technologies that strengthen the mobility of elderly persons. This also includes technologies supporting and assisting an impaired elderly individual in driving a car or other vehicles as well as other means enabling an elderly person to cover longer distances.

Information, Learning and Education

A typical risk of ageing is the loss of everyday competencies. Considering that professional and familial support options are continuously decreasing, technological devices are able to provide compensation and assistance. Today's IC technologies (internet or interactive TV) enable people to use a broad variety of information and education offers without the need to leave their home. Modern devices like mobile phones, handhelds or e-newspaper allow elderly people to stay informed. Information is essential for individual development, maintaining contact with the outer world and preserving and

exercising mental abilities. Conversely, services are needed to enable the people to handle the new technologies.

Social Interaction

Every person is a social being and desires face-to-face interaction with others. Interaction with other people is the basis of social life in general. It covers various aspects, such as communication, information, maintaining contacts and staying an active participant of society. Due to age-specific losses of competencies, the loss of friends because of death, isolation or loneliness however are typical phenomena of ageing. They are a mental health barrier. A great part of all emergency calls by elderly people is only made because they feel lonely and search for human closeness. Basic social needs in this sense comprise:
▶ maintaining links to social networks and places people have progressively built up in their lifetime,
▶ spending time with family, friends and other important relatives,
▶ having real physical contact with people living in the neighbourhood,
▶ being active in different communities (church, clubs, hobbies, voluntary organisations).

Hobbies

For most people hobbies are the most important occupations for social interaction, self-development and recreation. Games, music, reading, walking, playing golf, collecting objects or just talking are common activities to spend time with equally interested people in a convenient way. Apart from these rather conventional leisure activities, ICT may also help elderly to maintain their hobbies or even find new ones, especially in case they are suffering from typical ailments that constitute hindrances. This is an opportunity that still has not been explored so far. For instance, it is imaginable that elderly build and visit virtual communities of persons with same or similar interests. With broadband access to the internet not only mailing or chatting, but online gaming and gambling would also be possible solutions.

Working life

Working at home can roughly be divided into two categories: physical work (that is working with full physical ability, for people without any mobility problems) and mental work, which also is possible for physically impaired people. The exclusion of elderly people from work due to their retirement

often causes grave psychological and even medical problems, as they lose a central part of their earlier everyday life. Feelings of senselessness, boredom or emptiness are possible consequences arising from this transition from working life to retirement. Additionally, the drop-out from working life may also cause severe social problems, as the working space is also a social space enabling relatively stable contacts and relationships with other people. Thus, there is an overlapping of the well-being aspects "working life" and "social interaction".

One challenge to maintain the well-being of elderly people therefore consists in the question of how to meet the need of elderly people to fill the gap resulting from the loss of an active working life. Constructive activity is an essential need of individuals for their self-fulfilment and therefore also serves therapeutic purposes. That is why it is very crucial to develop concepts for a working life of elderly people that take into account social, medical and psychological aspects, as elderly people may suffer from a loss of earlier mental and physiological capabilities. Technological solutions to meet these needs and deficits, such as applications supporting or enabling work at home, may therefore be very preferable.

These needs have led to the basic classification of the database underlying the analysis. The next chapter will present the database structure in detail.

5   The Database of this Study

5.1 Fact Finding Approach

This study has been performed in parallel with the political decision process designed to establish a new funding programme named "Ambient Assisted Living" (AAL). It has been based upon article 169 of the Maastricht treaty. Therefore, a better understanding of member states' activities about "Independent Living for the Elderly' shall be given on the following pages. Research activities and products presented in this study are intended to extend the lifespan of people to live independently in their own home environment. New funding programmes addressing the common European demographic development will play a crucial role for an up-take and deployment of ICT. One of the results of the study is that the preparation of the Ambient Assisted Living Joint Programme has experienced an important first impetus by the establishment of a few national programmes and the conduction of several national calls for R&D proposals in related areas.

The study Best Practises in Europe on "ICT-enabled independent living for elderly" SMART 2006/0055 was called for by the European Commission, DG INFSO, ICT for Health Unit and executed by VDI/VDE Innovation + Technik GmbH from April 2007 until July 2008. The present contribution is a shortened version of the original study, representing the data obtained in a number of figures.

The study has been conducted as a fact-finding mission. Extensive desk research comprised the search for information – mainly web research – and the analysis of this information for the context of ICT-enabled independent living. To a major extent, the required information was retrieved from online sources, i.e. web pages and documents available from the World Wide Web. Information was searched in all European member States, concerning e.g.
- public policies within the concerned domains,
- national and regional public funding programmes,
- national research projects in the respective domains,
- available products,
- related literature,
- relevant stakeholders, organisations and persons.

This study clearly focuses on the perspective of which kind of ICT-based solutions may help to prolong the period when a person can remain in his or her preferred home environment. ICT applications targeted at an increase in the efficiency of (mainly administrative) processes within the medical sectors (or within a hospital) are not likely to change the status of an elderly person towards more self-autonomy. Hence, eHealth applications, such as digital infrastructures or implementations of electronic health cards, will be disregarded. It appeared however that very often the differentiation of products between ICT to support independent living for elderly at home and infrastructure approaches are not clear. This can be put down to the fact that even though certain infrastructures are needed for an implementation of, for example, tele-medical services, these essential conditions however do not exist yet. Projects often address both an infrastructure approach and a specific application. Due to this differentiation problem, the study only considers applications explicitly addressing elderly people. Infrastructural technologies and B2B basic components have only been included here in case they have explicitly been offered and advertised as AAL solutions. An important decision was to only concentrate on the needs

within the domestic area. This results from the premise that most elderly persons want to live within their familiar environments as long as possible, which has been introduced in the previous chapter. In this study we have therefore exclusively classified and categorised products, services and research projects concentrating on the well-being of elderly people in their homes.

The domain of the study is built on a rather wide description of the following terms:

Information and Communication Technologies (ICT) "enabled"

Information and communication technologies (ICTs) include telecommunication technologies, such as telephone, cable, satellite and radio, as well as digital technologies, such as computers, information networks, and software.

"ICT enabled" simply means that any product or service in this study must be based upon or use software, integrated micro systems, or communication technologies. A narrower definition turned out to be unsuitable because there are only very few products and research projects in this field.

Ambient Assisted Living (AAL)

The AAL Joint Programme fosters "the emergence of innovative ICT-based products, services and systems for ageing well at home, in the community, and at work, thus improving the quality of life, autonomy, participation in social life, skills and employability of older people and reducing the costs of health and social care." This description of goals is already a completion of what is comprised by ICT for independent living of elderly. Therefore, the term AAL is used throughout the study as a synonym of the subject matter of the present study.

Independent living

Within this study "living" refers to the private life of people. It includes all daily activities such as shopping, preparation of meals, communicating with friends or with authorities, washing the dishes, making chores and many more. These activities are often linked to buildings, i.e. living space. The environment and the habits of a person are integral elements of "living" and have to be considered by ICT solutions for AAL.

The composed term "Independent Living" has initially been used by disabled people in a context describing social notions

of disabilities. The following quotation taken from www.independentliving.org highlights this view: "Independent living does not mean that we want to do everything by ourselves, do not need anybody or like to live in isolation. Independent living means that we demand the same choices and control in our every-day lives that our non-disabled brothers and sisters, neighbours and friends take for granted." Exactly this holistic perspective, which takes into account the importance of social relations and the problems of social isolation, has been adopted and applied to this study.

Elderly

"Elderly" is an adoption of the term of the tender of this study and specifies the target group of the ICT applications considered in this study. This study especially focuses on older adult people. A subliminal partition is often made for the age of 65 and more because it is assumed that people retire at this age. This group often suffers from medical problems that typically develop when people become older. Of course, there is an intersection with younger people who are medically impaired or disabled and might as well profit from ICT solutions originally designed for elderly.

Comprising the short introduction of the terms above, this study focuses on ICT products or services using ICT in order to assist an ageing population to lead a normal everyday life. The majority of these products and/or services are offered for, applied to and delivered to the home environment of elderly people.

5.2 Five AAL Topics of Demand: The Database Structure

Bearing in mind the specific needs of elderly individuals discussed earlier, elementary AAL topics have been defined within the scope of this study to structure the collected data. These topics address the demand of elderly and are used to categorise all products and research activities:

Social Interaction

The topic "Social Interaction" refers to all kinds of products, services and research projects that enable elderly persons to stay in touch with the world beyond their domestic environments. This category mainly includes products and services using communication and networking technologies. Besides, any other kind of networking facility that brings people together belongs to this category as well, such as ICT

applications that help elderly to maintain their hobbies and social contacts. Hobbies and the demand for information and for learning are also represented in this category.

Health and Home Care

The last few decades have witnessed an overall trend towards more personalised health care. Meeting the specific needs of an individual by intelligent applications is one of the main strategies to guarantee independent living of elderly. At the same time, we assume that another trend will increase the number of cases in which care organisations provide care services at the home of their clients. It therefore seems very probable that a combination of supporting assistive technologies and rather conventional health or home care solutions might be best suited to provide the framework necessary for autonomous living conditions of elderly citizens.

In this regard, it makes sense to divide this topic into three further sub-topics. These categories have been distinguished by which particular kind of health care is addressed, i.e. prevention, assistance or therapy.

Prevention: This category is used when the respective product, service or research project mostly focuses on technologies that helped to prevent accidents, diseases or ailments, e.g. sensor-based solutions to detect alarming walking patterns.

Assistance: This category is used when the respective product, service or research project mostly focuses on technologies that assist elderly people by certain health or home care activities, as for example tele-monitoring systems for cardiac patients.

Therapy: This category is used when the respective product, service or research project mostly focuses on technologies that support elderly people with chronic diseases or during after-care phases, e.g. often specialised training systems are useful to treat stroke patients.

General: In case a product could not be defined clearly by the other subtopics and yet seemed to address health and home care, this category was chosen.

Supply with daily goods and chores

Independent living and well-being of elderly people also imply that typical everyday activities within a private household, such as shopping, cooking and tidying, can be performed

despite possible impairments or burdens. Since the competencies needed for these everyday chores decrease in line with the processes of ageing, there is a need to support these activities. Under this category all types of associated activities are comprised.

Safety

This category stands for fulfilling the safety, privacy and security needs of elderly persons. "Safety" is more than secure doors and windows – it may include authorisation of visitors and emergency technology. A specific technological infrastructure (smart home, domotics) may help to provide or even increase the confidence of elderly in their domestic space and thus increase their well-being at home in general.

Additionally, it was necessary to introduce two further generic topics:

General

The category "General" refers to any kind of products, services or research projects addressing the topics mentioned above in general, without being able to be categorised more clearly.

Others

The category "Others" addresses all products, services or research projects that do not fit into any other topic.

As a result, the database for the study includes the following data:

Collected Data	Classification "Topics"	Classification "country"	Classification "Stakeholders"	Classification "Product Group"
Organisations that deal with AAL topics (e.g. companies, research institutions, public institutions, authorities, …)	Social Interaction Health and Home Care Prevention Assistance Therapy General Supply with daily goods and chores	AT BE BG CY CZ DE DK EL EE ES FI FR HU IE IT LT	Building and Housing Industry Consulting Government Local or Regional Authorities Hardware/Software/Device Providers Service Providers Providers of AAL products or services Healthcare Providers Medical Institutions / Hospitals Industry Insurances NGOs Universities Non-university Research Organisations Safety Others	
Research projects	Safety General	LU LV		
Products	Others	MT NL PL PT RO SI SK SE UK EU		Communication devices Compensation of impairments Consumer electronics/multi-media Medical assistive technology Mobility Others Safety and Security Smart home / daily chores Tele-monitoring / Tele-Medicine
Literature				

Table 1: The structure of the database

6   Stakeholders in a Market for AAL Products

At present, the market for AAL products and services addressing the needs of elderly people is quite small. However, considering that the elderly population of EU-27 will significantly grow within the next few decades, it is most likely that a market for the demands of elderly will emerge a result of the consequences an ageing society has.

This future market will be structured by various stakeholders of possible value chains. The stakeholders' interests are main drivers for establishing and expanding a genuine AAL market. For the present study, we have identified some groups of stakeholders that shall be introduced further below. These groups resulted from the investigations for this study, which, amongst other things, led to a collection of names of organisations already active in this field.

Within the scope of this study one main difference has been drawn between research organisations and product providers, which shall both be separately analysed in the following chapters. The group of product providers gives the impression of an already existing market while it is assumed here that it is, however, research organisations that provide the main information sources on future market structures. The motivation for companies to invest in new branches or topics of research requires a strong economic prospect. Other organisations involved in this field are active due to already existing demands or other driving forces. They complete the overall impression of a future market structure.
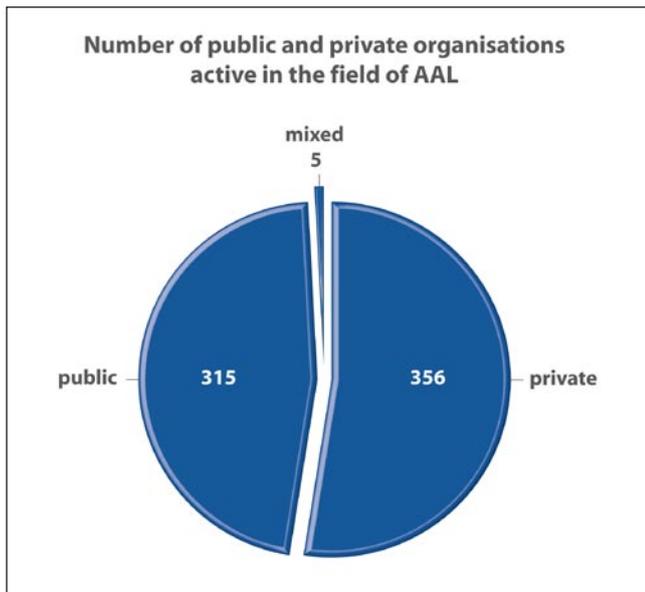

Figure 9: Number of public, private and mixed organisations working in the field of AAL (EU-27)
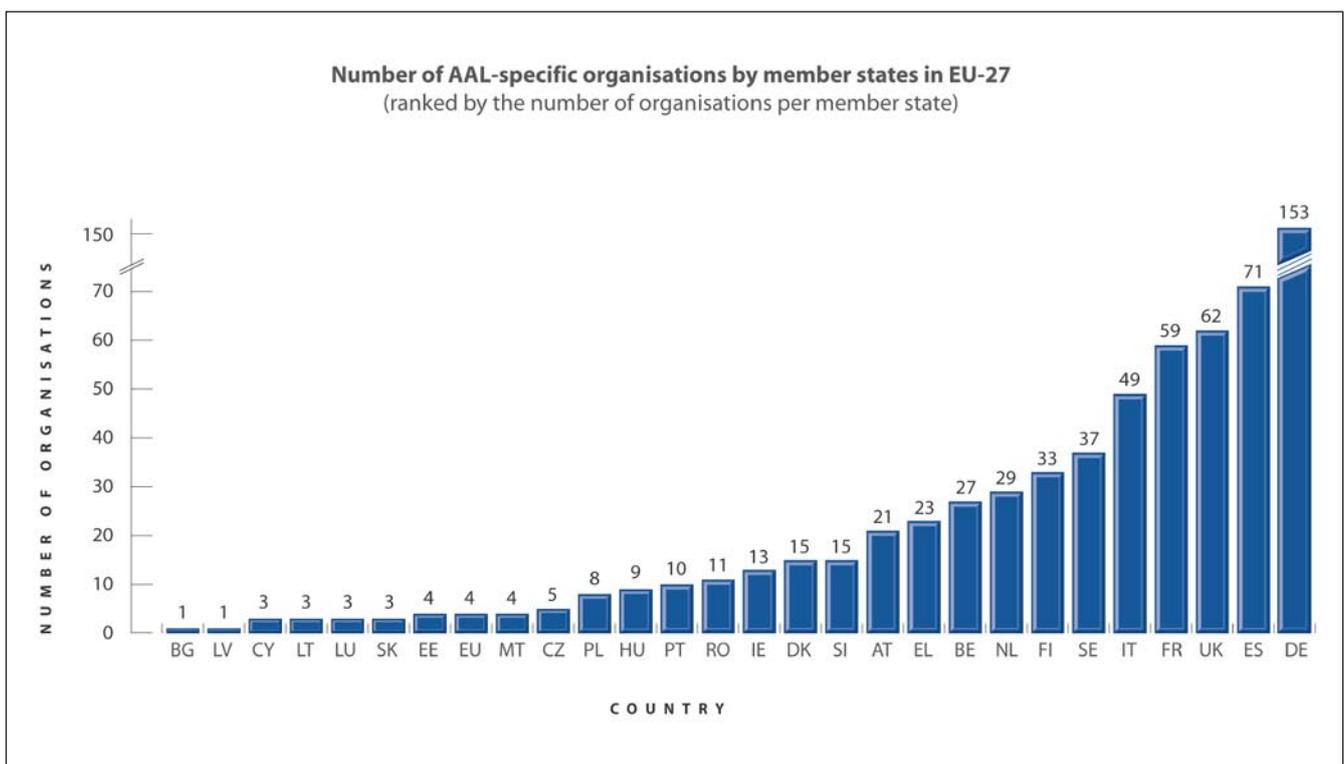

Figure 10: Number of AAL-related organisations by member states of EU-27
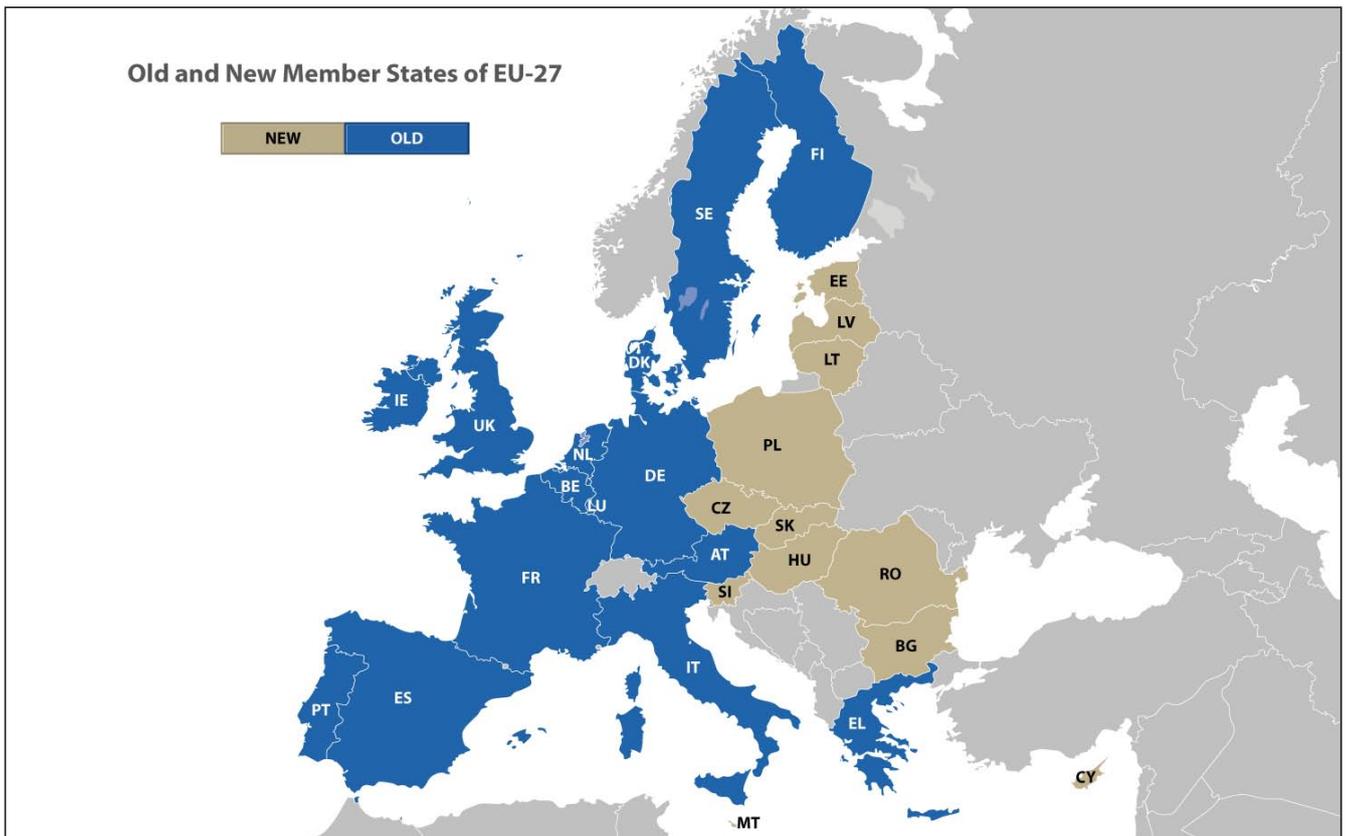
Figure 11: The countries of EU-27 distinguished by old and new member states
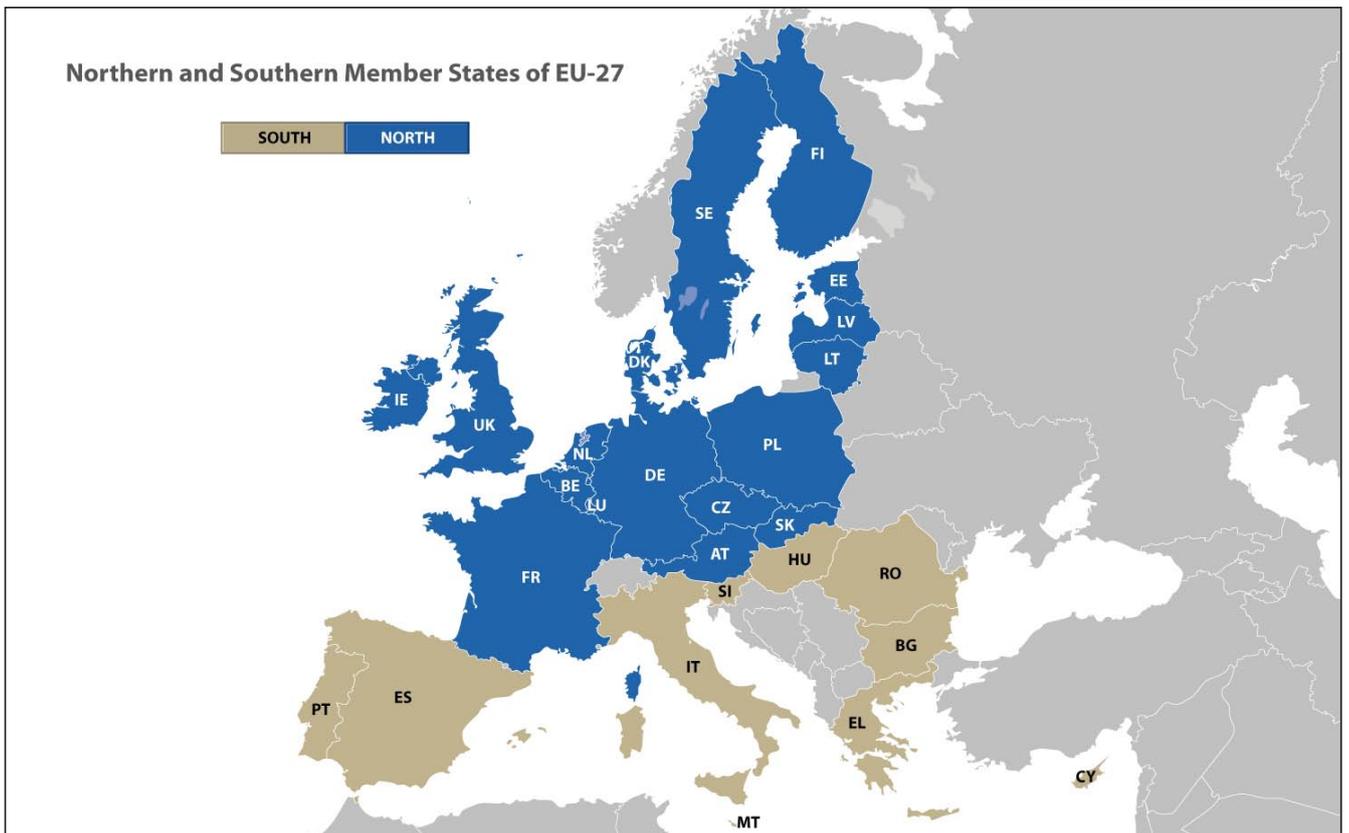

Figure 12: The countries of EU-27 distinguished by northern and southern member states

The findings of this study reveal that the demand for AAL products and services does not only address public but private stakeholders as well. In fact, among all European member states, a total of 676 organisations have been found to deal with products or research in the field of ICT for independent living of the elderly. The pie chart in Figure 9 displays the total numbers of organisations that belong to public, private and both sectors ("mixed")[23].

The number of private organisation (356) slightly outweighs public ones (315), whereas the number of mixed organisa-tions (5) is quite negligible. This means that there are more private organisations working in the field of AAL (i.e. as partners in research consortia or in the function of product providers) than public organisations. Apart from this, the numbers of all organisations are distributed rather unevenly among the member states of EU-27. The bar chart in Figure 10 shows this distribution for each European country.

With altogether 153 organisations, Germany holds the strongest position. These are twice as many organisations as Spain contributes (71). Although this number certainly shows a correct tendency, we also have taken into account the fact that the research in this study has been performed in Germany. It therefore is assumed this has had an influence on the findings for Germany, thus having been increased over-proportionally with regard to other countries: many organisations could be taken from already known research projects. Information therefore was more easily available, as many stakeholders were already well known. Furthermore, research is still mostly being organised on national level. That is why a lot of information on research and products for independent living of elderly people is still often available in the respective national language only. This language barrier again hinders investigating relevant information. Therefore, the findings in this study always represent certain trends only. The problems described will be present throughout this study and must therefore be kept in mind during all analyses made below.

For a further analysis, we distinguished between old and new member states of EU-27 on the basis of the EU enlarge-ments that have taken place since 2004 (Figure 11) as well as between southern and northern countries (Figure 12). As illustrated in Figure 11, the new member states are mainly located in the East of Europe and consist of altogether 12
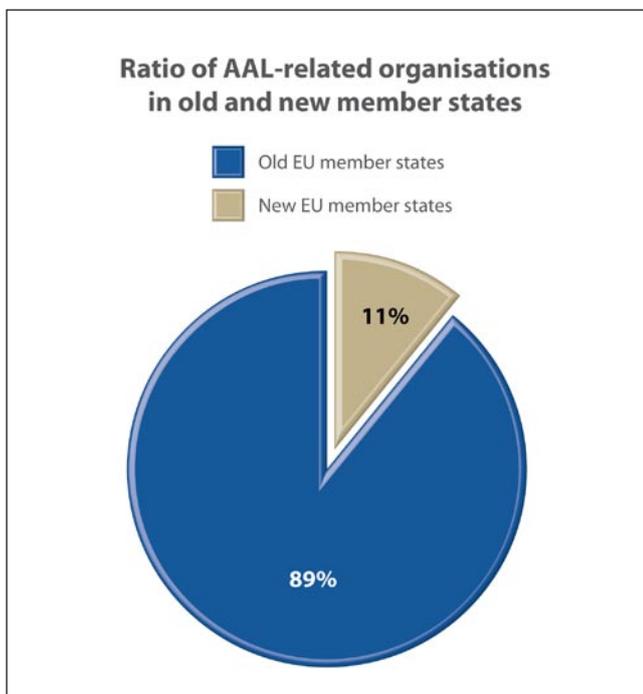
Figure 13: Ratio of AAL-related organisations in old and new member states (EU-27)
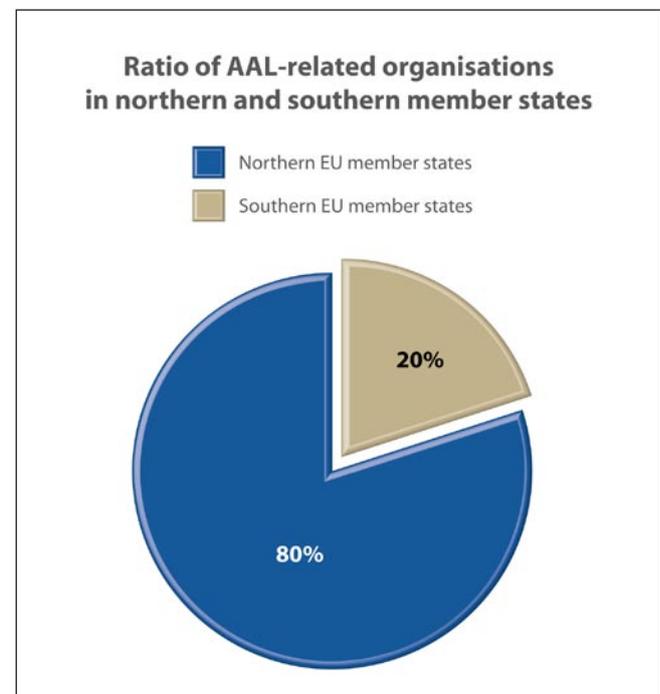
Figure 14: Ratio of AAL-related organisations in northern and southern member states (EU-27)

[23] These figures do not include the organisations which are involved into the research projects of the first and second call of the AAL Association because the final lists have not been ready early enough in the preparation time for this study. http://www.aal-europe.eu/, last visit 08/14/2009.

countries: Estonia (EE), Latvia (LV), Lithuania (LT), Poland (PL), the Czech Republic (CZ), the Slovak Republic (SK), Hungary (HU), Slovenia (SI), Romania (RO), Bulgaria (BG), and the two islands Malta (MT) and Cyprus (CY). In terms of GDP, these countries are economically rather week in comparison with the old member states.

In Figure 12 the European countries are distinguished by North and South. The border has been defined geographically between France, Austria and the Slovak Republic, which follows our own line of thinking. The underlying idea is to provide evidence for the thesis that there is a correlation between AAL involvement today and the economic wealth of the different countries rather than between expected demographic problems and extensiveness of research. The southern countries include the economically rather week countries in terms of GDP.

Collating the information from Figure 10 and the information from Figure 11 and Figure 12, a common trend shows itself: most AAL-related organisations can be found among the old member states, especially in the richest countries (by GDP). Germany (153), Spain (71), The United Kingdom (62), France (59), Italy (49), Sweden (37), and Finland (33) are found amongst the first third. Likewise, the last third almost only consists of the economically rather weak new member states – with the exception of Luxembourg (3) and European organisations (4). European organisations (EU) are defined as organisations, mainly NGOs, which operate Europe-wide and therefore cannot be assigned to one single country, although they of course often have headquarters in one particular country.

The following pie charts (Figure 13 and Figure 14) make it possible to overview this uneven distribution of organisations at a glance. While Figure 13 compares the ratios of organisations in old and new member states, Figure 14 does the same for northern and southern countries.

Of all organisations we have found addressing the field of ICT for independent living of the elderly, only 11% can be attributed to the new member states. There is a similar distinction between North and South: While 80% of all organisations are located in northern countries, only 20% can be found in southern ones. There is a significant divide between old and new member states on the one hand and northern and southern member states on the other hand.

There are various reasons for these differences, which would need further investigation. At this stage it seems as if there is a correlation between the economic strength of a country and the number of organisations working in the

field of ICT-ILE. It is very probable that economically weaker countries will have a rather weak infrastructure for research on, and the provision of, AAL products and services.

In the following, we will provide a deeper insight into the organisation types that have been derived from the data of the study. It has to be borne in mind that categories may overlap or companies are sometimes active in several fields. The assignment of organisations during the process of data mining was determined by the organisation's foci and the interpreters' estimations. Each organisation is only assigned to exactly one of the following categories.

Building and housing Industry

The term "Building and housing industry" refers to all kinds of organisations that provide housing space in general. This includes the construction as well as the managing of buildings, e.g. socially oriented public housing. Organisations of this type are interested in AAL solutions because, owing to the demographic change, they will be facing a change of customers with a higher average age. Therefore, customers will be looking for age-appropriate infrastructures. Dependingon the respective region and country, even today the building and housing industry suffers from vacancies and therefore has a strong demand for new services and business models to become more attractive.

Consulting

The term "Consulting" is assigned to advisory bodies. They often offer knowledge about system integration, project management and branch-specific processes. Often, they also offer accompanying measures, such as patents laws, general law or public relations.

Government

The term "Government" is used for authorities, institutions or organisations responsible for the development and performance of policies on national level, such as national ministries or health institutes.

Being an issue of great public interest, governmental institutions are interested in fostering and initiating research in this field. They pursue this goal for example by supporting research projects in their respective nations. In the context of ICT for the independent living of the elderly, governmental institutions provide funds or needed infrastructure,

establish, supervise research programmes and often play a coordinating role.

Local or Regional Authorities

The term "Local or Regional Authorities" refers to institutions and organisations responsible for the development and performance of policies, yet on regional level only, e.g. cities, municipalities and councils.

The local and regional authorities have in many cases the responsibility for social infrastructure, parts of the welfare systems and public services in the respective regions. They definitively will suffer from the demographic changes if they are ill prepared for it.

While research funding is often organised on national level, the local and regional authorities frequently are themselves partners in research projects and initiatives. They often play a crucial role as main stakeholders.

Hardware/Software/Device Providers

The term "Hardware/Software/Device Providers" refers to all kinds of (almost exclusively private) organisations providing hardware, software or IT devices in a broader sense. This means that these companies either create such products by themselves or provide them.

New information and communication technologies for use by elderly people will allow the development and creation of new specialised products and services, which will open up a new market with new costumers. Hardware, software and device providers will want to participate in this market by supplying such services and products, and to provide their maintenance and repair. Accustomed to ICT by the nature of their market segment, these providers will perfectly suit costumer demands concerning these new products and services.

Service Providers

The term "Service Providers" is reserved for all private or public organisations providing services that do not belong to healthcare. This category comprises a rather heterogeneous group of organisations mainly dealing with telecommunication and the supply of everyday products and services, such as installation services or hotlines. Especially new communi-

cation technologies for elderly people attract their interest in order to open up markets for new products and services.

Providers of AAL products or services

The term "Providers of AAL products or services" concerns organisations that have a clear focus on supporting an independent living of elderly people. This comprises organisations offering integrated systems, such as emergency calls for elderly or only services designed for elderly that have no technology as a central part. An example could be "food on wheels", which is combined services of hotline, internet order, logistics and cooking.

Providers of AAL products or services often cooperate closely, including technology providers, service providers and one company implementing the interface to the elderly in order to get one complex product realised. This group therefore consists of an intersection of different other organisation types. As a market for AAL-related products is only in a nascent stage yet, organisations specified by this category usually do not define themselves as providers of AAL products or services, but have been given this term due to their concentration on such products and services.

Healthcare Providers

The term "Healthcare Providers" concerns all organisations providing healthcare services, especially mobile healthcare services for the domestic area of elderly. This category therefore does not include hospitals or nursing homes.

Given the healthcare aspects of future AAL products and services, healthcare providers are thought to be one of the main stakeholders that might be interested in new ICT applications to reduce costs or increase efficiency.

Medical Institutions / Hospitals

The term "Medical Institutions / Hospitals" concerns all organisations providing medical services or working in medical research. This mainly includes (private and public) hospitals and independent medical institutes on either regional or national level.

Due to the interdisciplinarity of AAL research, medical institutions are important research partners. They deal with the medical aspects of ICT for elderly and provide necessary

Ratio of organisation types in EU-27

1% Healthcare providers

1% Insurances

1% Safety

2% Others

2% Building and housing industry

4% Industry

4% Government

4% Medical insitutions / hospitals

5% Consulting

5% NGOs

7% Hardware/software/device providers

7% Providers of products or services for AAL

7% Local and regional authorities

13% Service providers

**16%** Non-university research insititutions

21% Universities

Figure 15: Ratio of organisation types of all stakeholders active in the field of AAL

knowledge on health issues concerning elderly people (especially in the discipline of gerontology).

Industry

The term "Industry" refers to all private companies and organisations that deal with the development and fabrication of technological devices, but usually do not sell them on the market as AAL products. Examples are telecommunication companies that provide technical communication platforms, but do not run appropriate services, MEMS producers, or even car producers.

Stakeholders from the industry segment are mainly interested in research and development of products and services that are not only applicable to AAL purposes, but can be used by different other customers as well. Products in

this scope will therefore be those that can be used by elderly as well as by other people with special hindrances.

Insurances

The term "Insurances" refers to all companies providing insurance services. Within the scope of this study this mainly comprises public and private health insurances working on national level. Health insurances have a strong interest to reduce costs for the healthcare of elderly people, who, due their specific susceptibility to diseases, need a lot more and often very high-cost medical treatments. Especially preventive and assistive medical technologies may help reduce costs by preventing accidents within the domestic environment. In the case of an emergency, these applications may also be able to introduce supportive measures more efficiently than current techniques.

NGOs

The term "NGOs" refers to all kinds of non-governmental organisations, e.g. networks representing the (social, medical, legal or political) interests of elderly people. Given their function as interest groups for seniors, these NGOs are very eager to support and promote the development of new products and services for elderly people in order to increase their well-being.

Universities

The term "Universities" refers to all public or private institutions for higher education and research. Owing to their nature as research institutions, universities are mostly part of research consortia, where they contribute their knowledge and expertise. Often enough universities are the project coordinators.

Non-university Research Organisations

The term "Non-university Research Organisations" refers to all research institutions that do not belong to universities and are independent bodies. For instance, these organisations include the German Fraunhofer-Societies and the Spanish "Fundación Instituto Gerontológico Matia (INGEMA)", both organisations with a very strong activity in the field of ICT for independent living[24].

Safety

The term "Safety" refers to all private organisations that deal with devices or services to increase and maintain the sense of security, mostly within the domestic area of elderly people, e.g. by the use of alarm systems. All organisations within this category therefore mainly address the AAL topic "safety" (cf. p. 56).

Companies providing safety applications may want to participate in the emerging AAL market in order to supply products that enhance the safety of elderly people living at home.

Others

In case an organisation could not be clearly specified by the terms given above, it was identified as "Others".

By comparison, the stakeholders are distributed by types very unevenly. The pie chart in Figure 15 displays the ratios of all organisation types found among all member states of EU-27. With 21% for universities and 16% for non-university research institutions, the research sector covers the majority of all organisation types found (i.e. altogether 37%). This clearly shows that a lot of activity in the field of AAL is focused on research, and not on marketable products and services. However, the third largest ratio is contributed by service providers (13%). This suggests a strong contribution and interest of the service sector as well. By adding the ratios of local and regional authorities (7%) to the ratio of government (4%), it can be claimed that political institutions build the third-strongest group among all organisations (i.e. altogether 11%). The rather small ratio of only 4% for medical Institutions and hospitals may be surprising, but could be put down to the fact that these institutions often do not possess the sufficient resources needed to contribute to intensive research activities or the provision of products. It furthermore is quite interesting to notice that health care providers seem quite underrepresented (only 1%), which could either show only little interest for the use of technologies or a lack of resources for research and for the supply of products by these organisations.

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24 For further information on the Fraunhofer-Society: http://www.fraunhofer.de/EN/index.jsp, last visit 08/19/2009; for information on INGEMA: http://www.ingema.es/ingles/home.php, last visit 08/19/2009.

7   Supply of AAL Products

7.1 The Range of AAL Products

In order to describe AAL products already on the market, it is necessary to first define the range of products that suit the label of "AAL products". Up to now, there is no common definition of an ICT-enabled AAL product for elderly people. The term "AAL" or comparable expressions are today used in the research community, but they are neither established in the corresponding market nor for the communication with the customers. Therefore, it happens that products, systems or services may be designed for elderly people, but are not explicitly declared as such.

Another problem is coming up with the differentiation from products for impaired and disabled people and solutions for people with chronic diseases in general. For example, there are products for disabled people, such as programmes for voice output of PCs or medical devices as e.g. electronic retina implants or cardiac pacemakers. Such solutions suit the purposes of an independent living for elderly people as well.

A third classification problem arises from the differentiation between the system parts and the integrated solution. AAL products very often integrate a wide range of technologies, comprising e.g. sensor technology, internet technology, innovative computer interfaces, bus systems and control systems. Although several different technical components often are part of AAL products or systems, these components have not particularly been developed for AAL solutions.

Within this study it therefore is assumed that all products under consideration explicitly refer to elderly people as target group. The classification of located product has often been made by reading the product description carefully to understand the application area in detail. Here the term "product" is used as a synonym for different kinds of product types, such as hardware devices, software or services (both traditional services performed by people and internet services) and first of all integrated solutions. Especially by analysing research projects it becomes obvious that future AAL products will be integrated solutions of different technologies and services, e.g. for tele-monitoring.

As a basis for this study's product classification, the following definition has been established:

AAL-products are developed and designed to mainly meet the needs of elderly people. They use information and communication technologies, at least in an accompanying service. The product provider explicitly addresses older adults as target group. An AAL product can be everything, starting from hardware components and ending in complex system solutions that integrate devices as well as services.

7.2 Amount of Products on the Market in EU-27

Although a market for ICT-enabled or AAL products and services for elderly people is only just emerging, some ICT products for the independent living of elderly are already available among the member states of EU-27. The status quo of this market shall be presented in the following. Present and future trends within this economic area shall be discussed as well. Overall, information on 177 products could be found among all EU-27 countries. The bar chart in Figure 16 displays these findings by particular member states.

Considering the many countries without any available information on products (i.e. nine in total), it is easy to understand that the current market situation for AAL applications is quite unbalanced. The majority of products are only to be found among the old member states of EU-27, which at the same time are the economically strongest countries. The old member states together provide 171 products (i.e. 98%), whereas all new members states together only provide six products (i.e. 2%; Figure 17). This situation is somewhat different when northern and southern countries are compared. In that case, northern member states contribute 78% of all products while southern member states provide 22% (Figure 18). Despite this slight difference, the overall trend is quite clear: there is a strong North-South divide as well as a divide between new and old member states. The market for AAL products and services in new and southern member states of EU-27 seems to be rather undeveloped in comparison to old and northern member states.

As explained in the chapter before, the products and services to be regarded within the scope of this survey are supposed to

Number of AAL products in EU-27

No information was available for BG, EE, LU, LV, MT, PL, RO, SI, SK
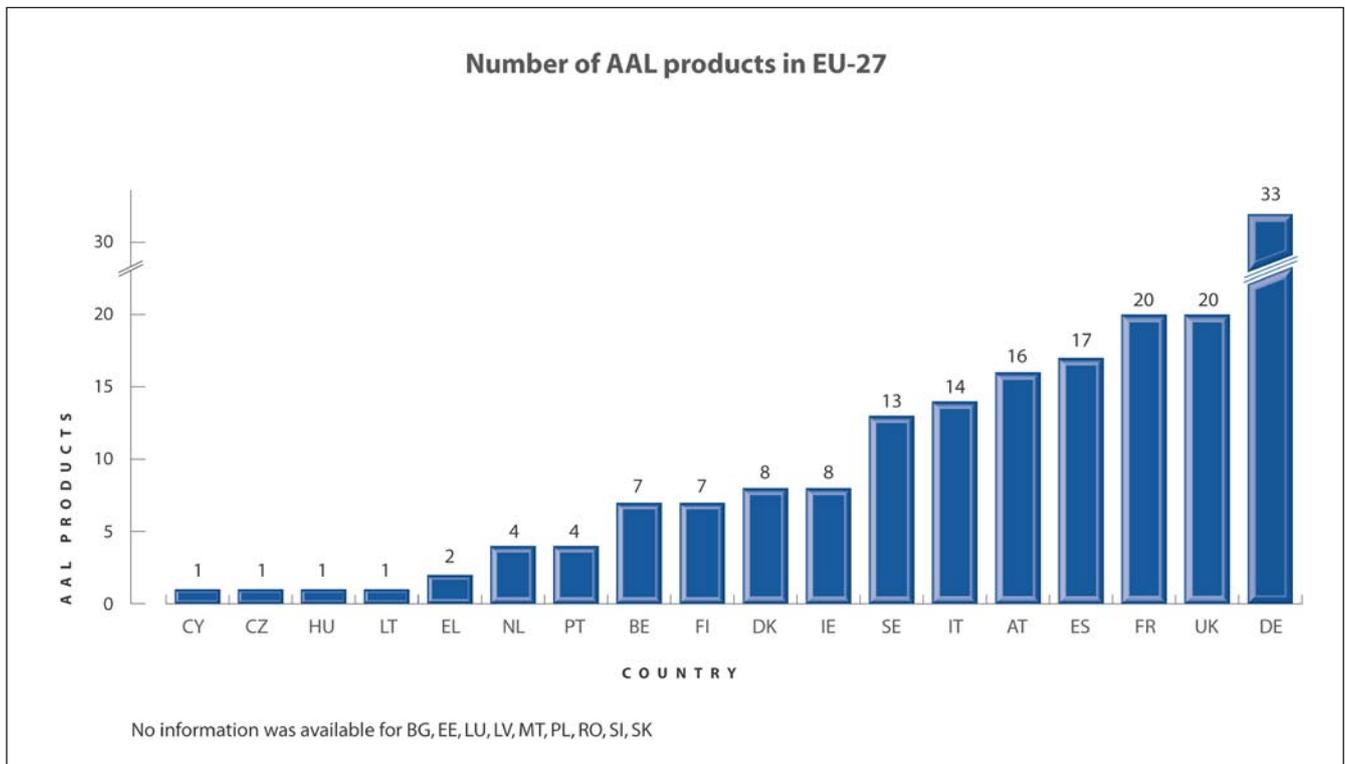
Figure 16: Number of AAL products in all member states of EU-27

**Ratio of AAL products
in old and new member states of EU-27**

- Old EU member states
- New EU member states

2%

98%
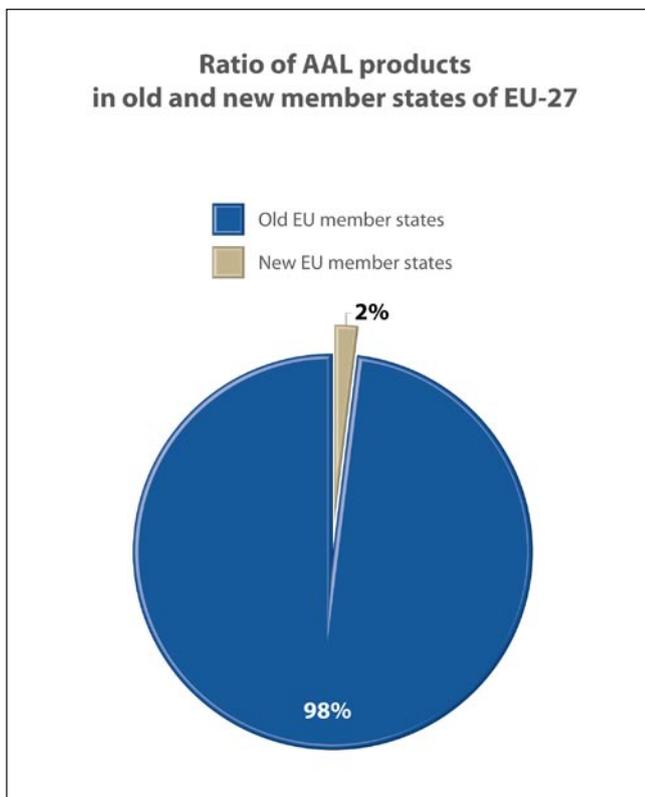
Figure 17: Ratio of AAL products in old and new member states

**Ratio of AAL products
in northern and southern member states of EU-27**

- Northern EU member states
- Southern EU member states

22%

78%
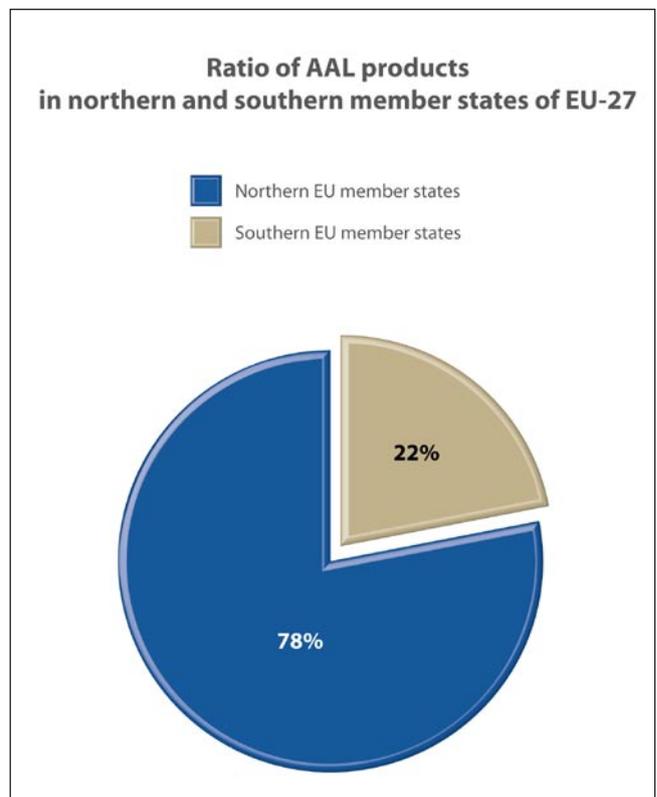
Figure 18: Ratio of AAL products in northern and southern member states
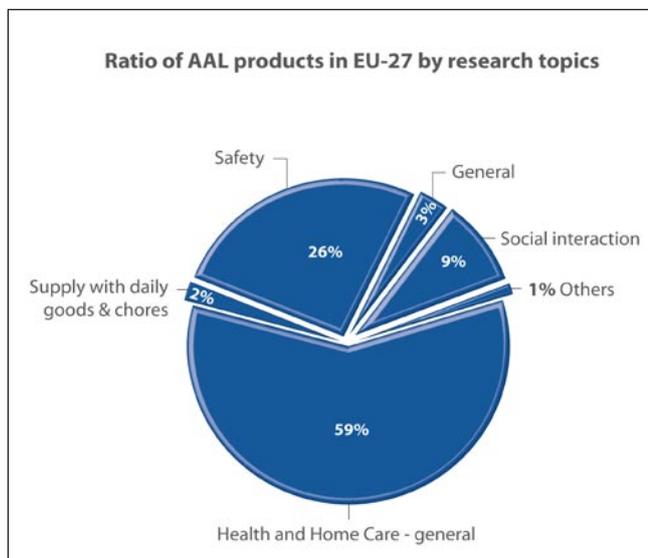
Figure 19: Ratio of AAL products in all member states of EU-27 by research topics
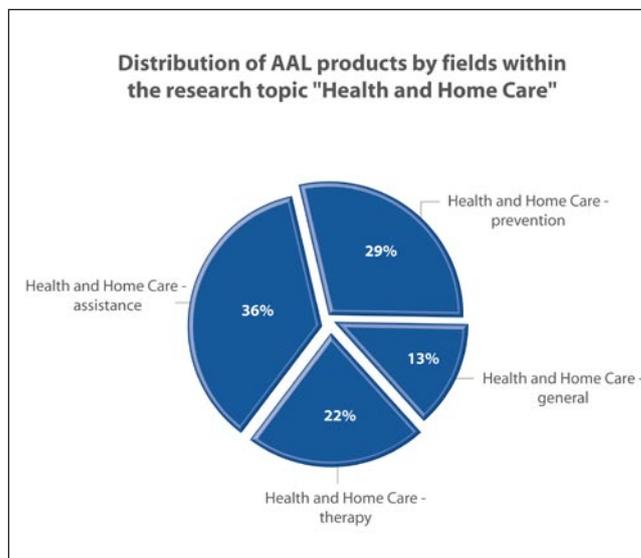
Figure 20: Distribution of AAL products by fields within the research topic "Health and Home Care"

meet the demand resulting from age-specific needs. Therefore it is reasonable to explore to what extent which particular AAL topic (as described in chapter 5.2) is addressed by products and services. The pie charts in Figure 19 and Figure 20 display the overall ratio of these statistical findings.

As can be seen in the left chart, more than half of all products address the topic "Health and Home Care" (59%). This means that the maintenance and support of health is clearly considered to be the most important issue for products addressing elderly people. With only 26% the topic "Safety" is the next biggest ratio after "Health and Home Care". Though it is rather far behind, "Health and Home Care" it still possesses a rather high percentage in comparison to all other topics. Considering that between the two greatest topics overlapping contents exist, it can easily be judged that most products and services for elderly concern both fields, i.e. are products which both deal with safety and health care issues, such as (tele-) alarming systems based on health data.

As "Health and Home Care" is the greatest topic addressed by AAL solutions, it also is interesting to have a further look at the ratio of its sub-topics. Figure 20 displays the distribution of products within this topic. Here again, one has to keep in mind that overlapping contents are possible. Figure 20 shows a nearly equal distribution of products regarding the three sub-topics. Nevertheless, the assistive products are represented

a little more frequently (36%), closely followed by prevention (29%) and therapy (22%). The subtopic "General" does not have to be observed that closely, for it only was used in cases where a product could not be clearly assigned to any other category. With some proviso, it can therefore be claimed that most products for health and home care concentrate on assisting elderly people in their home environments, while there are not so many products for prevention or therapy.

7.3 Product Groups

As there is a great variety of possible AAL devices and complex solutions within the study, the located products have also been classified regarding their application areas. The following categories are strongly related to Mollenkopf et al. We introduced her itemisation of technological products enabling independent living of the elderly with some additional aspects and own explanations[25].

Communication devices

Communication devices mostly cover the need for social interaction, but also provide various kinds of information to users. By the usage of communication devices elderly are able to maintain

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[25] Mollenkopf, H., Schakib-Ekbaton, K., Oswald, F. & Langer, N.; Technische Unterstützung zur Erhaltung der Lebensqualität im Wohnbereich bei Demenz (2005), p. 4-5, 14.04.08 (http://www.dzfa.uni-heidelberg.de/pdf/Forschungsberichte/fb19.pdf. last visit 08/14/2009).

their social contacts, obtain consultancy, information and educational contents.

Concerning elderly people, providers of communication devices have to take into account the specific user problems of elderly people, such as hearing or visual impairments, in order to design and develop adequate products. In this regard, communication devices for elderly e.g. would be visual telephones, specified internet and e-mail applications, and computers with devices for image or symbol communication.

Compensation of impairments

As mentioned before, due to the typical multi-morbidity many elderly people tend to develop visual and hearing impairments. Therefore, an urgent demand for devices compensating such sensory impairments exists, which currently is supplied by devices such as intelligent electric magnifiers and reading lenses, electronic communication aids and associated (IT) systems.

Consumer electronics/multimedia

To meet the need for leisure activities or hobbies and to bridge times of loneliness of elderly people, certain products and services using ICT are currently being developed and provided, e.g. multimedia applications and age-specific contents, ICT-based games, books and e-newspapers as well as internet communities. This also includes the development and creation of contents appropriate for the interests and use by elderly people.

Safety and security

Raising the feeling of safety at home is a very important issue amongst elderly people. In proportion to the decrease in certain bodily and mental abilities, it is crucial to provide technologies within the domestic area that prevent accidents and increase the sense of safety. This usually goes along with security applications, such as surveillance and locking systems as well as customised alarm systems, e.g. in case the elderly person has forgotten to turn down the cooker. Current safety and security
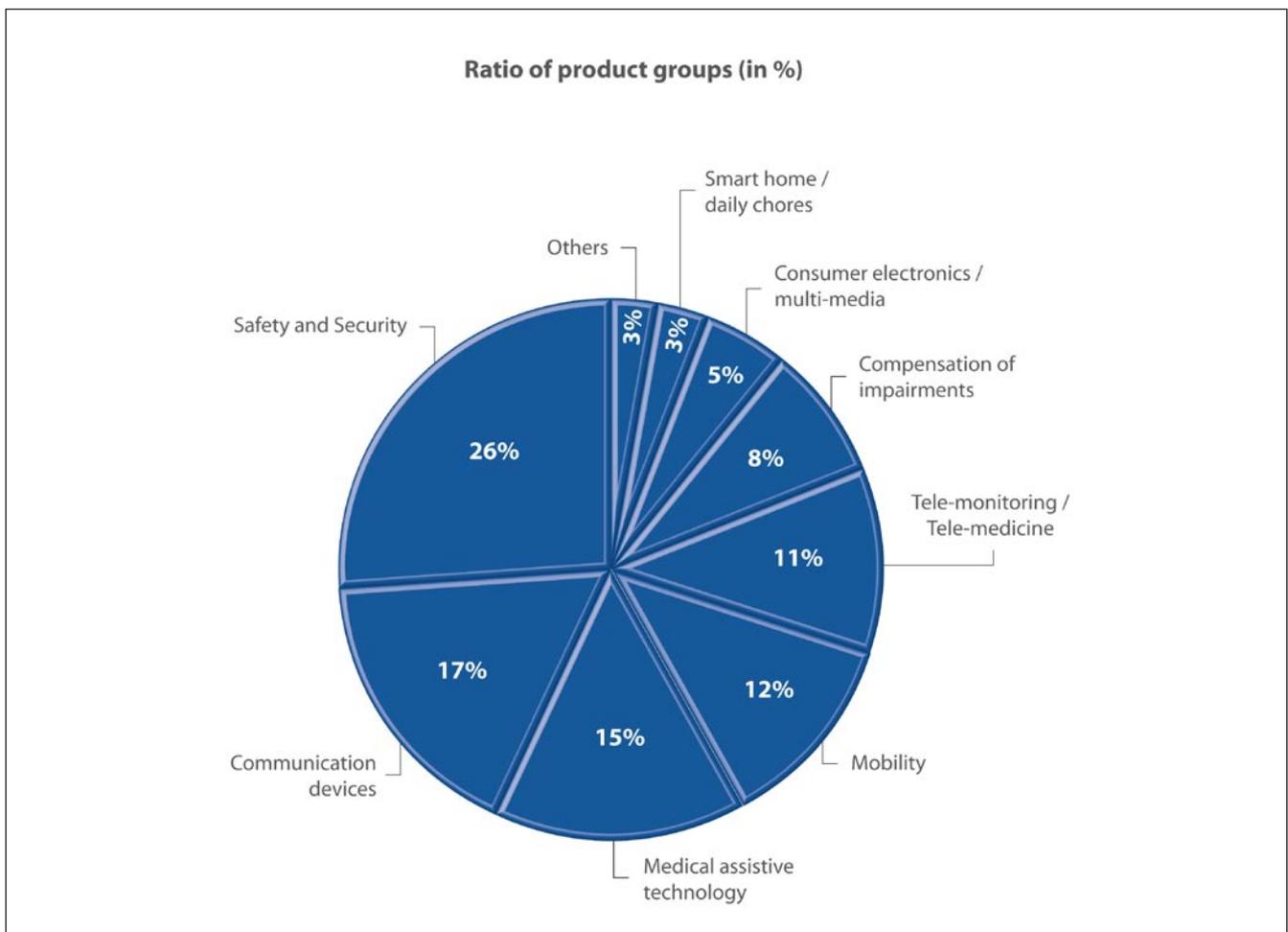

Figure 21: Ratio of product groups among all member states of EU-27

products however have generally not been developed for use by elderly people for a broad costumer group.

Medical assistive technology

Medical assistive technologies are destined to support family members or professional nursing staff during their everyday healthcare procedures on elderly persons suffering from ailments and diseases.

Such products focus on medical applications and mostly devices that require self-control by patients, e.g. concerning blood pressure, blood glucose, but also lifting or mobility aids, special bathroom technologies, and fall alarms.

Tele-monitoring / Tele-medicine

Recent technological developments in the field of telemedicine allow elderly people with chronic diseases or certain impairments to be treated and monitored within their domestic environment. The great advantage of tele-medical applications is that the patients do not have to move to a medical institution to be monitored and treated appropriately. Information on vital parameters can be taken from the patient by (portable) devices and transmitted to medical institutions in order to control them and to interfere if necessary. Overall, tele-medicine and tele-monitoring products guarantee more autonomy for elderly patients.

Mobility

The typical decrease in mental and physical capabilities often causes a lack of mobility for elderly people. Walking and driving a car can become very difficult or even impossible, depending on the severity of the ailment. Creating devices that are capable of restoring or even increasing the mobility of elderly people therefore is very important in order to secure their well-being. Such applications may be walking aids, like wheel chairs or step lifts, but also assistive devices, for instance to be able to drive a car or to do sports.

Smart home / daily chores

A consequence of multi-morbidity is that elderly people often have troubles performing daily chores, such as making the bed etc. Automatic and intelligent devices and services capable of performing, or at least facilitating, such requirements of everyday life are a great help, e.g. remote-controlled doors

and gates, microwave or normal stoves with various sensors or online services offering tele-shopping or tele-banking, etc.

The pie chart in Figure 21 displays the percentage distribution of product groups among all member states of EU-27. The chart shows the percentages but not the absolute numbers because multiple categorisations of products were permitted:

There are two different ways to read these ratios, both of which can be considered to be correct within their own scope:

The first interpretation is that there are application areas with more marketable solutions than in others. This implies that there are currently more marketable products for safety and security than for any other product group, i.e. about one fourth of all AAL products have been developed to provide and increase the need for safety of elderly people. Yet this does not necessarily imply that the ratios represent the overall economic interest of product providers in the field of AAL. On the contrary, it is quite imaginable that these ratios will change in line with future technological progress, enabling and increasing the development of marketable solutions for other application fields.

An indicator for this perspective is that the interest of elderly people for consumer electronics and multi-media or devices for the compensation of impairment seems to be rather small in the chart. As stated earlier in the study, elderly people often suffer from sensory impairments as well as loneliness and isolation. It is very probable that the real need for solutions for these matters is much higher. Thus, the ratios (8% and 5%) seem to indicate that only few consumer electronics, multi-media applications and devices for a compensation of impairments especially exist on the market at present – at least with regard to ICT solutions for elderly people. Applications for the support of daily chores seem to be underrepresented (3%). This is certainly the result of a yet weak technological development and marketability, which are both thought to change together with future technological enhancements. The product groups that can be found most frequently are: safety and security (26%), communication devices (17%), medical assistive technology (15%), mobility (12%), and tele-monitoring (11%).

The high percentage of safety and security products and services has to do with the fact that, by their nature, most AAL products in some way deal with the provision of safety and security. During the research process almost all products and services could therefore be classified as security and safety at least in a broader sense, which very often appears in combination with other groups (e.g. products that fulfil the categories safety and security and medical assistance).

Another factor for the grading of ratios certainly is the current state of the art of technologies for use by elderly people. Some technologies are already sufficiently developed to be used in marketable products while others are only at the stage of basic research. For instance, alarm systems mostly require technologies that have already been in existence for a long time now, whereas applications for performing everyday chores such as shopping or cleaning are either non-existent or in a rather rudimentary state. It can thus be assumed that products using low tech or older technologies will have a stronger market presence than those requiring high tech – which in fact could be an explanation of the fact why especially the category "Smart homes / daily chores" has such a small percentage.

Apart from that, it could furthermore be assumed that the chart also reflects a hierarchy of consumers' interests for certain product groups. However, this cannot be deduced from the given ratios that easily, as they only represent the current status on the market. Just like in the case of the influence of the degree of technological maturity and marketability, statements about the real importance and interest of consumers would need further studies reflecting the product demands from the perspective of the persons concerned.

7.4 Product Types

Although it is understood that all products considered within the scope of this study are always based upon ICT (due to the

definition of AAL products given above), the resulting products may, however, address only special ICTs or combine them with other technologies.

Figure 22 represents the percentages and total numbers of AAL products and thereby distinguishes between
▶ pure ICT devices,
▶ ICT enabled devices,
▶ services,
▶ software solutions,
▶ mix.

While pure ICT devices consist of ICT only, ICT enabled devices integrate different technologies, but must still be based upon ICT (i.e. ICT should not just be an additional technology). AAL products only are categorised as "software" if they do not include technologies other than software. The same goes for "services", which is only assigned if a product consists of ICT-specific services, e.g. telephone hotlines or emergency services using mobile phones. "Mix" is only used in case a product is a mixture of all given categories and could therefore not be identified clearly. All these product types help to conceive of a categorisation of AAL products currently available on the market in a more tangible way.

According to the chart, more than half of all AAL products represent an integration of different technologies (53%). This is not surprising, for this finding mirrors a current technological trend towards an interlinking of various technologies. Besides,
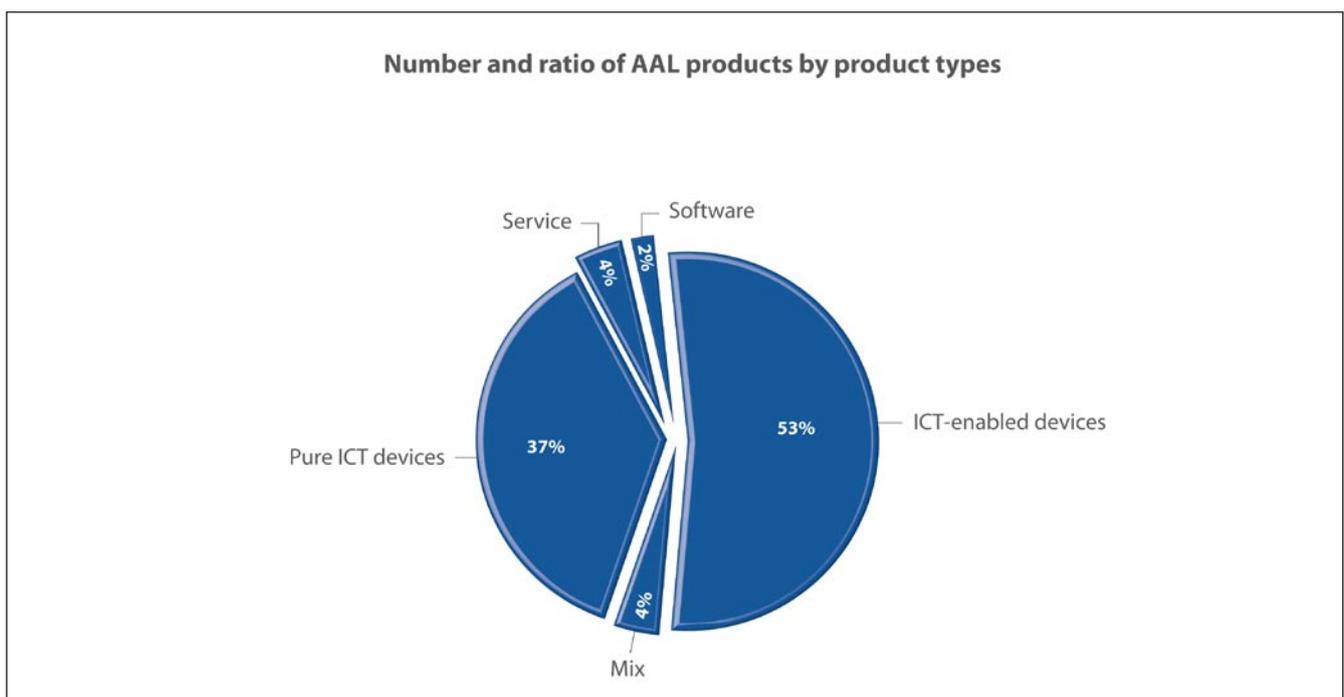

Figure 22: Number and ratio of AAL products, distinguished by product types

the amount and percentage of pure ICT devices are very high as well (37%).

Overall, it is quite obvious that the market for AAL products and services is just evolving. Most products currently available in EU-27 are not sole ICT applications by origin. This may be attributed to the fact that the usage of ICT enabling an independent life of elderly people is quite new. Therefore, only very few products and services have been developed to particularly address senior citizens. As shown before, the greater part of all AAL products addresses either health and home care or safety.

7.5 Product Providers

The following subchapter will give an overview of the distribution of organisations providing AAL products on the pan-European market.

It will also be discussed which regional differences there are, which particular organisation types these organisations belong to and which are the largest providers for AAL products in EU-27. This gives a deeper insight into the already existing infrastructure for the marketing of AAL products in each nation and what types of organisations offer AAL products within their portfolio.

Overall, 93 product providers could be found in the database. The bar chart in Figure 23 ranks the total number of product providing organisations in every member state of EU-27.

As is the case with products, most product providers can be found among the old member states of EU-27, which at the same time are the economically strongest countries. Accordingly, the three top ranking countries are Spain (11 product providers), France (15 product providers) and Germany (20 product providers). The divide between old and new, northern and southern member states is depicted by the pie charts in Figure 24: Ratio of product providers in old and new member states of EU-27 and Figure 24.

Similar to earlier findings, most product providers can be found among the northern and old member states of EU-27. This of course is also the case because the charts on products necessarily are congruent with those on product providers.

The pie chart in Figure 26 shows the ratios of product providers distinguished by the organisation types defined in chapter 4.

With 35%, providers for AAL products and services contribute the majority of all AAL products. This means that there are already many providers for these specific products on the market, although the market for AAL products and services is currently only in the making. However, in comparison with the other ratios one has to bear in mind that this category builds an intersection with others. The exact fields of work and interests can therefore not be concluded directly as with other categories. Most providers for AAL products and services (in exact percentages: 68.75%) offer tele-medical services while the next greater group (18.75%) consists of telecommunication providers.
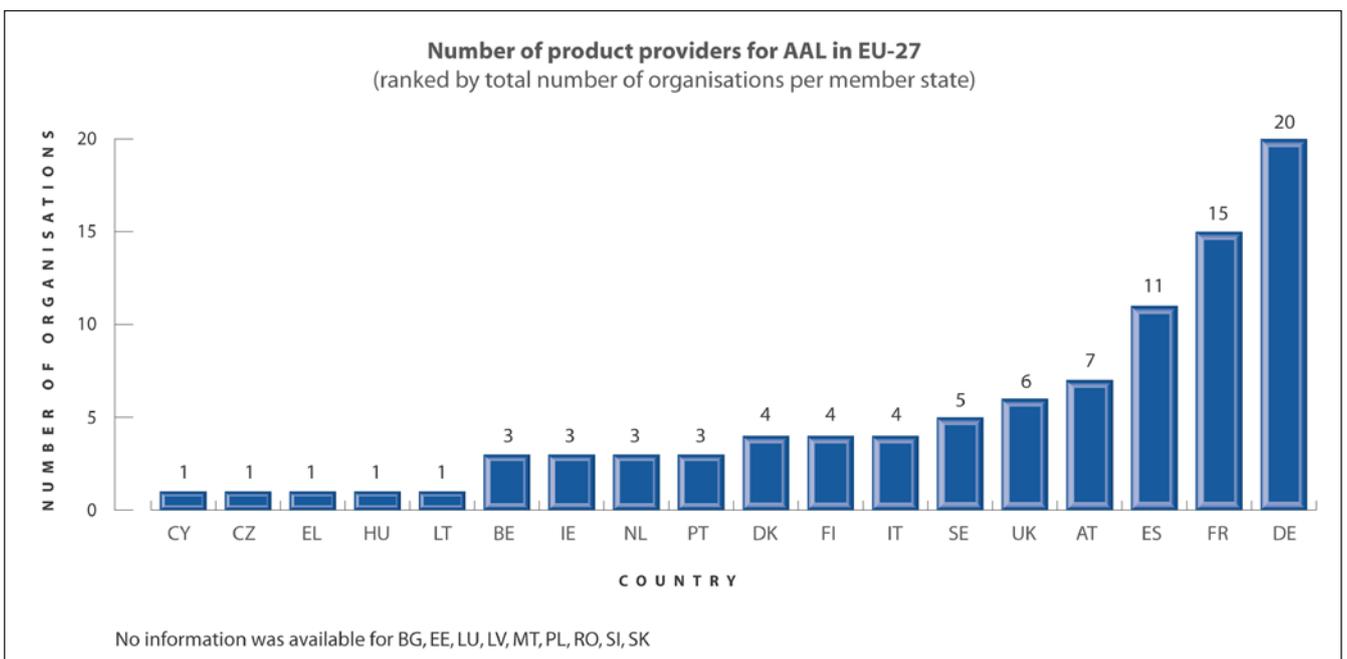

Figure 23: Number of product providers in all member states of EU-27
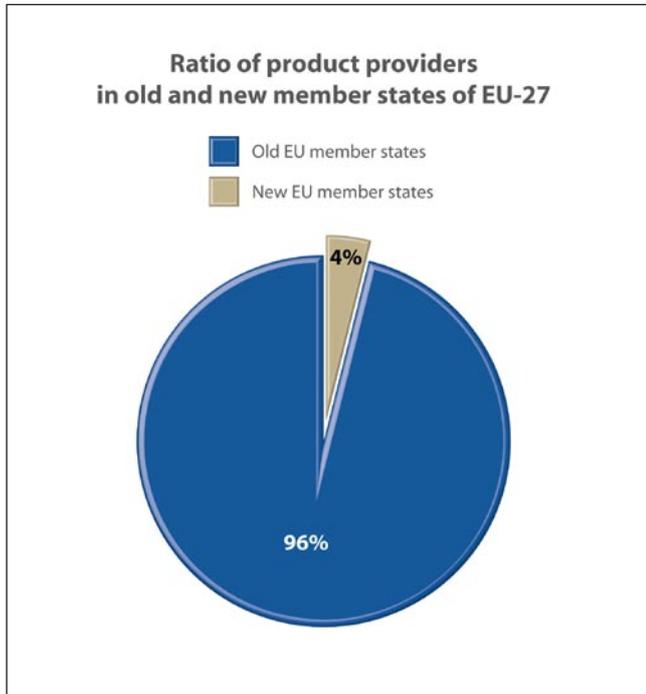
Figure 24: Ratio of product providers in old and new member states of EU-27
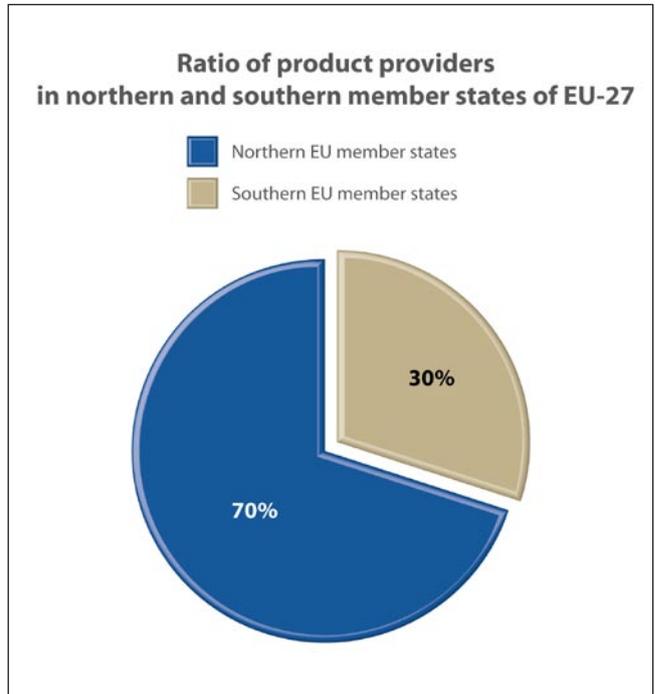

Figure 25: Ratio of product providers in northern and southern member states of EU-27
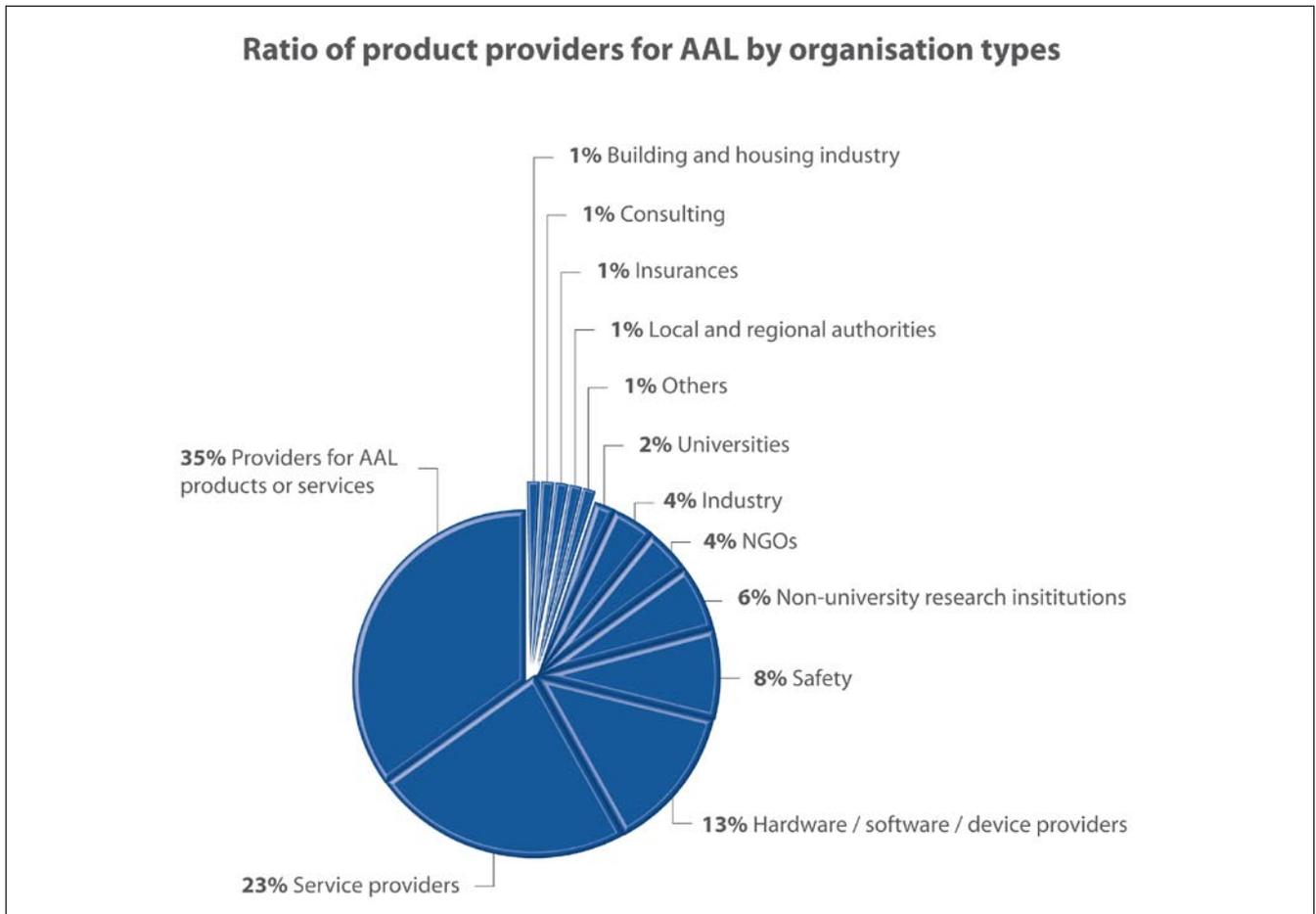

Figure 26: Ratio of types of organisations providing AAL products

The next largest ratios are service providers (23%) and hardware/software/device providers (13%). This shows that service providers have a strong interest to offer new services for elderly people, whereas hardware and software solutions for elderly seem to build another large interest group as well. Further investigations on the group of service providers have proven that it mainly consists of telecommunication companies (in percentages: 52.38% of all service providers), such as Bazile Telecom (France), Corscience (Spain), Elsi Technologies (Finland) and Hellenic Telecoms S.A. / OTE A.E. (Greece), also the national telecommunication company of Greece.

With 8%, providers for safety products and services seem quite underrepresented, for safety surely is an important issue for the well-being of elderly. However, this ratio may also be explained by the fact that providers for AAL products and services may offer products and services for maintaining and increasing the sense of security of elderly people as well.

7.6 Highly Active Product Providers

Although many product providers in EU-27 do not offer more than one AAL product, there are some that offer several. They therefore have a strong position within the field of AAL

products. For the following bar chart in Figure 27, these organisations have been ranked by the total amount of AAL products they offer.

The majority of these thirteen product providers operate in the area of tele-medical solutions, medical assistive technology as well as products for security and safety, often in terms of an intersection of these categories. This correlates very well with the ratios of product groups given earlier (cp. Figure 21): Tele-medical solutions, medical assistive technology and products for safety and security contribute the largest share of organisations for the provision of AAL products. To give a deeper insight into the structure and design of these companies, they will be described as follows. In this context, they may also be considered as paradigms for product providers in the field of AAL as a whole:

Telcomed Advanced Industries Ltd.[26] supplies wireless telemedicine products and software worldwide and mainly concentrates on telemedicine monitoring technology. Within the scope of AAL the Irish company with headquarters in Dublin supplies portable medical watches monitoring vital parameters, such as blood pressure, ECG, heart rhythm, respiratory rate, oxygen saturation, body temperature, etc. Many of these applications are able to transmit data to a gateway automatically
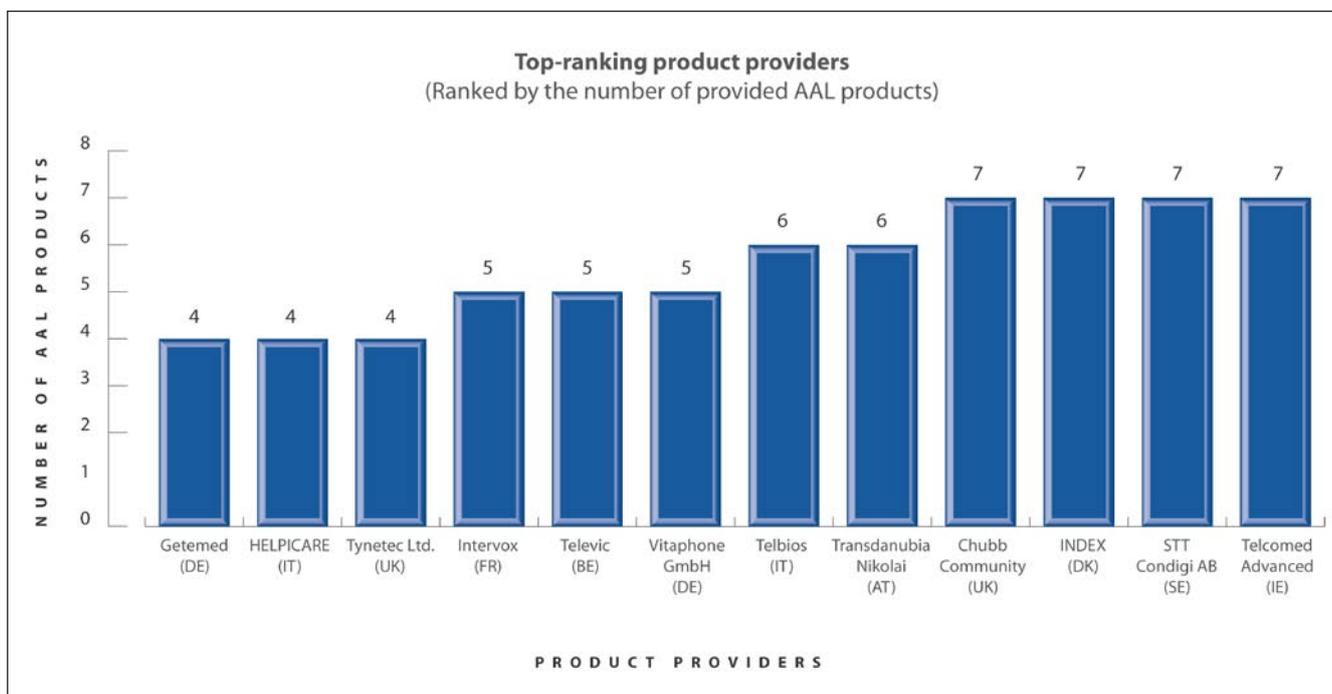

Figure 27: Top-ranking product providers by the number of provided AAL products

[26] http://www.telcomed.ie/, last visit 08/14/2009

and wirelessly, which then is forwarded to a telemedicine monitoring centre or web medical file via telephone or internet. It therefore has been classified as a genuine provider of AAL products and services.

STT Condigi AB[27] is a European supplier of dispersed alarms (i.e. "care phones") and alarm systems for elderly residents living in their own homes. The company resulted from a merger between the Danish Condigi Televagt A/S and Swedish STT Care, and is mainly owned by the Swedish 6th Pension Fund. Established in Malmö, STT Condigi develops and markets a platform for care systems. The special feature of this platform is that it allows interlinking of all parts of STT Condigi's product portfolio.

INDEX AWARD A/S[28] is a rather uncommon example for an AAL product provider. Located in Copenhagen, INDEX calls and carries out an international design award. The award follows a strong humanistic approach and is dedicated to changing the global mindset by showing and exploring how design can improve everyday life. The website also presents various products for elderly that have been awarded because of their innovative and creative design. Some interesting and extraordinary examples are computerised clothing for the visually impaired ("MUKANA"), a solar powered and portable storage device to keep insulin cold ("Diabet-Cool"), a mobile bladder monitor for patients with incontinence ("UTURN"), and a gadget-like hearing device with superior performance ("Oticon Delta")[29]. These examples make it reasonable to include the organisation in the AAL database, although it does not produce or provide products in a narrower sense.

Chubb Community Care[30] is a provider of tele-care, tele-health and care monitoring products for persons with special needs, such as elderly, impaired and disabled people. The company concentrates on the British market only. Products comprise e.g. care phones, alerts and various tele-health applications. Located in Blackburn, Lancashire, and as a member of United Technologies Corporation (UTC), it is Chubb Community Care's declared goal to preserve independence for people and help them enjoy the highest possible quality of life.

Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)[31] is an Austrian company with headquarters

in Vienna. It provides various aids and technological applications for use by visually impaired people, some of which even apply high-end ICT. Many products are designed as both mobile and/ or stationary applications. Apart from rather traditional and low-tech aids, such as glasses or magnifiers, the company's portfolio also comprises electronic magnifiers (using electronic displays and scan technology), electronic reading aids, some of which are even able to read a text by using a synthetic voice, mobile phones with big keys, seeing or reading aids developed for mobile phones, mobile devices for voice recording as well as software designed to suit all of these applications.

What is more, the company also includes an "Optic Centre" and a "Braille Centre". The "Optic Centre" is concerned with services based on aids and applications offered, e.g. the determination of a patient's visual acuity, repair services or consulting services for the illumination of interior spaces. The "Braille Centre" offers devices and services focusing on the usage of the Braille letter system for blind people. Some of these applications are to be considered as high-end technology, as they use USB or wireless interfaces to computers.

Telbios is a large Italian company strongly focused on particularly mobile tele-medical devices and homecare services. Headquartered in Milan and Rome, the company covers three different technological areas: tele-assistance, tele-cardiology and tele-monitoring. Its products and services are sold on both the Italian and worldwide market. Main customers are globally operating companies, but some Italian ministries as well.

Apart from offering products, Telbios also invests a major part of its business volume in innovative research in telemedicine. This mainly concerns international collaborations with the European Union in general as well as the Italian and European space agencies in particular.

Vitaphone GmbH[32] develops products and services for the recording and transmission of vital parameters using new information and communication technologies that are integrated into tele-medical monitoring and care systems. Main customers of the German company are not only individual patients but healthcare suppliers and insurers. The company explicitly addresses elderly people, tackling both the socio-economic problems deriving from the European demographic change

[27] http://www.sttcondigi.com/uk, last visit 08/14/2009.
[28] http://www.indexaward.dk/, last visit 08/14/2009.
[29] For further information on all given products, please go to
   http://www.indexaward.dk/tekstside.asp?topmenu=950&undermenu1=1264&undermenu2=1269, last visit 06/09/2009.
[30] http://www.chubbcommunitycare.co.uk/, last visit 08/14/2009.
[31] http://www.transdanubia.at/, last visit 09/03/2009.
[32] http://www.vitaphone.de/vitaphone_startseite.html?&L=1, last visit 09/04/2009.

as well as the special requirements of people over 60 for an independent life at home. This especially concerns diseases typical for elderly people, such as cardiac arrhythmias, heart failure, hypertension, and diabetes mellitus.

Products offered by Vitaphone concentrate on the fields of "TeleCare" and "mobile emergency and service calls". TeleCare applications use telephone technology for the monitoring of elderly in order to stay at home as long as possible. This includes devices as well as accompanying tele-medical services. Mobile emergency and service calls have been especially designed for health and home care providers to support their everyday work and improve the security of elderly persons at home. With a view to meeting these objectives, Vitaphone developed its own specialised mobile telephone devices, such as "Vitaphone 1100", which can be easily used by elderly people. It gives assistance and counselling and consists of an emergency function that allows giving immediate help in case of an emergency. Vitaphone is an internationally operating company whose main activities are concentrated on Europe, but also maintains subsidiaries in the USA, the UAE, China, India, South Africa and Egypt.

Televic[33] develops and creates multimedia and communication devices for specialised market segments, such as transport, healthcare, event management (conference technology) and education. Not only does the Belgian company offer ready products already available on the market, but it also maintains an R&D team of its own designed to develop future products using innovative ICT. These research projects are often carried out in collaboration with research institutes, universities and engineering school. Core technologies applied and researched on by Televic are digital audio, digital video and digital networks.

Within the scope of AAL, Televic provides a series of call systems for health and home care staff, which can also be individually used by elderly people at home. One outstanding example includes tele-medical systems for patients suffering from dementia[34]: A batch is applied to a wristband. This allows localising the patient in case he or she gets lost and does not find their way back. Thus, the system enables individuals suffering from dementia to maintain a certain degree of mobility as well as preventing dangers and accidents.

Televic is also engaged in the Belgian project "COPLINTHO" (Innovative Communication Platform for Interactive eHomeCare), a collaborative research project concentrating on the further development of ICT to improve care processes for patients at home. This problem is not only tackled from a technological but from a sociological perspective as well to guarantee a holistic approach towards the special demands and needs of these patients. The main objective is to create ICT platforms and services to suit these purposes. This includes three aspects: to create individualised networks enabling the patient to interact with his or her care staff, to improve the communication between members of the respective healthcare staff and to build up virtual communities of (isolated) patients at home[35].

INTERVOX Systèmes[36] is a French company focusing on the development, manufacture and supply of security applications concerning people and property protection as well as video surveillance. The company also actively participates in European standardisation processes for electronic security systems.

Its applications for person protection explicitly address elderly and/or dependent people. They are thus designed to ensure a constant and immediate connection to health care providers and medical institutions. This way, elderly persons are enabled to stay at home and lead a mostly independent life and will nonetheless be helped immediately in case of an emergency. The surveillance and security systems of INTERVOX use the following technologies: environmental detectors for home accident prevention (e.g. for smoke, gases, temperatures), presence and activity detectors (for alarm in case of unwanted perpetrators), video and communication technologies enabling conversations with family members, friends or home care providers.

Tynetech Ltd.[37] is one of the largest British companies for warden call systems, tele-care and tele-health equipment and access control systems. These products are designed by an in-house R&D team. Their main costumers are local authorities and housing associations in the UK. The company's portfolio therefore comprises hard-wired and wireless solutions.

Apart from more general products and services within this business sector, Tynetech possesses a special segment dedicated to telecare applications for an independent life at home[38]. These solutions are integrated into the domestic environment

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[33] http://www.televic.com/default.dhtml?I=BE, last visit 04/09/2009.
[34] http://www.televic.com/cms_files/N-265-BEFile1.pdf, last visit 04/09/2009; the document is available only in French and Flemish.
[35] For further information, please look up the project's homepage at http://www.ibbt.be/en/project/coplintho, last visit 04/09/2009.
[36] http://www.intervox.fr/eng/intervoxsystemes/overview.php, last visit 09/16/2009.
[37] http://www.tynetec.co.uk/, last visit 09/04/2009.
[38] http://www.tynetec.co.uk/page/telecare_in_the_home, last visit 09/04/2009.

and address elderly people in particular. The website to this business segment gives a vivid simulation of a house completely equipped with such AAL technology developed by Tynetech. These solutions use a very large span of technologies, ranging from tele-monitoring to sensors, detectors, alarms and communication devices.

The Italian company **HELPICARE**[39] produces and sells assistive aims for disabled and impaired people based on information technology (IT). These products are designed to improve the autonomy, therapy and communication of persons suffering from cognitive, sensory or motor impairments. Headquartered in Bologna, the company was founded in 2001 in the form of a spin-off from an activity that had been launched in 1994 by an association of parents of disabled persons. HELPICARE closely works and co-operates with major research and development

centres on national and international level. It exports its technology and solutions to various countries of the European Union as well as to the USA and Canada.

getemed Medizin- und Informationstechnik AG[40] is a provider of monitoring and cardiology products applying ICT. Products can be integrated into existing hospital management systems and exhibit tele-medicine characteristics. However, applications by getemed may also be used within the domestic area of patients. The main goal of these applications is to reduce healthcare costs and provide innovative tele-medical solutions that support patients' mobility and autonomy at the same time. The company's activities are mainly concentrated around two areas: a cardiological workstation developed by getemed and a variety of monitors for monitoring heart rate and blood oxygen saturation as well as for detecting central apnoeas.

8   Research Activities

The ageing population in Europe has both an economic and a social impact on societies. It therefore requires new approaches in research that bring together diverse stakeholders, e.g. from care and medical institutions for senior citizens and from technology experts. Only the total group of the stakeholders concerned is able to form a relevant research community. However, the analysis of research projects from the database shows that during the last few years AAL research and closely related tasks seem to be driven by more general research programmes rather related to ICT and close-by technologies. This is especially the case for new member states. The resulting research projects tend to focus on technologies and to disregard the complex stakeholder structure.

In the past, many European countries did not provide programmes specialised on the research and development of ICT for an independent living of elderly. If at all, projects touching on AAL-related topics were integrated in broader research programmes centred on key terms such as "eHealth", i.e. healthcare practices supported by electronic processes and communication. Chapter 10 lists and describes AAL-related

research programmes for each country based on information available on the internet. However, some countries do not provide any particular national programme for ICT issues at all. For more information, the study "European ICT R&D Landscape – Report on National Priorities and Programmes" offers a good overview of the ICT research landscape in Europe and reflects existing funding programmes[41].

Regarding the novelty of AAL as a research focus and the formerly rather unspecialised research funding for this subject, the picture has significantly changed in the meantime. For example, during the 6th IST call of FP6 the European Commission announced "Ambient Assisted Living" proposals. As a result, 13 projects (3 IP, 10 STREP)[42] have been undertaken since early 2007. This has been the first important wave of research and development projects for AAL in Europe so far.

Then, in September 2007 a European AAL Joint programme (AAL JP) was launched. This multi-national funding programme focuses on the support of healthcare and everyday life of elderly people at home. It is particularly dedicated to information

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[39] http://www.helpicare.com/chisiamo_en.php, last visit 09/16/2009.

[40] http://www.getemed.net/index.php?mid=114&vid=&lang=en, last visit 09/16/2009.

[41] Uotila, Marjo; Peräjoki, Janne; Nurmi, Hannu (no publishing date). EUROPEAN ICT R&D LANDSCAPE – Report on National Priorities and Programmes. http://www.kooperation-international.de/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/redaktion/doc/cistrana_eu_ict_report_2181.pdf&t=1247933692&hash=c8c4749fa291cc49d70c317e003f9e1d&PHPSESSID=c33269fafb89cb7622d0c5cb8c6a7, last visit 07/17/09.

[42] Aladin, Caalyx, Easy Line+, Emerge, Enable, Hah, Inhome, Netcarity, Oldes, Persona, Sensaction-AAL, Share-It, Soprano.

and communication technologies, service and assistive systems for elderly. At present, the AAL Joint Programme involves 20 European member states and 3 associated states, which organise and co-finance the research projects selected by the JP. All participating countries are committed to co-financing research projects for the total programme duration of six years. Although the European Union adds substantial funds from the European framework programme, it is the countries that are in charge of implementing it. As a side effect of the joint programme, a network of national contact points has been established, including national professionals of executive organisations responsible for the national funding processes[43]. This situation holds the potential to press ahead with future European cooperation processes. Since projects funded by the AAL JP will not have been finally selected before the final version of this study, they have not been included here.

The research projects analysed in this study have all been carried out under the patronage of various European and national research programmes, dedicated to supporting and funding projects within the scope of AAL. As a result, the database underlying this study consists of 143 national and European projects selected to consolidate information and communication technologies with special needs for elderly. This data shows that research in the field of AAL is still in its beginning. This can be derived from the date on which most research projects were started, mostly around 2005. Hence it can be assumed that it will take at least further 3-5 years after the end of the projects and some additional years until the results are incorporated into a product or service available on the market.

During the following analyses on the current research landscape for AAL it has to be kept in mind that it is difficult to map the number of research programmes against the quantity of research projects found. Although, according to the findings listed in chapter 10, every country provides several programmes under which AAL-related projects will most probably be funded, for many countries the internet research resulted in only few or even no information on ongoing research projects. Considering that most research projects are carried out with the support of national research programmes, information on these projects will often be limited to national communication channels only and thus will often not be available from the outside. A lack of information transparency and existing language barriers have therefore been an obstacle to investigations on the current European research landscape for AAL and again prove a certain lack of international consolidation. To give a common example, certain expressions which

have already become widely used technical terms are not being used comprehensively in all countries. This is the case for keywords such as "ehealth" and "tele-medicine", which are often translated into the national languages. This certainly has had a distortive effect on the statistical analyses in this chapter.

8.1 Topics of Research Projects

For the classification of research projects, the same scheme already introduced in chapter 5 has been applied: Projects have been classified in the same manner like products, i.e. by the terms "Social Interaction", "Health and Home Care", "Supply with daily goods and chores" and "Safety". These categories were applied to identify the current research foci of the respective projects. Additionally, each project has been assigned to a country or to the label "EU" (for "European projects"), i.e. projects with consortia that include partners from at least two different nations. However, this does not necessarily mean that these projects are funded by the EU and its competent bodies, although this is the case for most projects within this category.

The bar chart in Figure 28 shows the number of the research projects within the scope of AAL for the member states of EU-27. Each bar represents the total amount of research projects in the related country with the total number of 143 projects. With altogether 62 projects European consortia provide the largest share. Although the number of all national projects, 81 in total, exceeds the total number of European projects, there is not a single country contributing as many. This fact highlights the fundamental role the EU already plays for AAL research in general. In Figure 28 it also becomes visible that there are countries for which no projects addressing AAL could be researched so far, i.e., Denmark, Greece, Lithuania, Latvia, Romania and the Slovak Republic. This follows the overall trend that especially new member states do not participate in the field of AAL as much as old member states. Of course, Denmark and Greece are exceptions to this rule. As with earlier findings, this however does not necessarily imply that there is no ongoing research activity within these countries at all, but that information may not be accessible because information is only available in the national languages. This has especially been a significant problem in Greece and Bulgaria, where the general obstacle of language barriers is even augmented by the existence of deviant letter systems, which exacerbated our investigations even more.

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[43] http://www.aal-europe.eu/contacts, last visit 08/19/2009.

Number of research projects in EU-27
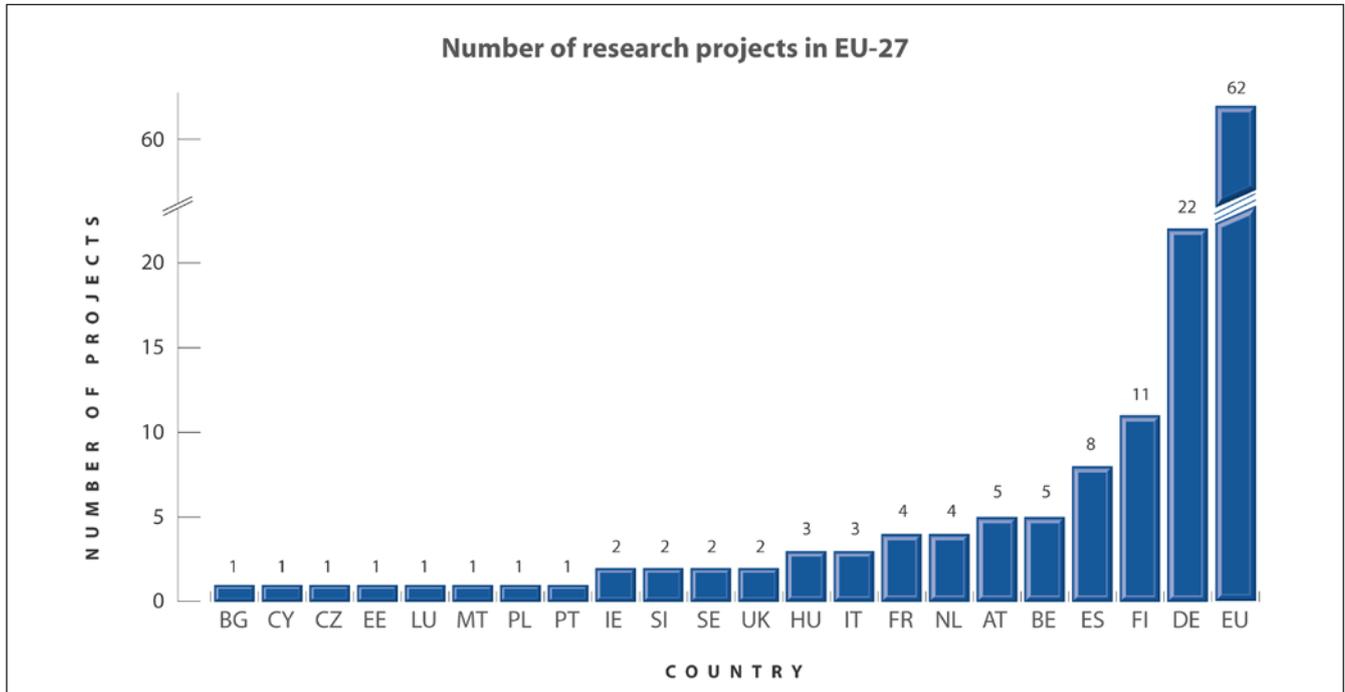
Figure 28: Ranking of research projects by member states in EU-27

Ratio of research projects by research topics

**Distribution of fields within the research topic "Health and Home Care"**
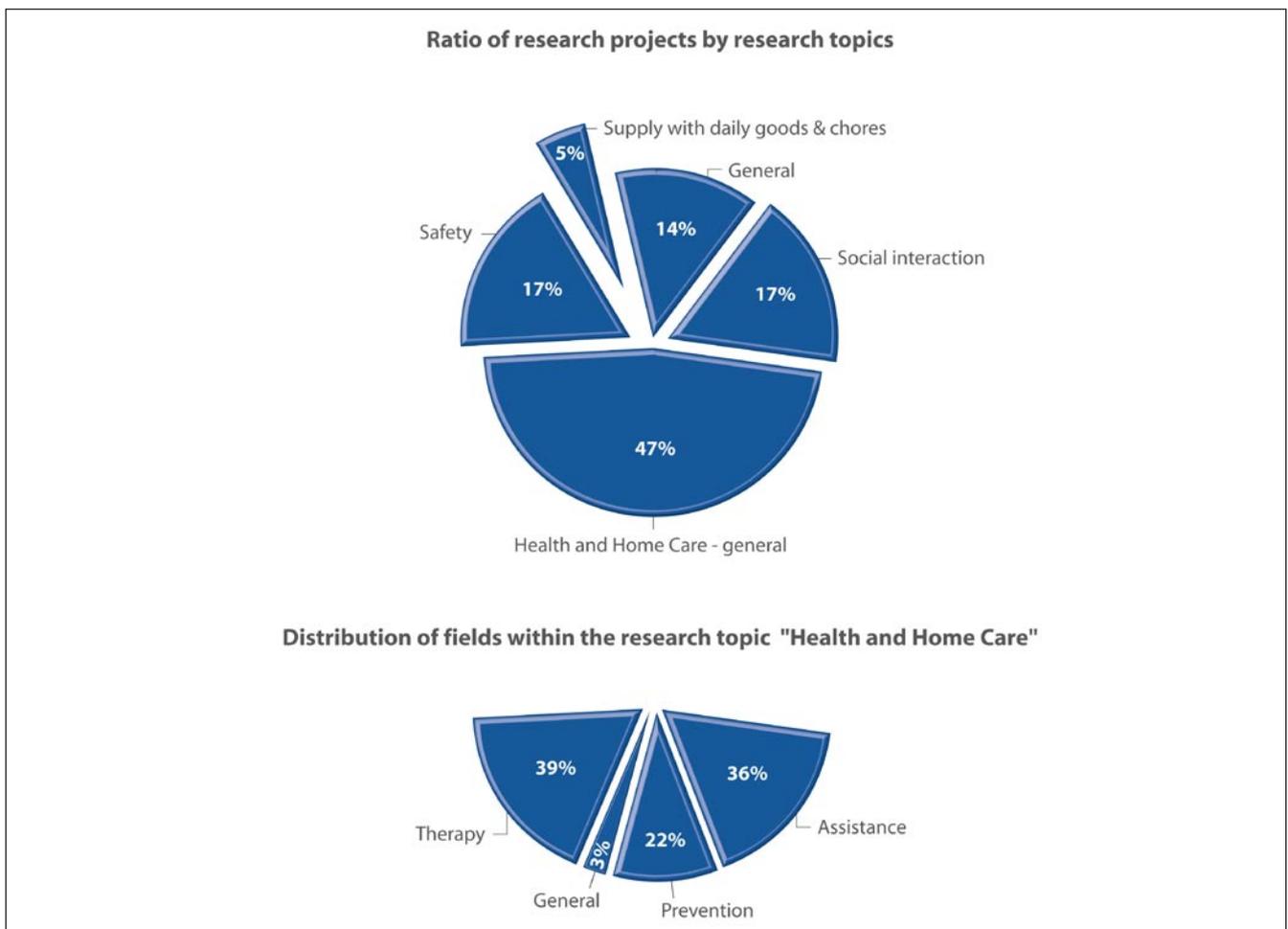
Figure 29: Ratio of research topics by research projects

The pie charts in Figure 29 depict the research topics addressed by research projects. While the upper pie chart shows the ratios for particular topics, the lower one represents the ratios of fields within the topic "Health and Home Care", which counts as 100% for the subordinate categories in the lower chart. With altogether 47% "Health and Home Care" has the largest ratio, whereas within this category medical therapy (39%) and assistance (36%) are the largest groups. Prevention was counted more rarely (22%). Apart from "Health and Home Care", the other 53% are distributed equally among "Safety" (17%) and social interaction (17%), followed by general research within the scope of AAL (14%). Research on technologies supporting the supply of elderly people with daily goods is last in line (5%).

8.2 Participating Organisations

Within this study we follow the thesis that the specific kinds of participants in research projects give a more adequate impression of prospectively involved AAL stakeholders in the future. At present, even today various organisations are dealing with research on ICT for an independent living of elderly. To start with, the bar chart in Figure 30 shows the number of organisations for every member state of EU-27 working on research projects. Under the term "organisation" we subsume different kinds of organisation types, including both private and public organisations. As only a few organisations are classified as "European", the corresponding bar in this chart is to be found further on the left in comparison with Figure 28. Most organisations participating in EU or multi-national projects have been assigned to one country. International companies are classified either according to their head office or according to the headquarters of the subsidiary enterprise if independent. Only few European organisations discussed here are in fact European NGOs.

Figure 30 illustrates that all European countries participate in research projects with at least one organisation, whereas Germany spearheads with altogether 141 organisations. Spain, the country ranking next to Germany, is further behind with altogether 63 organisations. However, as already mentioned in the chapters before, this extreme advance reflects the fact that this study has been undertaken in Germany, which assumedly has influenced the accuracy.

The chart in Figure 30 also reflects the differences between old and new member states. The first third of this ranking consists of old member states only: Germany (141), Spain (63), The United Kingdom (58), Italy (45), France (44), Sweden (32), Finland (29), The Netherlands (27) and Belgium (24). Contrariwise, the last third mainly consists of new member states (with

the exception of Luxembourg). The pie charts in Figure 31 and Figure 32 emphasize this impression: 89% of all organisations participating in AAL projects are based in the old member states, only 11% in new member states, and almost three quarters of all organisations are based in northern countries (74%), only about one quarter (26%) in the southern countries.

Because organisations often participate in several research projects at the same time, divergent from Figure 28 and Figure 30, Figure 33 also counts multiple research activities of single organisations. It shows that single organisations sometimes work in several consortia at the same time. This indicator therefore approximates the factual research activities and strengths of respective countries than by only counting single organisations. That is why apart from only giving the total numbers of organisations, their participations in research consortia has been considered here as well.

However, the leading countries remain the same, only Finland and Sweden have swapped places. The positions of Germany (196 participations) and Spain (96) have become more significant, whereas Finland and Sweden have come closer to each other. The bar chart deviates from the one in Figure 30 insofar as Slovenia (SI), the top new member state, is found even farther behind. By comparison, Slovenia (17 participations), Hungary (14) and Romania (11) are the new member states with most participations in research projects. The last ten member countries consist of new members only, with the exception of the few European (European NGO's) and Luxembourgian organisations, which both contribute to research projects only 4 times.

Research in the field of AAL is undertaken by both public and private organisations. Their ratio by total number is shown in the pie chart in Figure 34. With 316 against 289 organisations public organisations slightly outbalance private ones. This means that research is currently dominated by public organisations, although there are many private organisations to be found in research consortia as well.

To get a comprehensive perspective on the research landscape concerning ICT for an independent living of the elderly, it is also important to know what particular types of organisations participate in research projects. Therefore, the pie chart in Figure 35 displays the ratios of organisations using the organisation types as defined earlier in the study (chapter 5).

With a percentage of 25% universities hold the majority, shortly followed by non-university research institutions (19%). Both percentages together total 40% for research institutions in general. The next share belongs to service providers (12%). The meaning of this category has already been explained and
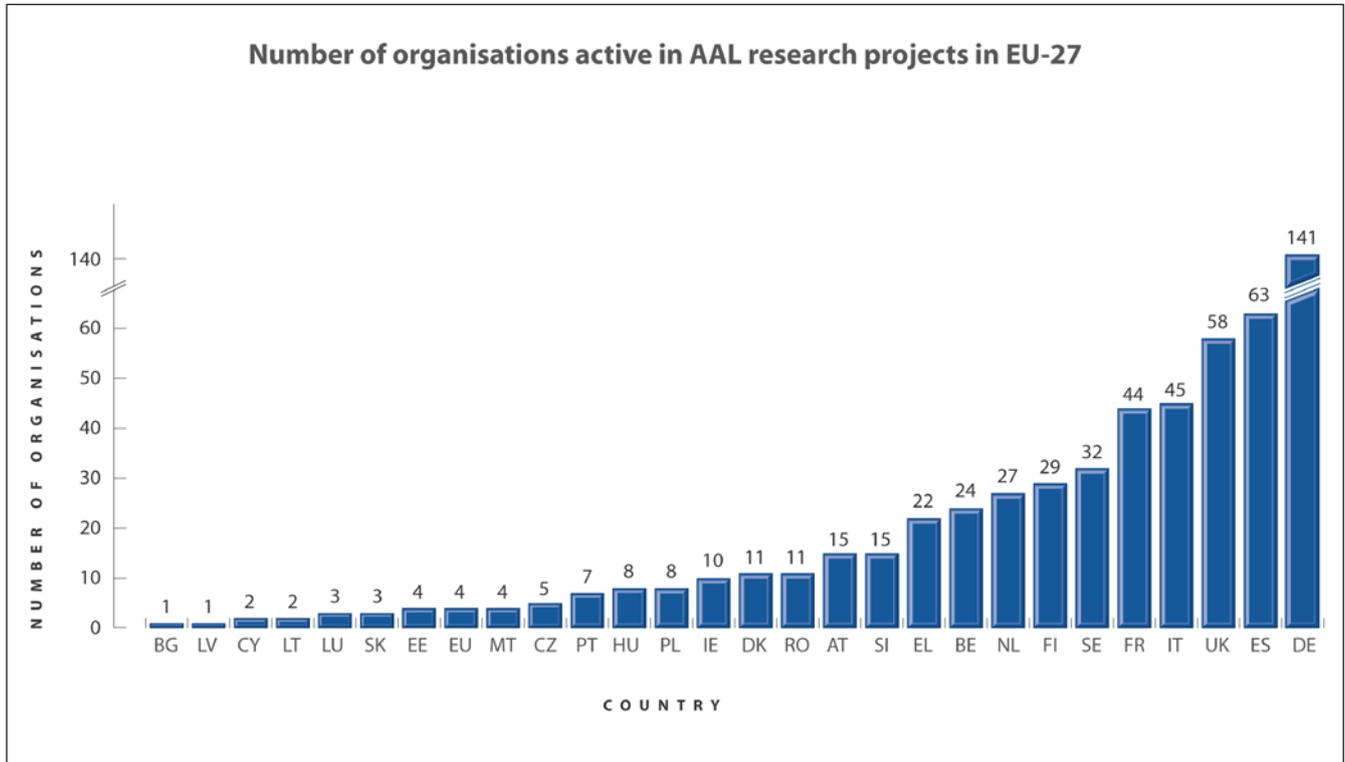
Figure 30: Number of organisations active in AAL research projects in EU-27
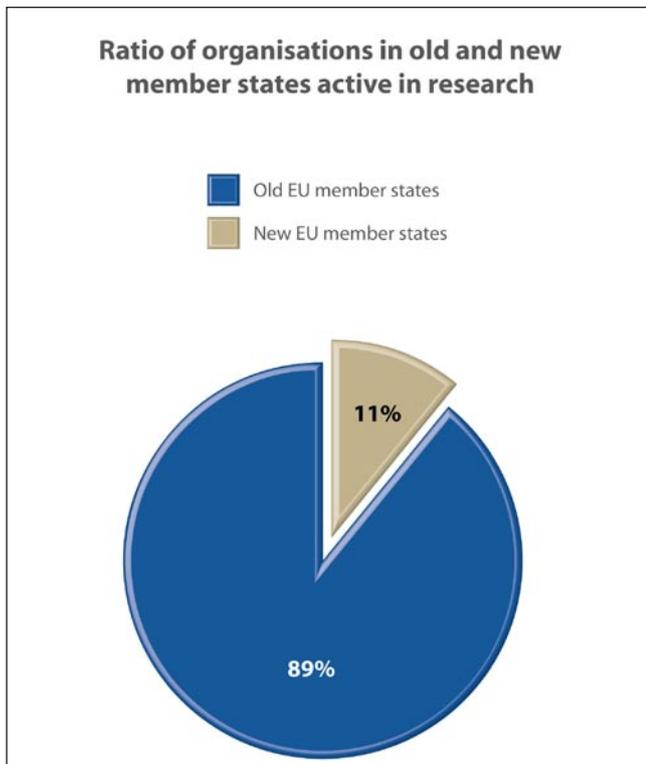

Figure 31: Ratio of research organisations in old and new member states
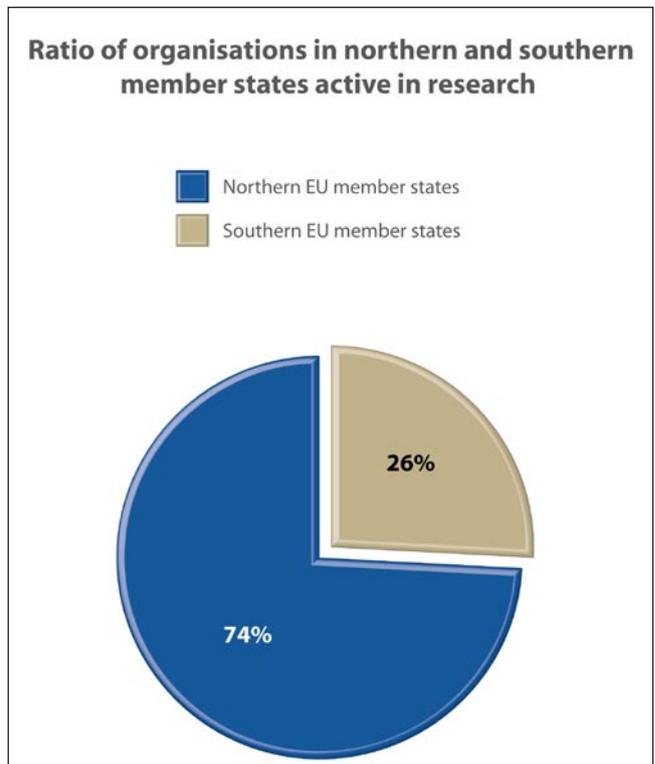
Figure 32: Ratio of research organisations in northern and southern member states
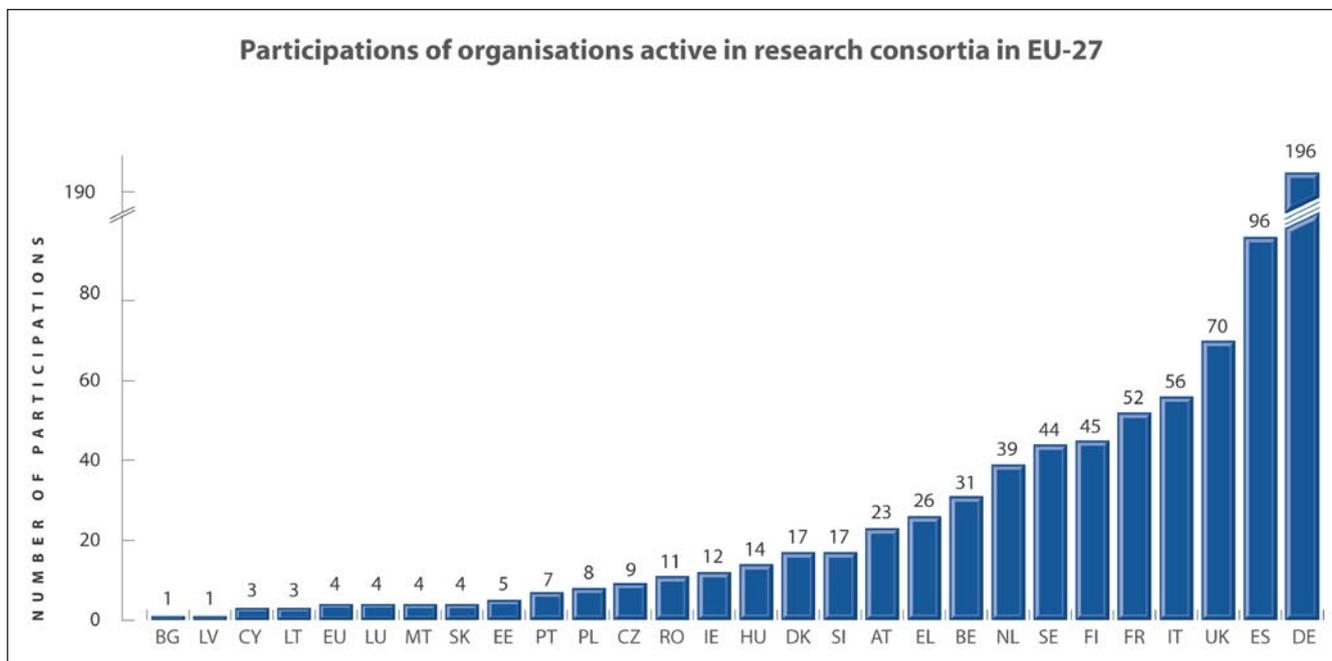
Figure 33: Number of participations of organisations in research consortia per member states in EU-27

shall be repeated again shortly here: Service providers subsume private or public organisations which not belong to healthcare, as for example technology services (repair, installation, etc.), the supply of everyday products and hotlines. All of this results in a rather heterogeneous group of organisations. The share of local and regional authorities sums up to 13%. Hardware and software providers as well as consultants total 6%, Medical institutions and hospitals 5%, Industries 4%. Contrary to expectations, providers of products and services for AAL only have a total share of 3%. The diagram also shows a participation of building and housing industries of 2% and a very small share of 1% for insurance providers and healthcare providers.

The high percentage of **universities** and other **research institutions** is interpreted here in a twofold manner: First, it reflects the early state of the AAL market with many unsolved scientific problems. Secondly, it shows that the relevant aspects of AAL are widely distributed over ICT topics and need to involve many different experts.

Service providers are the second strongest group of stake-holders. Typical representatives of this category are telecommunication organisations. During this study it has become obvious that telecommunication companies in all Europe are strongly interested in AAL. Today these companies are facing changing conditions of the telecommunication branch. The market for traditional telephone services is scaling down and mobile phones are dominating the market more and more. However, the telecommunication companies do not enter the market with hardware products at a considerable scale. They
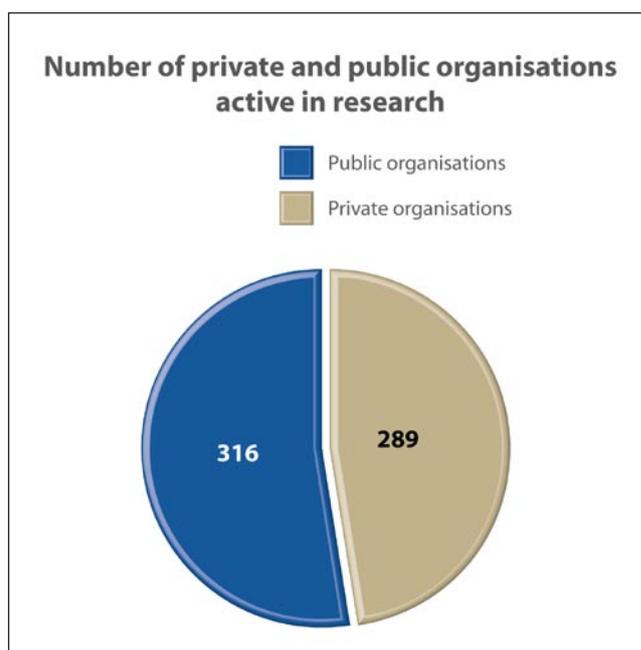
Figure 34: Number of private and public research organisations

try to open up new markets with services and software for mobile phones and tele-services instead. In combination with a potentially enormously growing number of customers in this field, AAL is a promising market for telecommunication providers.

The apparent presence of **local and regional authorities** reflects that main solutions for AAL are linked to regional

Ratio of organisation types of organisations active in research

1% Healthcare providers

1% Insurances

2% Others

2% Building and housing industry

3% Providers of products or services for AAL

4% Industry

5% Medical insitutions / hospitals

6% Consulting

6% NGOs

6% Hardware/software/device providers

8% Local and regional authorities

12% Service providers

19% Non-university research insititutions

25% Universities

Figure 35: Ratio of organisation types of research organisations

stakeholders and responsibilities of local and regional policy makers. This includes institutions and public bodies, such as the central administration of regional governments, municipalities, counties, cities or towns. Within research consortia local and regional authorities often play both the roles of financial supporters and end users, e.g. in order to provide public sector services to the local elderly population. Such consortia are often modelled as Public Private Partnerships (PPP). Therefore, such consortia may include all IT-based services and activities performed by public bodies, local public administrations, non-profit organisations and the private sector.

The successive categories are represented by a few organisations only. The reasons for these shares however are not really distinct. Being comparably small, the corresponding numbers (6% for hardware/software/device providers as largest, 1% for healthcare providers as smallest number) will not be interpreted here by a particular ranking. Interestingly enough, these smaller categories comprise the most relevant stakeholders for an AAL market. This situation suggests that even though the market is not well developed at present, first steps are currently underway.

The participation of **hardware/software/device providers** must be seen in the context of the utmost importance of mobile devices in the AAL approaches to be newly adapted to the special requirements of elderly people.

NGOs represent senior interests. The need to integrate such organisations into research projects is obvious. Experiences in AAL German research projects have nonetheless proven that often enough it is difficult to integrate elderly persons into specific tests. This results from ethical reasons that have to be respected. Together with healthcare providers, a group with an enormous relevance for home solutions for elderly people as well, NGOs share comparable problems regarding the participation in research projects: they often do not have a legal form fundable within the framework of conventional research programmes (i.e. civil law associations), they are very short of staff (especially scientific staff), and they generally have only little experience in research. All these issues are responsible for a significant increase in orientation time and additional costs.

Although **medical institutions** such as hospitals do have a share of scientific staff, they are barely involved in research

projects. It is impossible to judge by the database if this is currently changing. However, due to their business models and fields of activity it can certainly be assumed that hospitals are rather interested in medical solutions than AAL systems focussing on the home domain. For example, tele-medicine solutions can be operated by medical institutions and thus provide perspectives on future business models, savings and perhaps even economisations.

The small share of **industry partners** more or less automatically has to do with their role as stakeholders. They provide basic technologies and components for bigger AAL solutions but usually do not operate or manufacture systems for end users. In the standard case their products are not explicit AAL solutions. Therefore, industry partners participate in consortia for AAL research mainly if there are technical tasks to solve like production or assembly. For industry, AAL affords the opportunity to find new application areas for already existing technologies which might be adapted to new requirements. Nonetheless, there are some exceptions, such as Siemens AG, which has entered the market for AAL products all by itself. But especially in this case, it has to be considered that Siemens is an exception for it operates both as an industry and a product provider for medical technologies. Thus, it has been classified as "industry" in Figure 35, although its motivations for being active in AAL rather originate from its role as a provider of medical technologies.

If the small amount of **providers of products or services for AAL** is interpreted as an indicator of the progress made in the corresponding market developments, which would mean that only few companies are interested in this market. Because the companies integrated in the diagram in Figure 35 are selected from the research landscape, this also means that few providers of integrated AAL systems will be involved in the near future. Hence, the lacking integration of providers into research might turn out as a barrier to the development of an AAL market because of insufficient coordination concerning goals and requirements in this market. It is assumed that both parties – AAL providers and research - do currently not sufficiently step up to each other. One problem from the perspective of research might be the low number of existent providers. Seen from this angle, there are concrete reasons for the AAL providers' caution marketwise: On the one hand, they concern the expensive and lengthy process of entering the regulated market and fulfilling all criteria for a medical, which

is also precondition for many AAL products[44]. On the other hand, the risks to enter the non-regulated market are very high because the market is still undeveloped.

Only a small percentage of partners from the **building and housing industry** could be identified. For the database, it was only possible to document a certain point of time. Therefore, no data about recent changes could be provided. It nevertheless can be assumed that the building and housing industry will become an important player on the market as long as the AAL market develops, as they are a crucial instance for the realisation of AAL home concepts. Within a value chain they will probably advance towards main customers of AAL systems.

Insurances have an interest to reduce costs, especially with regard to a risk group such as elderly people. Therefore, the application of AAL products and services could help reduce costs, e.g. for medical treatments caused by accidents in the domestic area. However, the participation of insurances seems to be rather small at present and they seem to prefer participating in an observant but not active function.

8.3 Largest Consortia

On average, all research consortia included in the underlying database consist of 6.23 partners. In this context, it is interesting to note that with 9.31 partners European consortia are larger on average than national consortia, which consist of 3.69 partners. The bar chart in Figure 36 ranks the 10 largest project consortia, displaying nationality and name. With the only exception of the British project "MATCH", these 9 largest consortia are European and consist of more than 15 project partners. The five largest consortia even have more than 25 partners. The objectives and scopes of the largest consortia will be described shortly below to give some examples of typical projects within the AAL research landscape.

HEARCOM[45]: The HEARCOM project (Hearing in the communication society) aims at reducing limitations in auditory communication of people who suffer from a hearing impairment in order to allow them to keep on being a member in a communication society. Although this project is not explicitly related to elderly people, it has been integrated into the AAL project list because hearing impairment is a typical disease of elderly people.

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[44] Schlötelburg, C., Weiß, C., Hahn, P., Becks, T. & Mühlbacher, A. (2008). Identifizierung von Innovationshürden in der Medizintechnik. Studie erstellt im Auftrag des Bundesministeriums für Bildung und Forschung (BMBF).

[45] http://hearcom.eu/main.html, last visit 08/19/2009.
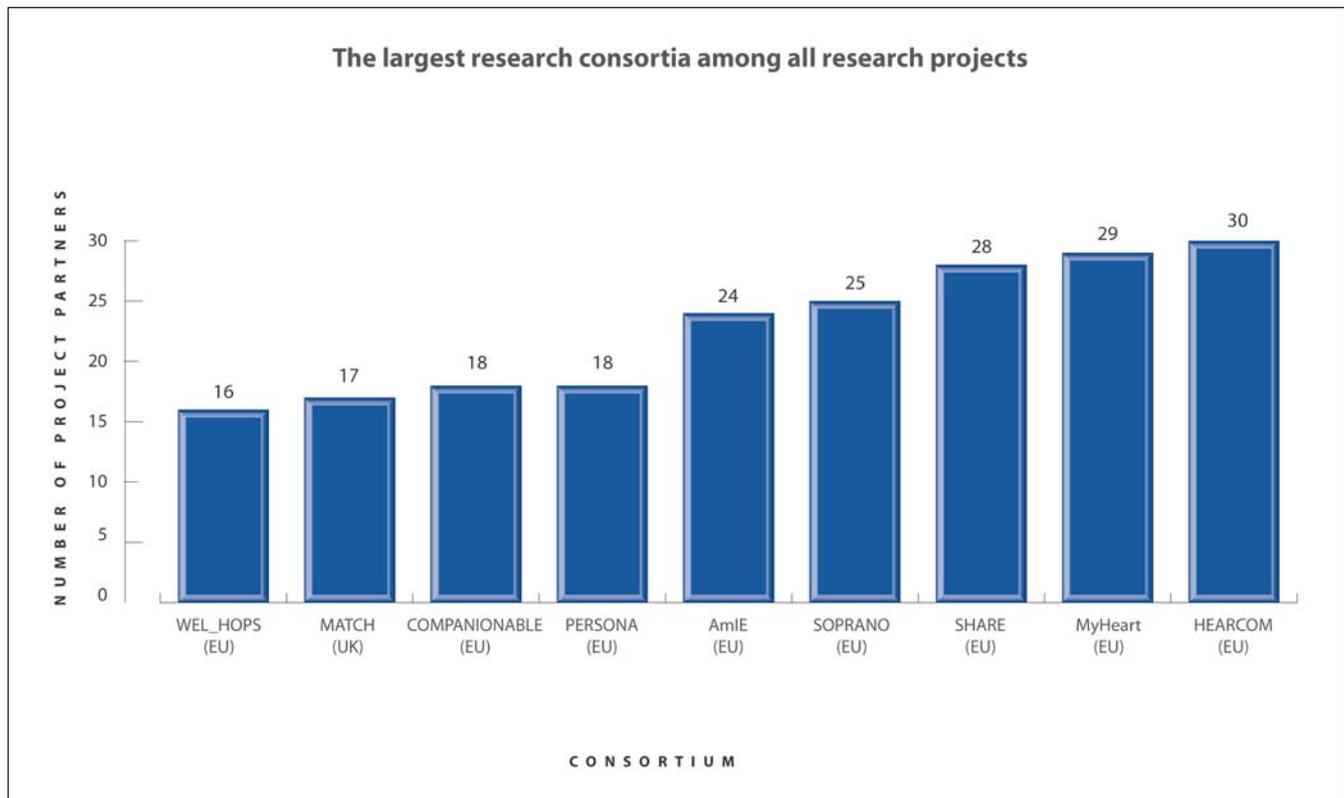
Figure 36: The largest research consortia

The project consists of 30 partners from 13 nations. The project consortium integrates various scientific disciplines in the fields of audiology, acoustics, speech technology and ICT. HEARCOM had a total project time of five years (2004 - 2009) and had been carried out within the scope of the eInclusion segment of the IST priority of FP6.

The project addresses the developed of different tele-screening approaches of the individual's hearing ability. It also makes available different information about equipment already on the market and gives general information for example to family members. Via an ePlatform, these services are offered to the public and to professionals. The objective regarding professionals is to support them with models, software tools, and demonstrations to estimate hearing devices in terms of their communication quality. Included in the ePlatform, a "hear companion" offers a step-by-step approach for people to assess their own hearing and guide people along hearing aids.

MyHeart[46]: MyHeart starts from the problem that in the western world cardio-vascular diseases (CVD) are the main cause of death today. In Europe over 20% of all citizens suffer from

a chronic CVD and 45% of all deaths are caused by CVD. Every year Europe spends billions of euros on the treatment of CVD. Due to the demographic change, in future there will even be more elderly citizens suffering from CVD, thus causing higher health expenditure. It will then be a challenge for Europe to deliver healthcare to elderly people at affordable costs.

The main objective of MyHeart is to support citizens in preventing cardio-vascular diseases by an appropriate lifestyle and an early diagnosis. The approach is to integrate system solutions into functional clothes with integrated textile sensors ("biomedical clothes"). The process consists of performing diagnoses, detecting trends and reacting to them. Together with professional services, the biomedical clothes create the MyHeart system, which will help citizens to fight major CVD risk factors and to avoid heart attacks.

The MyHeart consortium is very interdisciplinary: it brings together 33 partners from 11 countries, ranging from (textile) industry, research, academics and medical hospitals. The consortium thus covers the whole value chain from textile

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[46] http://www.hitech-projects.com/euprojects/myheart/, last visit 08/19/2009.

research to fashion and electronic designers and is strongly user-oriented.

SHARE[47]: SHARE (Survey of Health, Ageing and Retirement in Europe) is primarily a data collection task force. The project developed a "multidisciplinary and cross-national panel database of micro data on health, socio-economic status and social and family networks of more than 40,000 individuals aged 50 or over".[47]

The survey has been conducted in several waves of data collection. The first took place in 2004 in the form of a balanced representation of various regions in Europe, ranging from Scandinavia (Denmark and Sweden) via Central Europe (Austria, France, Germany, Switzerland, Belgium, and the Netherlands) to the Mediterranean (Spain, Italy and Greece). In 2006 two new EU member states (the Czech Republic and Poland) joined the study. Together with Ireland these were included in a second wave of data collection in July 2006. During the third wave in September 2009 altogether 16 European countries participated.

The collected and analysed data comprise various health indices (e.g. on self-reported health, health conditions, physical and cognitive functioning, health behaviour, use of health care facilities), bio-markers (e.g. grip strength, body-mass index, peak flow), psychological variables (e.g. psychological health, well-being, life satisfaction), economic variables (current work activity, job characteristics, opportunities to work past retirement age, sources and composition of current income, wealth and consumption, housing, education), and social support variables (e.g. assistance within families, transfers of income and assets, social networks, volunteer activities).

AmIE[48]: The main objective of AmIE (Ambient Intelligence for the Elderly) is the development and testing of a home platform, including non-intrusive sensing and vital signs monitoring combined with context awareness. The platform is intended to offer assistive services with the focus on individual adaptation. Its target is to improve the quality of life according to the individual's specific situation, and in a non-intrusive and respectful way. The system shall be able to individualise its medical and homecare assistance by adapting to the users' needs, preferences and characters. In order to implement such an intelligent system, concepts for characterisation models, rules engines and ontologies and adaptive interfaces are used.

Within the scope of the project first prototypes shall be developed in order to build one or more demonstrators to show the functionalities of the system in a real environment, with real users. This also allows the analysis of the acceptance of such systems by elderly people.

AmIE started 2007 and is expected to be finished by 2010. The collaborative project brings together 26 research and industry partners from altogether six (Belgium, Spain, France, Finland, The Netherlands, and Turkey as a non-European partner).

SOPRANO[49]: SOPRANO (Service-oriented programmable smart environments for older Europeans) is an integrated project under the European Commission's 6th Framework Programme (i.e. IST Priority 6th Call on Ambient Assisted Living -AAL).

SOPRANO will develop a home environment to support assistive technology by "unobtrusive components seamlessly linked to external service provision". The platform is developed through a service-oriented architecture (SOA). The main objective of SOPRANO is the development of "affordable, smart ICT-based assisted living services with interfaces which are easy to use for older people…" Thus, the project also tackles the problem of how to convince elderly people to accept technology-based monitoring systems.

Services shall perfectly fit in the domestic environment of elderly people without causing fears. Such systems bear the potential to give users access to the outside world, including general online information and innovative forms of eCare. The SOPRANO services are designed to give active advice or reminders and support help when needed. In order to optimise the acceptance of these new technologies by elderly people, the project develops accompanying measures.

The SOPRANO consortium consists of 25 partners from seven different countries (Greece, UK, Germany, Netherlands, Spain, Slovenia and Ireland), including various organisation types ranging from SMEs to multinational companies as well as public and non-profit organisations, each of them contributing their know-how and expertise in a large spectrum of disciplines, such as software solutions, tele-care and tele-health services, social, human and gerontological research, computer graphics, communication and technology services, smart environments and information management.

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[47] http://www.share-project.org/, last visit 08/19/2009.
[48] http://www.amieproject.com/, last visit 08/19/2009.
[49] http://www.soprano-ip.org/, last visit 08/19/2009.

PERSONA[50]: PERSONA (Perceptive spaces promoting independent ageing) aims at advancing technologies and concepts for the development of sustainable and affordable solutions for the social inclusion and independent living of senior citizens. PERSONA develops solutions to support daily life activities and to avoid risks for the people. Therefore, a scalable open standard technological platform is being developed to offer seamless services, to demonstrate and test the concept in real-life implementations, assessing their social impact and establishing the initial business strategy for future deployment of the proposed technologies and services.

COMPANIONABLE[51]: Without a cognitive stimulation the health condition of elderly people with dementia decreases very quickly. This also is a challenge for care staff. To tackle this issue, the project COMPANIONABLE (Integrated Cognitive Assistive & Domotic Companion Robotic Systems for Ability & Security) wants to develop an assistive smart home environment within the home of elderly people, which shall support both the elderly patient and the care staff. Cognitive stimulation as well as medical organisation will thereby be supported. The assistive systems shall be evaluated by elderly, their relatives and further relevant stakeholders such as care staff. This assistive system will also include a domestic assistive robot.

The development of this "robot companion" calls for an improvement of human-robot interaction, e.g. by a video-based recognition of persons and gestures, typical movement patterns and facial expressions. This also implies the recognition of dangerous situations, such as falls or of a lack of physical training. Within this project, gerontologists, elderly care institutions, industrial and academic partner are collaborating.

WEL_HOPS[52]: WEL_HOPS (Welfare Housing Policies for Senior Citizens) undertook a large survey on possibilities of independent housing for elderly people among six European countries. Being part of the European framework INTERREG IIIC, its main objectives were to establish common guidelines for the design of senior citizens' homes and for the renovation of homes in which they live, to create a European Network of Experts to assess new schemes and to promote the sharing of information and good practices. The study analyses the needs of individuals by using interviews as well as best practices. It thus wants to give a realistic and consistent picture of the present situation of housing interventions for seniors and of their life quality relating to a demand-and-offer adjustment.

8.4 Especially Active Organisations in the Research Area of EU-27

The collected data on organisations active in research projects allows calculating an average participation rate of 1.33 projects per organisation. This means that most organisations only participate in one single project, while only a few organisations participate in several consortia at the same time. The bar chart in Figure 37 ranks those organisations that are to be considered the most active. For this analysis, "most active" has been interpreted pragmatically: Nine organisations participate in at least five consortia. There are also several organisations contributing to four, three or two projects. To include them in the list of high performers as well, would have blurred the clear picture, as the list of organisation would have become too long.

Based on the collected data, the analysis shows that the two leading organisations are Spanish: Telefónica I+D and INGEMA. This again highlights a strong interest of Spain in AAL research.

Telefónica I+D[53]: Telefónica I+D (Telefónica Investigación y Desarrollo) is the innovation company of the Telefónica Group, the largest provider for telecommunication in Spain with headquarters in Madrid. Telefónica I+D has set up several research groups focusing on certain key areas. These groups follow an open research model in collaboration with universities and other research centres, and are in favour of disseminating the results of their work through publications and technical transfer.

Due to its origins, in research projects Telefónica I+D focuses e.g. on mobile communication and services, multimedia and interactive telephone services and network management systems. Several strategic topics of Telefónica I+D are related to AAL, such as mobile communication technologies and architectures (e.g. 3GPP, 3GPP2, OMA, IETF), ALL-IP and IP Multimedia, the development of the core network, location-based services and speech-enabled services.

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[50] http://www.aal-persona.org/index.html, last visit 08/19/2009.
[51] http://www.companionable.net, last visit 08/19/2009.
[52] http://www.welhops.net/index.asp, last visit 08/19/2009. The final report of the project is available here: http://www.welhops.net/download/Final_Report.pdf, last visit 08/19/2009.
[53] http://www.tid.es/en, last visit 08/19/2009.

Figure 37: Especially active organisations in research[54]

INGEMA[55]: With headquarters in Madrid the Instituto Gerontológico Matía (INGEMA) is a spin-off of the Fundación Matía (Matia Foundation). Fundación Matía (Matia Foundation) is a social institution founded and located in Donostia near San Sebastian in the Basque Country[56]. Its main objective is to provide free social and medical services to elderly and impaired persons. Adopting this basic framework, INGEMA performs and focuses on research dedicated to generating, developing and spreading knowledge about the needs of senior citizens and the impaired. Therefore, the organisation promotes and supports research projects that deal with the development of individual capacities of senior citizens and enable their social participation.

INGEMA covers three particular fields of research, i.e., the promotion of active ageing and prevention of dependency, the rehabilitation and compensation of fragility and dependency, and e-health and home care. This strong focus on the needs of elderly people explains the above-average research activity of INGEMA in the field of AAL.

TEKES[57]: Tekes, the Finnish Funding Agency for Technology and Innovation, is the main public funding organisation for research and technological development in Finland. Every year, Tekes finances some 1,500 business research and development projects, and almost 600 public research projects at universities, research institutes and polytechnics.

The focus areas outline future priorities for innovation in Finland. Tekes intends to encourage innovation in areas defined on the basis of clear user needs, such as products and business models, the environment and energy, health and well-being, services, safety and security, and work and leisure. Furthermore, the organisation is the main Finnish member within the Ambient Assisted Living association. It contributes its knowledge concerning funding, organisation and performance for research projects.

Royal Institute of Technology[58]: KTH, the Royal Institute of Technology (Kungliga Tekniska högskolan), is a Swedish

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[54] In the diagram Tekes is shown as an important institute participating in research projects. This data is taken from online information and could not be qualified in more detail, but might be insufficient. The study authors regard Tekes as the project management organisation on behalf of the Finnish funding authority rather than a project partner.
[55] http://www.ingema.es/ingles/home.php, last visit 08/19/2009.
[56] http://www.matiafundazioa.com, last visit 08/19/2009.
[57] http://www.tekes.fi/eng/, last visit 08/19/2009.
[58] http://www.kth.se/?l=en_UK, last visit 08/19/2009.

polytechnic and one of Scandinavia's largest institutions of higher education in technology. Education and research cover a broad spectrum – from natural sciences to all branches of engineering as well as architecture, industrial engineering and management, urban planning, work science and environmental engineering. In addition to the education and research carried out by KTH's Schools, a large number of both national and local Competence Centres are located at KTH.

As to AAL research projects, the KTH contributes technological expertise especially in the fields of speech communication & technology (e.g. in the project "Hearing at Home"[59]) and human-computer interaction (e.g. in the project "Commrob"[60]).

Budapest University of Technology[61]: The Budapest University of Technology and Economics (Budapesti Műszaki és Gazdaságtudományi Egyetem: BME) is an old and well-established University in Hungary. The BME follows up many activities in the field of AAL and adjacent topics. In the group of new EU members BME has the highest number of project participations.

As to the project description of the project "BelAMi"[62], research of BME is centred on "Ambient Intelligence", covering aspects such as Mobile Communication, Human-Machine Interaction, Microelectronics and Software Engineering. The objective of this project, a co-operation between Germany and Hungary, are technological solutions providing assistance for elderly and, to some extent, to handicapped people for independent living at home.

Fraunhofer Society[63]: The Fraunhofer Society (Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V.) is a German research organisation with more than 80 research units, including 57 Fraunhofer Institutes on 40 different locations in Germany, each focusing on different fields of applied science. The Fraunhofer Society employs over 12,500 people and is also active on an international level: Affiliated research centres and representative offices provide contact with non-European regions. Beside activities regarding eHealth and eHome, Fraunhofer launched a cross-institutional AAL focus group.

Empirica AG[64]: With headquarters in Germany, empirica is an internationally active research and consulting company concentrating on concept development, the application and development of new information and communication technologies and the information society. Its clients are large and medium–sized companies in the insurance, pharmaceutical and automobile industries as well as software developers, hardware manufacturers and public bodies. Its main field of activity is the compilation of surveys. Many of these contributions have been related to topics concerning living concepts for elderly and policies for senior citizens.

Vienna University of Technology[65]: The Vienna University of Technology is one of the major universities in Austria. It currently has about 17,600 students, 8 faculties and some 4,000 staff members. The university's teaching and research is focused on engineering and natural sciences.

Within the scope of AAL research projects the Vienna University of Technology mainly contributes its knowledge in expertise in the fields of user interfaces and computer communication.

SIEMENS AG[66]: Siemens AG is one of the world's largest electrical engineering and electronics companies. Siemens' international headquarters are located in Berlin and Munich, Germany. The company concentrates on three main business sectors: Industry, Energy and Healthcare with a total of 15 divisions. Among various research topics the company is also interested in healthcare and therefore also participates in seven AAL research projects.

Not only one, but various divisions of Siemens are working within the research projects located within the scope of AAL. Most of them are concentrated on telecommunications and IT products (such as mobile phones and computer systems), but there also are some more specialised subsidiary enterprises. For instance, "Siemens Hearing Instruments"[67] contributes to the project "Hearcom" ("Hearing in the communication society"), which deal with technologies improving the communication abilities of (elderly) people suffering from hearing impairments.

[59] http://www.hearing-at-home.eu/, last visit 08/26/2009.
[60] http://commrob.zenon.gr/UserPages/Home.aspx, last visit 08/26/2009.
[61] http://portal.bme.hu/langs/en/default.aspx, last visit 08/19/2009.
[62] http://www.belami-project.org/, last visit 08/19/2009.
[63] http://www.fraunhofer.de/, last visit 08/19/2009.
[64] http://www.empirica.com/, last visit 08/19/2009.
[65] http://www.tuwien.ac.at/tu_vienna, last visit 08/19/2009.
[66] www.siemens.com, last visit 08/19/2009.
[67] http://hearing.siemens.com/en/03-home/index-en.jsp, last visit 08/19/2009.

Coming from the application side, Siemens and its various subsidiaries contribute know-how and expertise for the implementation of project results into new products and services. The company thus guarantees a strong user orientation and the marketability of AAL research projects and their results.

8.5 Non-EU Participations

Considering the participation of organisations in European projects, it also is interesting to examine how many organisations do not belong to EU-27 but yet contribute to these projects as well. The main non-EU countries are Norway, Switzerland, Israel, the USA, Turkey and Canada. The bar chart in Figure 38 shows how often organisations from these countries participate in European projects. With 17 participations Norway clearly tops the ranking. This goes back to the fact that Norway has a strong relationship with the other Scandinavian countries (Sweden, Finland, and Denmark). That is why Norway collaborates in many research projects with a strong participation of Scandinavian countries which belong to the EU.

One outstanding example is the European project "Baltic eHealth"[68]. Baltic eHealth promotes the use of eHealth in rural areas of the Baltic Sea region by creating a large trans-national infrastructure for eHealth, the Baltic Sea Healthcare Network. The objective is to counteract rural migration in the Baltic Sea region. This also comprises products and services for elderly people. The project is part-financed by the European Union. The five countries participating in Baltic eHealth therefore all are Scandinavian and Baltic, i.e., Denmark, Estonia, Lithuania, Norway and Sweden.

8.6 Comparison of European Projects (EU) and National Projects

The bar chart in Figure 28 presented all research projects that have been found, distinguished by their origin. As mentioned before, a total number of 143 research projects dealing with AAL was found, 62 of which possess multi-national European consortia and altogether 81 projects consist of partners from one single nation only. In this subchapter we want to compare the different composition of consortia in national and European projects as well as between their research foci. A main objective is to find out whether the stakeholders in national and European projects are the same and therefore are congruent or not. If not, this would indicate that the current research landscape is clearly divided between stakeholders working on national level and those working on international/European level.
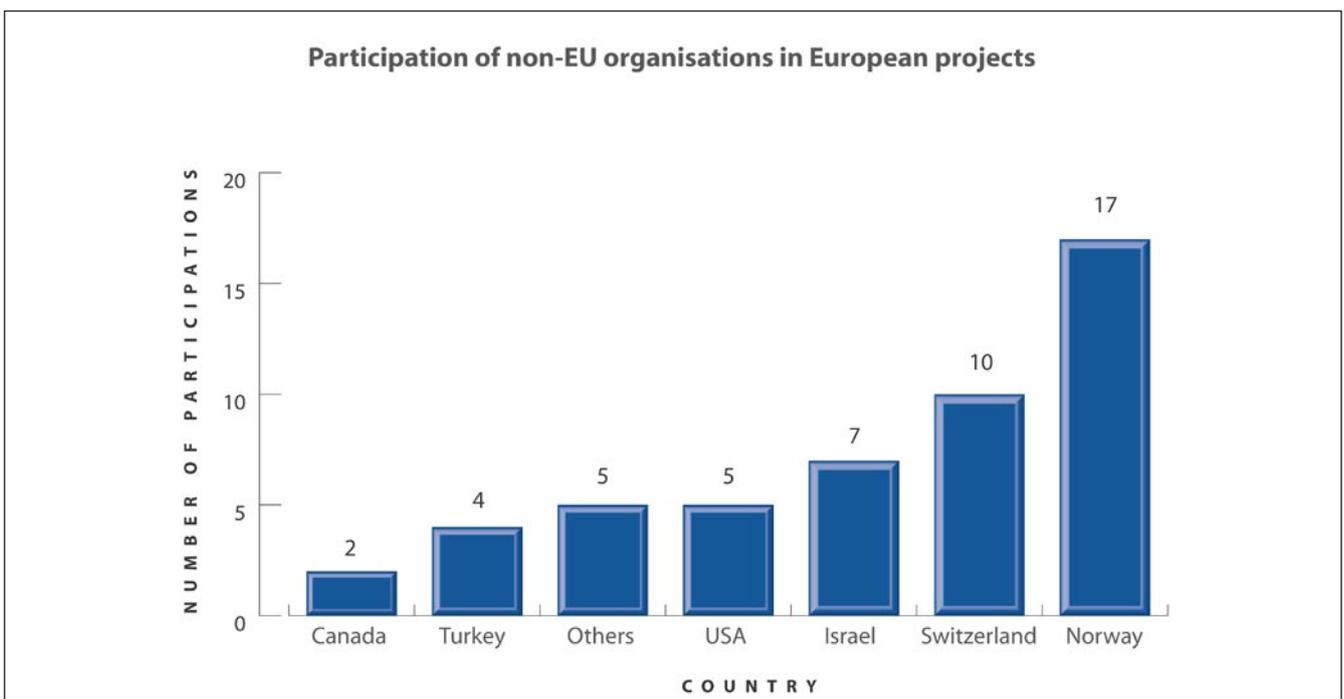
Figure 38: Participation of non-EU organisations in European projects

68 www.baltic-ehealth.org, last visit 07/08/2009

Participation of member states in European research projects (EU-27)
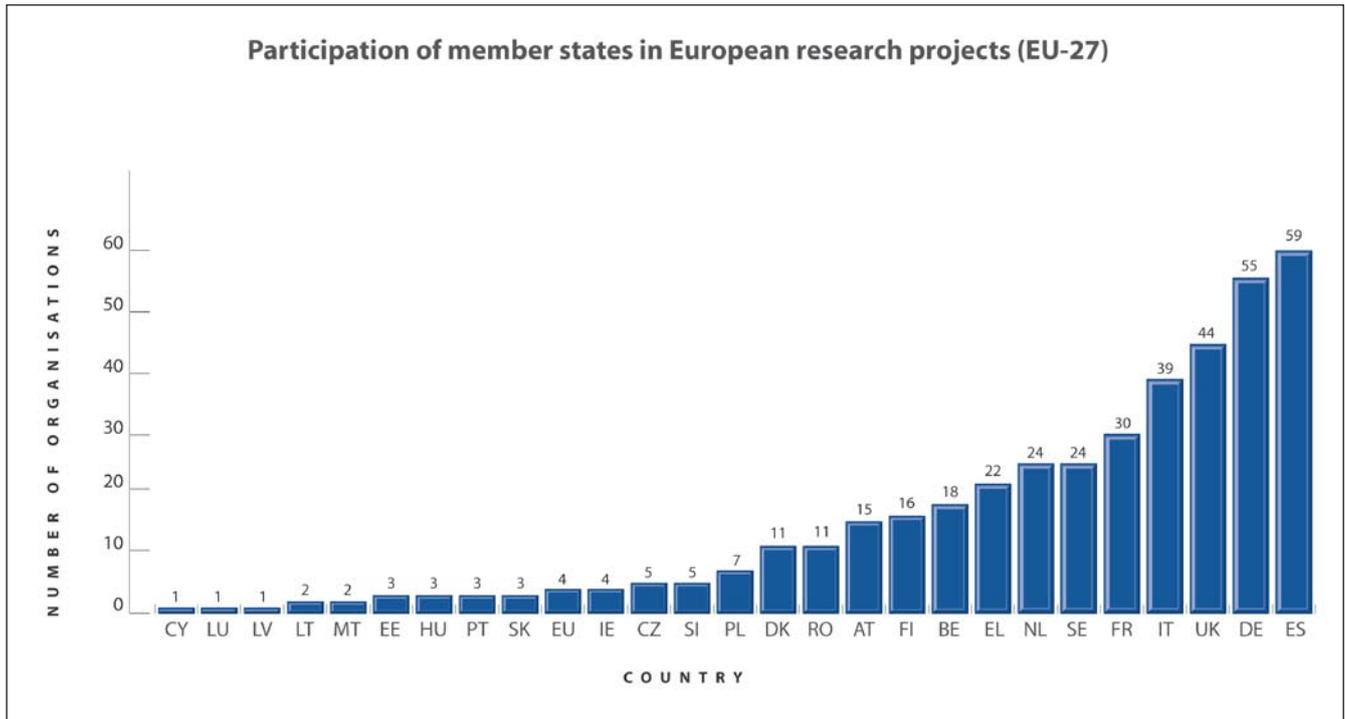
Figure 39: Number of organisations contributing to European projects

Ratios of organisations in European research projects by old and new member states

1% EU
11% New member states
88% Old member states
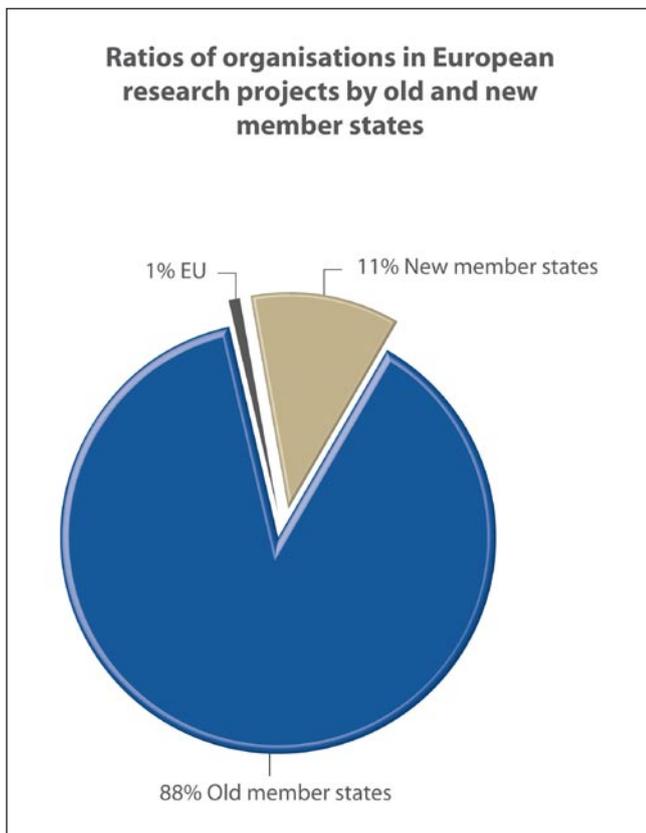
Figure 40: Ratios of organisations in European research projects by old and new member states

Ratios of organisations in European research projects by northern and southern member states

1% EU
36% Southern member states
63% Northern member states
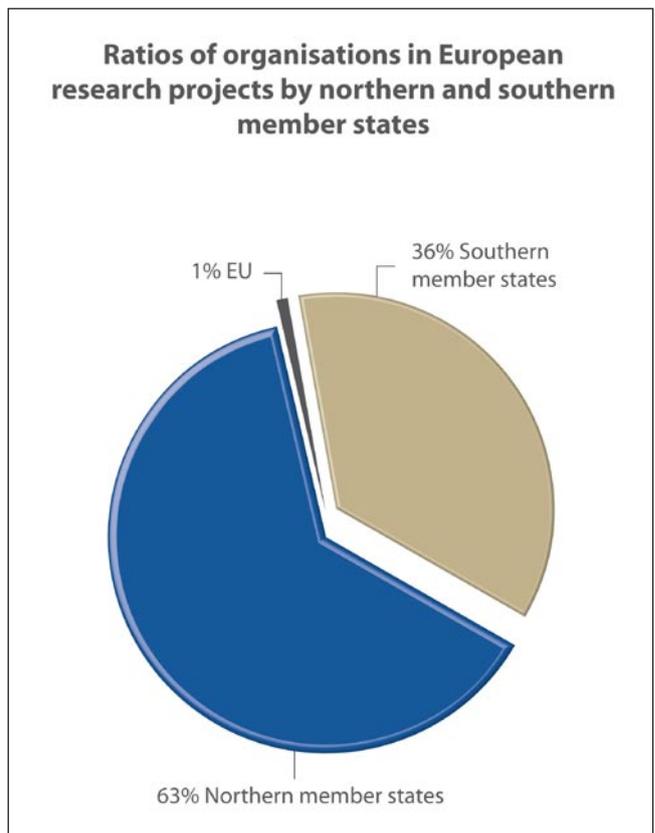
Figure 41: Ratios of organisations in European research projects by northern and southern member states

Origin of organisations in European and national projects

First of all, let us have a clearer view of the composition of consortia in European projects. For that purpose, the national origins of organisations working in the 62 European projects found have been evaluated. Generally speaking, altogether 399 organisations from all member states of EU-27, except Bulgaria, contribute to European projects (Figure 39). In this context, it is somewhat surprising that Spain contributes most organisations to European projects while Germany contributes most organisations for research purposes in general (as shown in Figure 30). However, like before, the top third of countries consists of old member states only, with Spain, Germany and the United Kingdom on top. Within the scope of European projects Romania (RO) is the new member state with most organisations participating in European projects. With the exception of Luxembourg and Portugal, the last third of the ranking consists only of new member states with one to three participating organisations each.

In order to have a more precise and clearer view of organisations involved in European research projects, especially of their distribution among southern, northern, old and new member states, the Figure 40 and Figure 41 provide the respective percentages in the form of pie charts. Unlike in earlier analyses, a surprising finding is that the divide between northern and southern countries is not as strong as before. With 35.7%

against 63.3% for northern countries, the southern regions of Europe of course still have less ongoing research activities; this gap however is not as huge as for old and new member states (in this case: 15.5% for new member states against 83.5% for old member states). This is explained by the fact that there are strong players to be found among southern member states as well as in northern states, which furthermore are quite equal as to their strength. Spain (59), Italy (44), Greece (22) and Romania (11) are the southern countries with the highest amount of organisations participating in European research. As said before, within the scope of European projects Spain even outruns Germany as to the amount of organisations and Italy can be found on position four in the ranking. Apart from these observations, new member states have only very little research activities going on in European research. Romania is the strongest player among the new members of EU-27, which is a result of European funding policies aiming to integrate new member states in research consortia. With less than 1% participation rate (0.97% is the statistically exact value), European NGOs themselves however do not play any decisive role and are rather negligible.

In order to find out how strong the overlap between organisations involved in European and national research projects is, it was necessary to also analyse national projects: The bar chart in Figure 42 shows the number of organisations for each country that work in national projects. As mentioned before, national projects have been defined as collaborative projects
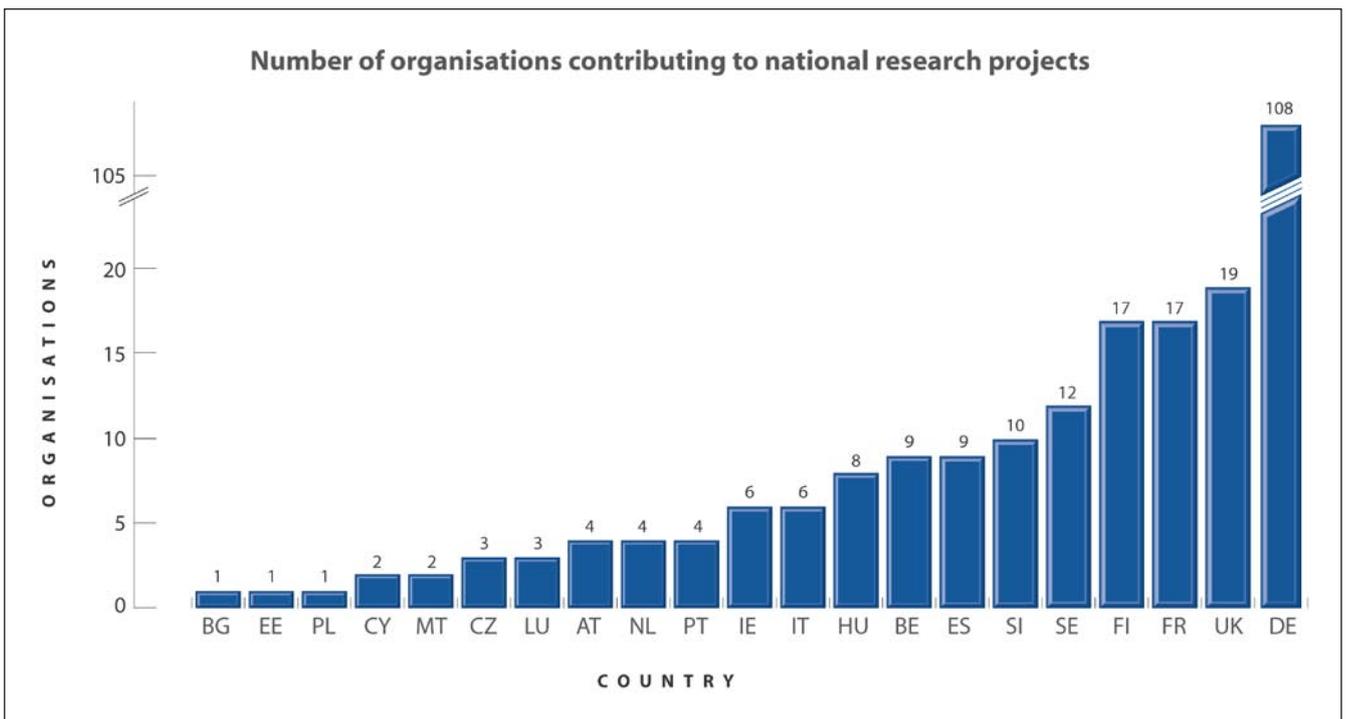

Figure 42: Number of organisations contributing to national research projects
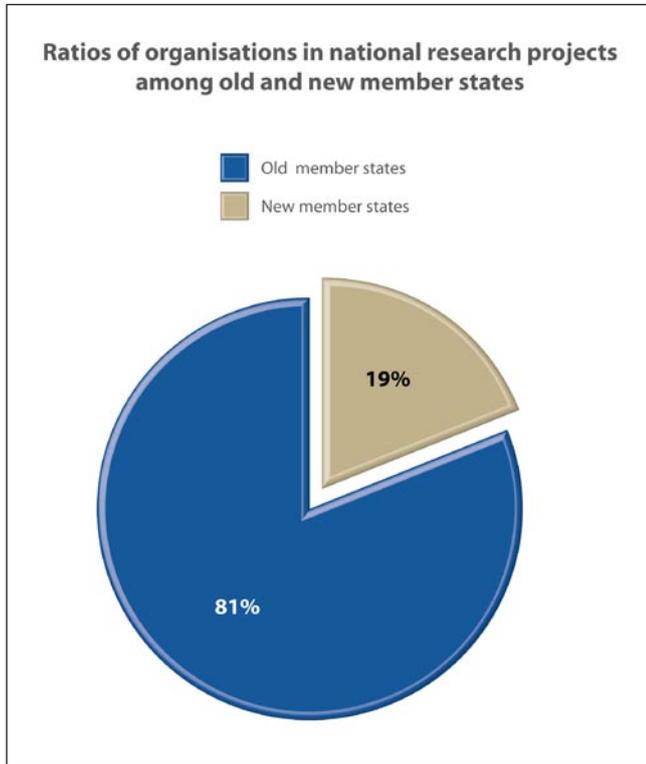
Figure 43: Ratios of organisations in national research projects among old and new member states
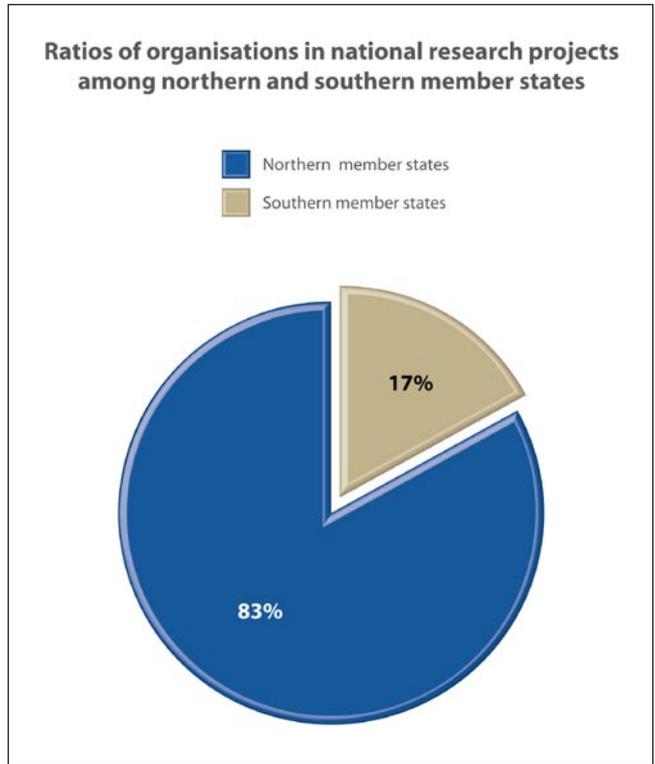

Figure 44: Ratios of organisations in national research projects among northern and southern member states
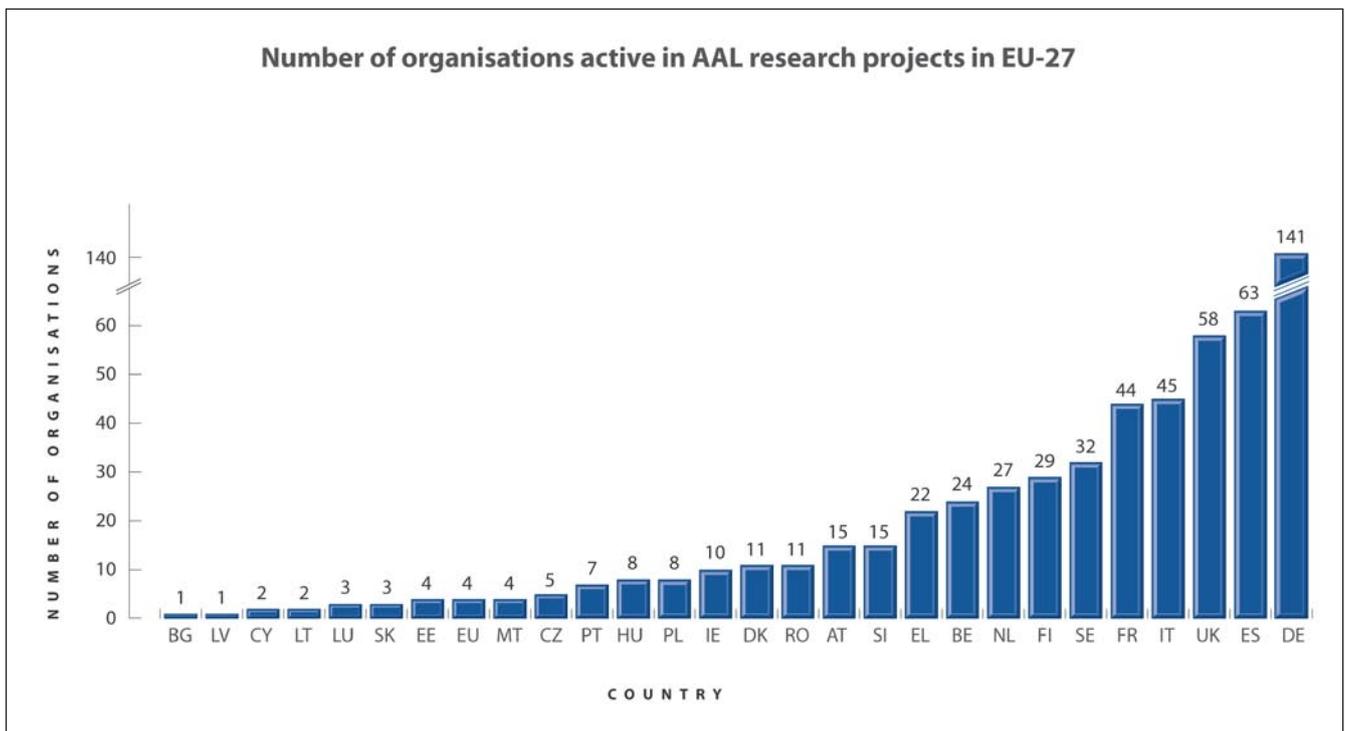
Figure 45 (repetition of Figure 30): Number of organisations active in AAL research projects among EU-27

carried out by organisations from one country only. Germany tops the statistics with altogether 108 organisations, followed by the United Kingdom (19), France and Finland (both 17). In comparison, the value for Germany seems a bit extreme, as it is more than four times as much as for the United Kingdom. Like before, it has to be taken into account that the study was carried out in Germany and German information sources were therefore easier to access than others. Apart from this, Germany turns out to be a major stakeholder for national research on AAL products and services.

A further interesting finding is that Spain, which topped the ranking of European research, lies far behind in the middle field (only seven organisations) for national projects. This shows that Spain concentrates more on collaborative research projects on European level. This is also true for most other countries. Only the United Kingdom (22), France (18), Finland (18), Sweden (12) and Slovenia (10) are both quite strong in research for AAL solutions on national and European level. No information concerning national projects was found for Denmark, Greece, Lithuania, Latvia, Romania and the Slovak Republic. This does not necessarily mean that there would not be any research activities going on, but that information on national research may not be available via internet or only in the national language – a general methodological problem of desktop research throughout EU-27 which has already been mentioned in the introduction to this study.

In order to gain a clearer view of the differing distributions of research activities among greater European regions, the ratios of old and new, of northern and southern countries have been summarised. These ratios are displayed in the pie charts of Figure 43 and Figure 44. Here, the divides between new and old as well as between northern and southern member states become quite obvious and are to be considered to be rather equal: of all organisations involved in national research, new member states only contribute 19%, while southern member states contribute only a bit less with a ratio of 17%.

Having analysed organisations working on either national or European level in particular, the next important question is how many of these organisations work on both levels at the same time. In order to create a sustainable answer to this question, it is necessary to take into the account the total number of organisations working under AAL research projects. This has already been done in Figure 30. To simplify matters, the bar chart shall be repeated here as Figure 45 in order to allow a quicker comparison between the different charts presented in this subchapter.

Subtracting the numbers of organisations working on national as well as on European level, shows the overlap between the two groups. This overlap for every country is presented in the bar chart of Figure 46. A main result that definitely strikes one immediately, is that more than half of all countries do not have an overlap at all. This means that within these countries there is no organisation participating both on national and European level at the same time. In other words: For these countries, research activities for AAL can be clearly divided between organisations working for either national or European projects.
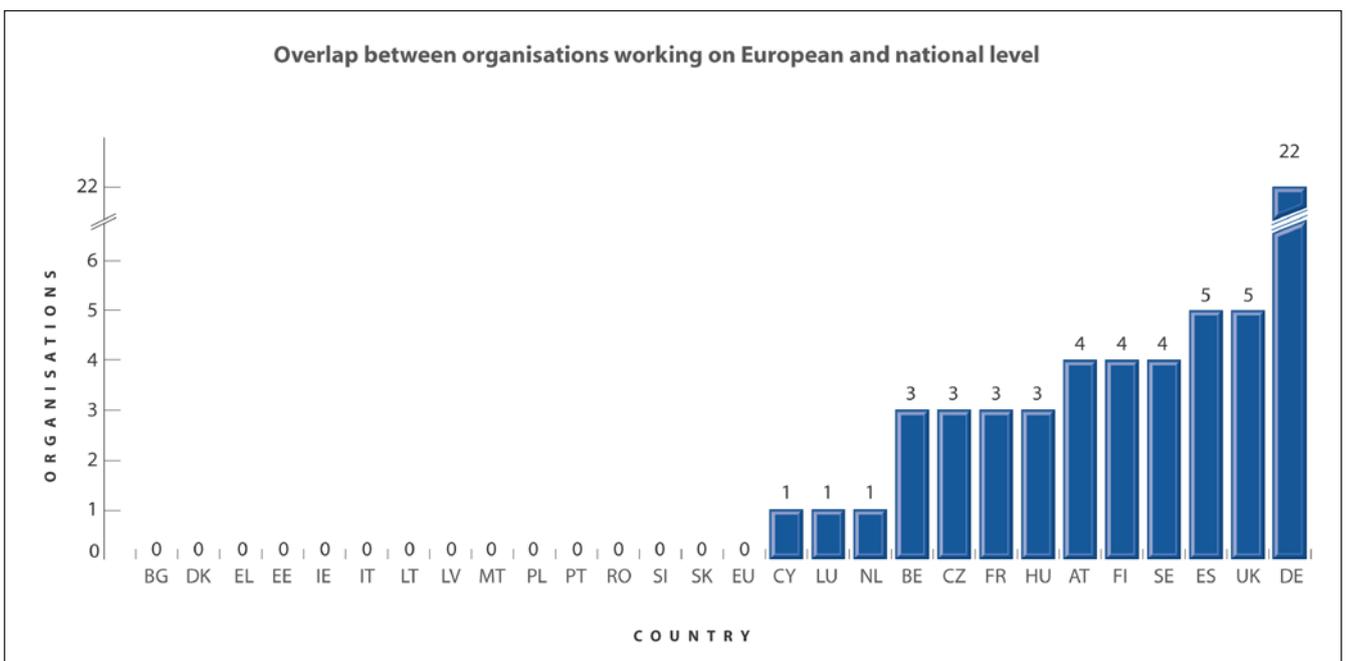

Figure 46: Overlap between organisations working on European and national level

This is true for almost all other countries as well, for they only have up to five organisations working on both levels, which is rather very little compared to the total number of organisations in each country. Even in the case of Germany, which provides most organisations working in research, these 22 organisations are to be considered rather few in comparison with the total amount of 141 organisations working in AAL research (in relation the overlap equals 15.6% of all German organisations). Overall, the average relation between overlap and the total number of organisations working in research projects is only 9.85%. Conversely, this means that 90.15% of all organisations work on either national or European level only. For the purpose of a better overview, this relation is presented in the pie chart of Figure 47. Thus it can be concluded that all research stakeholders found only take part in either national or European research and that there is almost no contact between the two spheres: The research landscape is mostly clearly separated between the two sides.

Figure 47: Distribution of research landscape on national and European level

Research foci of national and European projects

After having compared national and European research activities by the amount of participating organisations, we will subsequently regard the research topics of national and European projects, thereby following the hypothesis that they might differ in their focus and their national or multi-national direction.

First of all, the research topics of European projects are considered. The pie charts in Figure 48 show the percentages of research topics assigned by European projects: the upper represents the ratios of the four general AAL research topics "Health and Home Care", "Social Interaction", "Safety", "Supply with daily goods & chores" as well as a category "General" for broader, more unspecific projects. The lower pie chart specifies the broader category of "Health and Home Care" by distinguishing between "Therapy", "Assistance", "Prevention" and "General" approaches. However, it has to be kept in mind that the underlying percentages resulted from statistical values only, as during the data collection it was possible to simultaneously assign several topics to one and the same project.

Again, projects concerning health and home care have the highest percentage. With 44% it is even twice as high as for "social interaction" (22%), the next largest group. More specifically, most European projects for health and home care touch on issues of therapy (47%), followed by assistance (33%) and prevention (16%).

In contrast to the observations on European projects, the pie charts in Figure 49 present the ratios of research topics for

national projects. At first glance, the differences regarding the ratios for European projects vary only little: like in earlier charts, "Health and Home Care" has the largest percentage (50%). However, the other ratios for "Safety" (15%), "Social Interaction" (14%) and "General" (14%) are distributed rather evenly. Again, projects dealing with the supply of daily goods and chores are rare, yet are found a bit more often among national projects (6%).

Within the research topic "Health and Home Care", national research projects dealing with assistant issues are more common (37%). With 34% "Therapy" was named only a little less often. Research in the field of prevention has the smallest percentage, but still totals 25%.

Overall, the picture between national and European projects does not differ profoundly. However, slight differences can be identified for the distribution of the subtopics of "Health and Home Care". With 47% European projects rather focus on "Therapy". This is 13% more than for national projects. "Social Interaction" is addressed more often in European projects as well. It is difficult to explain this picture. One hypothesis tends to explain this situation by the focus of many European projects on complex integrated information and communication platforms. Such platforms perfectly harmonise with approaches concerning telecommunication being the core for ongoing social interaction approaches and for tele-medicine in general. Anyway, this research focus for European projects is rather astonishing, as one would perhaps expect that especially therapies might be influenced by national health systems and should be adapted to them.
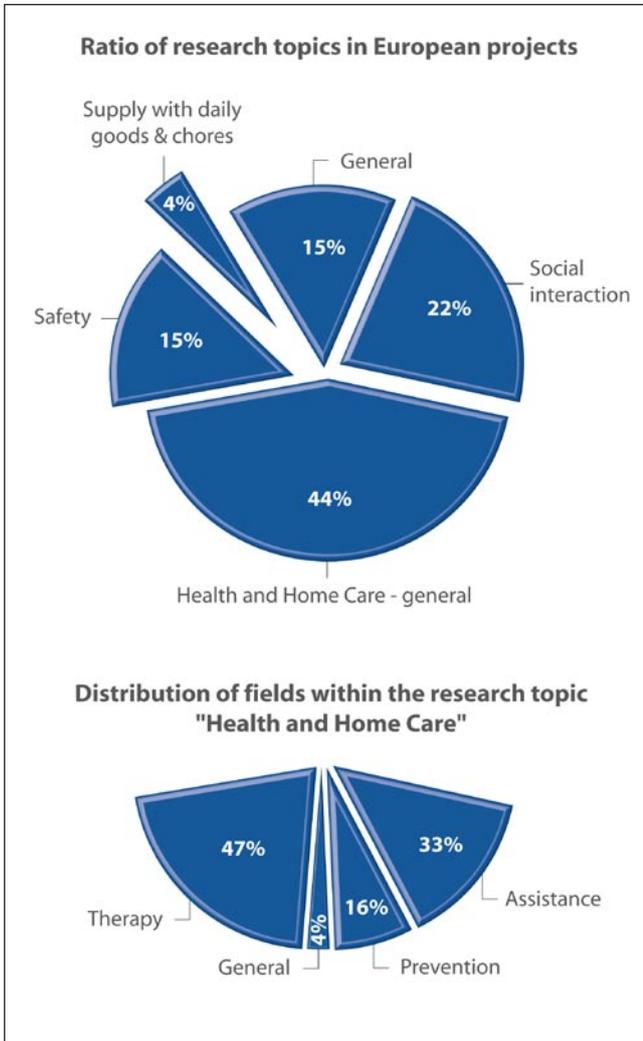
Figure 48: Ratio of research topics in European projects
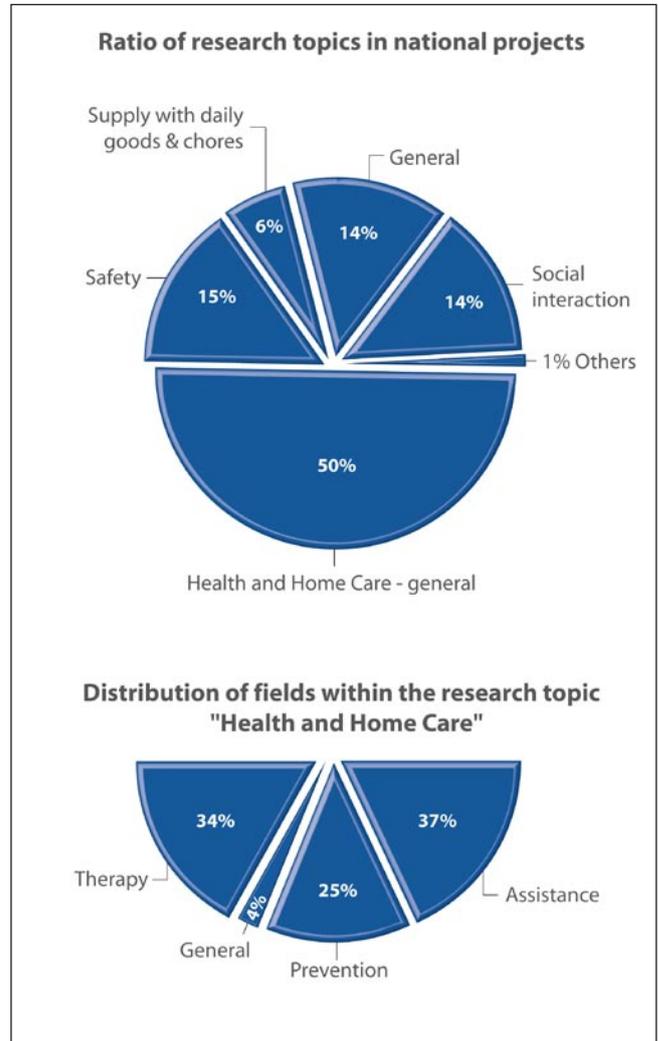
Figure 49: Ratio of research topics in national projects

9   Conclusions and Recommendations

The previous pages provided various statistical observations on present activities within the field of information and communication technologies enabling an independent living of elderly people. In summary, the data analyses lead towards the following results:

If the different nations are compared, there is an obvious gap between northern and southern nations as well as between old and new European Union member states. While the northern member states and the old member states are very active in the field of AAL, southern and new nations are rather inactive.

The national governments – represented by their competent ministries – serve as main drivers of developments within the area of ICT enabled independent living. This derives from their

role as funding institutions for most national and European research projects and the relatively high number of research projects.

The AAL market is still mostly undeveloped. Although information on products is accessible, it continues to be sparse. The respective products often only address elderly people indirectly. It therefore is difficult for elderly people as a costumer group to find comprehensive information about appropriate devices or systems. Offers are often to be found widely distributed and mixed with other products.

The most products already available on the market mainly address the category "Safety and Security". In general, these products are alarm systems. The topic "Safety and Security"

is followed by "Communication Devices", which first of all contains mobile phones adapted to some needs of elderly people, which very often only means that they are equipped with bigger buttons. The third category is "Medical Assistive Technology", among which e.g. measuring devices are listed. However, this category mainly contains stand-alone devices, such as pillboxes or blood pressure devices. The majority of these applications use rather low tech. Contrariwise, present research projects (especially within the AAL Joint Programme) mainly focus on home and service platforms using high-end technology.

Of all research projects, the topic "Health and Home Care" is addressed. The scientific contributions are mostly related to the subcategories "Assistance" and "Therapy". Many projects address the development of home platforms that integrate different devices and allow for automatic communication by external persons, e.g. to receive help, advice or support.

By taking a closer look at partners in research projects, it has to be stated that relevant partners in a value chain for AAL have not yet been involved enough. This is especially the case for system providers, healthcare services as well as end users and their associations. Also, system integrators such as building and housing industries are still not very active.

Most consortia still focus on research; on average, about 40% of all research partners are universities or non-university research institutions (cp. Figure 35). This research is mostly being carried out by international research in pan-European projects. These also contribute the largest consortia. Amongst all consortia partners from the application side telecommunication companies are the strongest group. The application areas for future products and services therefore currently focus on solutions with business models for telecommunication companies.

All figures and analyses in this study prove that there are significant divides between new and old member states on the one hand, and between eastern and western member states on the other hand. There are distinctly less national research projects and AAL products available on the market, to be found in new member states rather than in old. The same is true for all organisations involved in this field. These relations are similar for southern in comparison with northern countries, although the divides are not so extreme here. The strongest countries in research and products and services are: Germany, Spain, the United Kingdom, France and Austria. This group is always found amongst the top-ranking countries. Due to the low integration of end users and end-system providers, there currently is a high risk of technology-driven research without a chance to enter the market later on.

The main activity that consolidates approaches and standards is the Continua Health Alliance, which originally has not been a European activity at all. The only ongoing European consolidation process is pressed ahead by the AAL Joint Programme. However, this programme is directed at research funding with a rather open impact on market developments.

As was shown in the chapter "research activities", even today a lot of research projects specialised on AAL topics are already under way throughout Europe. However, the implementation of research results into marketable products has not been clarified sufficiently yet. Recent project results mostly target a non-regulated market, as an implementation within the framework of a regulated market is too difficult, especially for complex software systems. How to deal with the acknowledgement of software in terms of a medical product is not yet clear either, as medical software very often needs updates, which have to re-pass certification procedures.

The status quo analyses allow deriving a set of recommendations for the creation of future research policies to be undertaken in Europe:
▶ As main drivers of the AAL topic in general, national governments and governmental bodies, respectively should cooperate to influence several activities having already started. A strategic mapping of research topics would be beneficial for all stakeholders. The Ambient Assisted Living Programme is a promising start.
▶ There is a strong divide between new and old as well as between northern and southern member states of the European Union. The strongest countries are found among old and northern countries. What is more, the research landscape for AAL is clearly divided on national and European level: there are almost no relevant stakeholders working on national as well as European level. It however stands to reason what kinds of research policies seem appropriate to handle this situation. Strategies to transfer products and solution between the different nations should be developed.
▶ In order to take more advantage from ongoing research projects, accompanying research analysing and clustering results for wider use should be initiated. A European portal should be established for collecting such results. It should operate in the sense of a European competence centre. This centre should also serve as an independent contact point and should be staffed adequately.
▶ The user needs of AAL developments are still not sufficiently taken into account as well. In this regard, at least three reasons can be formulated: It is difficult to integrate the users into R&D projects because of their special state of health, because they often are single private persons who cannot be funded easily within projects, and because NGOs such as senior associations are often too far away from

research orientation. Thus, ideas have to be created on how to integrate users more effectively.

▶ It is favourable to create more products that meet the real demands of elderly people. For that purpose, further studies and analyses are required that target the individual needs and demands of elderly people.

▶ New technical infrastructures are needed for applications which are not available yet or seem to be too expensive or not adequately adapted to the needs of older adult persons. Therefore, the need for standards, interoperability and safety should be highlighted. This is the only chance to come up with modularised solutions.

▶ In many cases the test and validation of prototypes falls short. Reasons are for example the costs for living labs in case they are equipped for real life tests. These costs cannot be borne by single projects alone. Therefore, test methods to prove the reliability and sustainability of the potential of AAL products and services are required. Show rooms / demonstration facilities should be set up regionally (local and cultural competence) to demonstrate the potential of ICT-enabled independent living (to senior organisations and representatives of the demand pull side).

▶ Several stakeholders are still not involved enough, e.g. the building and housing industry and insurers. The awareness of the potential of ICT for AAL with "research-distant" communities has to be increased.

▶ The reasons for the main barriers to an AAL market are found in the different and complex health systems of the European countries and in the costly certification processes. One solution could be to develop business models that take into account the option of large reformation pre-projects with facilitated framework conditions.

▶ The establishment of proper procedures and guidelines for the purposes of medical software certification in particular is recommended. European standards for these types of applications and systems should be created.

▶ The results of the AAL JP projects should be evaluated as soon as available.

10 AAL-related Research Programmes

10.1 AAL-related Research Programmes before March 2008

The following abstracts summarise results of the underlying first version of the study "ICT enabled independent living for elderly". They show a condensed overview on research programmes financed by the different European member nations during the last years. These research programmes combine tasks related to the field of AAL respectively "ICT enabled independent living for elderly". They are often not dedicated only to this specific subject but are also related to broader questions. Because of the time span of the first study the research programmes referred to here do not exceed the status quo of March 2008 as well.

Austria

The Federal Chancellery of Austria co-ordinates horizontal information concerning social issues of ICT. It has an advisory board which developed an action plan in 2005 called "eAustria 2010". There are thematic RTD Programmes (e.g. FIT-IT[69]) as well as structure RTD Programmes (e.g. K+[70]). The BMVIT is the main actor for ICT activities in Austria, one of the thematic programmes contributing to AAL is FIT-IT with 11.5 million Euro funding in 2005. The Federal Ministry for Health and Woman (BMGF) is active as well, e.g. in health telematics[71].

There are several research institutions dealing with AAL-related problems, e.g. the University for Technology of Vienna with its Institute "integrated study" division "fortec" and different units of the ARCS. Main topics are usability, human computer interfaces, rehabilitation, assistive communication devices, sensory aids, and sensors for social alarms, smart home technology, robotics and much more. Another example is the University of Linz with its Institute "integrated study"[72]. The institute focuses on special HCI and software development, research and development in Human Computer Interfaces for persons with functional restrictions (visually, hearing and multiple impaired people), creating innovative HCI by controlling information via PDA or mobile phone, studying the consequences of technology for disabled and old persons, usability testing. For more details see the AAL CR[73].

Belgium

The responsibility for research lies in the hand of the regional governments of Flanders, Wallonia and Brussels. The coordination of research objectives is very complex due to the plurality of the involved governmental institutions. On federal level overall activities are coordinated by the Belgian Federal Science Policy Office, previously known as the Federal Office for Scientific, Technical and Cultural Affairs (OSTC)[74].

As an overall screening initiative to analyse the demands of the elderly in Belgium, the research project HIS65+ was started in September 2006 [75]. The goals are the development of a set of health indicators based on the Health Interview Survey 2004 (HIS) for persons aged 65 and over, an exploration of the potential of the HIS as a source of information for the planning of elderly care and the identification of research needs.

The IBBT (Interdisciplinary institute for BroadBand Techology) is an independent research institute founded by the Flemish government to stimulate ICT innovation. eHealth is one of IBBT research domains, where currently 8 projects are in progress[76]. The COPLINTHO (Innovative Communication Platforms for Interactive eHomeCare) and the TRANSECARE (Transparent ICT platforms for eCare)[77], part of this initiative, are discussed below.

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[69] http://www.fit-it.at/ , last visit 08/19/2009.

[70] http://www.kplus.at/ , last visit 08/19/2009.

[71] Austrian Federal Ministry of Transport, Innovation and Technology (2006). Information and Communication Technologies - A handbook on the Austrian Research and Innovation System. Vienna. March 2006. http://rp7.ffg.at/upload/medialibrary/ICTinAT_Final.pdf, last visit 08/19/2009.

[72] http://www.integriert-studieren.jku.at/, last visit 08/19/2009.

[73] ged/pm/zw/fortec (2005). AAL Country Report Austria. Final Version (14.03.2005). pp. 18. http://www.aal-europe.eu/Published/CRAustria.pdf, last visit 08/19/2009.

[74] for details see http://www.belspo.be, last visit 08/19/2009.

[75] for details see: http://www.agora65plus.be, last visit 08/19/2009.

[76] for details see http://www.ibbt.be/en/projecten, last visit 08/19/2009.

[77] for details see http://www.ibbt.be/en/project/transecare, last visit 08/19/2009.

Bulgaria

Research and development for ICT in Bulgaria is mainly organised and supported by the Bulgarian State Agency for Information Technologies and Communications (SAITC), the Bulgarian Ministry of Education and Science and the Ministry of State Administration and Administrative Reform in close co-operation with several UN and EU programmes. Apart from several regional Technical Universities in Bulgaria, one main supplier is the "Internet Society (ISOC) Bulgaria"[78], a non-governmental organisation for public profit, incorporated in Bulgaria in 1995. They are the implementing agency for several projects which are partly dedicated to the needs of elderly.

Cyprus

The Research Promotion Foundation (RPF), founded in 1996, was established at the initiative of the Government of the Republic of Cyprus, to promote the development of scientific and technological research in Cyprus due to the fundamental importance of research in contemporary societies. Therefore by default, RPF reflects the national research strategy.

The University of Cyprus, namely the Department of Computer Science, is deeply involved in several activities with regard to tele-medicine solutions[79] or services for impaired people[80], while the Cyprus Neuroscience & Technology Institute is working on projects with regard to Ubiquitous Computing for elderly.[81] The Centre for Leisure, Tourism and Sport Research and Development Intercollege is also partner in the Thematic Network THENAPA II: "Ageing and disability - a new crossing between physical activity, social inclusion and life-long well-being".[82]

Czech Republic

The formulation of research policy is undertaken by the Ministry of Education which also is responsible for international R&D

cooperation and the coordination of the National Research Programmes. Also, the Ministry of Industry and Trade provides public funds. The Research and Development Council (R&D Council) is an advisory body to the government in the area of R&D[83], designing national research policies and reports on its development. Its first National Innovation Policy (2005-2010) was adopted by the government in July 2005.

The Academy of Sciences of the Czech Republic is a network of 60 scientific institutions and five supporting units. This leading non-university public research institution is staffed by 7,000 employees and carries out fundamental and applied research. The Academy also provides information on three programmes for research and development; one of them in the area of information and communication technologies[84] could likely incorporate research close to the study subject. None of the "selected projects" listed are in the vicinity of ICT enabled independent living.[85]

Denmark

The Ministry of Science, Technology and Innovation has the overall responsibility for research and innovation policy. Practically all innovation related policies and activities have been transferred to this ministry. Thus the governance system for innovation policy in Denmark is provided with a strong element of political and administrative coordination. Currently, Danish innovation policy is focused rather on 'high technology research' and science based sectors (e. g. nanotechnology, ICT and biotechnology). Other, more traditional or low-tech areas have received less attention. To cope with future challenges and to form an overall strategy for innovation policy the Action Plan INNOVATION DENMARK 2007-2010 has been launched by the Danish Council for Technology and Innovation. Irrespective of the high attention the demographic change is given in other policy contexts, this challenge is not named in this action plan.

ICT research and development is an important part of the Danish R&D-policy. Compared with the European average,

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[78] http://www.isoc.bg/index_en.html, last visit 08/19/2009.

[79] e.g. www.healtware.alcasat.net, last visit 08/04/2009.

[80] e.g. CCELERATE (ACCEss to the modern Library sERvices for the blind and pArtially sighTEd people) is a European project that aims in providing to the visually impaired access to contemporary library services in co-operation with the Cyprus Library:
http://library.ucy.ac.cy/ENGLISH/accelerateE/accel_en.htm, last visit 01/04/2008.

[81] Makris, Pantelis (2007). Accessibility of Ubiquitous Computing: Providing for the Elderly. Cyprus Neuroscience and Technology Institute.
http://virtual.inesc.pt/wuauc01/procs/pdfs/makris_final.pdf, last visit 08/14/2009.

[82] http://www.thenapa2.org/, last visit 08/14/2009.

[83] http://www.vyzkum.cz/FrontClanek.aspx?idsekce=630, last visit 08/14/2009.

[84] for details see http://www.cas.cz/en/ostatni.php?m=4&ID=165, last visit 08/14/2009.

[85] http://www.cas.cz/en/ostatni.php?m=4&ID=4-07-00-00, last visit 08/14/2009.

the Danish level of investments in ICT R&D is high (e. g. R&D investments in ICT total about DKK 1,500 per inhabitant, while investments in EU-15 are less than one half of this). For disabled people the Ministry of Culture and the Ministry of Science, Technology and Innovation have for example supported the development of speech-to-text technology to facilitate the use of ICT for a wide group of citizens. Another significant Government initiative in the area of ICT research and innovation are „high-technology networks". Five high-technology networks were granted nearly DKK 20 million in 2005, including a network on pervasive health care as well.

The Competence Centre "IT for All" was established 2003 in connection with the action plan "Disability No Obstacle" from 2002. Since 2006 the Centre is a part of the National IT and Telecom Agency's regular operation. Its mission is to give everybody - including elderly and disabled people - equal access to the knowledge society (e. g. accessibility on public websites) but as well focusing on accessibility in a wide sense.

Estonia

Estonian Science Foundation ETF supports research initiatives in all fields of basic and applied research. The ETF uses state budget appropriations to award peer-reviewed research grants to individuals and research groups on a competitive basis.

Different components for a health information system are in place and a major project on Nation-wide Integrated eHealth Services, the "Electronic Health Record Project of Estonia" (2005-2008) has started, with the objective to create a centrally administered Digital Health Record. It is hoped that this supply side measure will have a positive impact on a broader user orientation, especially in terms of usefulness and quality of online offerings.

Finland

The Ministry of Social Affairs and Health finances different kinds of development projects to improve the efficiency of social and medical care.

The Health Care Programme (2004–2009) looks for new solutions to provide the public with a better service and to make

the sector even more effective. SITRA's (Finnish National Fund for Research and Development) role in this area is based on partnerships and collaborations.

FinnWell (2004-2009) is a technology programme for funding innovation, research and product development to improve the quality and profitability of health care and to promote business activities and export. Tekes (Finnish Funding Agency for Technology and Innovation) is one of the main drivers in the field of AAL and thus also funds R&D projects[86].

The Public health programme "Health 2015" is a cooperation programme providing a broad framework for health promotion in various component areas of society. It operates amoing different sectors of administration, since public health is largely determined by factors outside health care: lifestyles, living environment, quality of products, factors promoting and factors endangering community health.

In June 2006, the Science and Technology Policy Council of Finland decided to establish an international Strategic centres for science, technology and innovation in fields that are important to the future of the Finnish society, business and industry where "Health and well-being" is one of five topics.

The nation-wide programme ITSE (Improving Assistive Technology Services) consists of regional level initiatives and aims to promote independent living of older people and people with disabilities by using IT solutions. It incorporates accompanying measures, such as social services staff training, provision of funding for ICT solutions and long term utilisation of these by the ultimate target groups - elderly, people with disabilities and their carers. Furthermore, the project aimed to accelerate the creation of common operational models and networks at regional level. In 288 communes there were 659 training events with 12,321 participants.[87] Finland is a main driver of the European Ambient Assisted Living Joint Programme. The focus of the AAL programme is to guarantee and improve the life quality of elderly people in Europe by the use of Information and Communication Technologies.

France

Several French organisations and institutes are responsible for the national health care system. One important institution is

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[86] complete list see http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/en/projektilistaus.html?filter=0, last visit 08/14/2009.
[87] www2.stakes.fi/ITSE-hanke/aluehankkeet/index.htm, last visit 08/14/2009.

the National Institute of Health and Medical Research (Institut national de la santé et de la recherche médicale – Inserm), which monitors the public health[88].

The French Agency of Health Safety of Health Products, (Agence Française de Sécurité Sanitaire des Produits des Santé – AFSSAPS) was created by the law of 1 July 1998 and set up in 1999. Its aim is to strengthen existing monitoring and health safety systems, in order to provide and improve response to the increasing diversity and interaction of health safety issues relating to health care products. Its mission is to guarantee the independence, the scientific competency and the study of administrative efficiency, research on therapeutic properties, usage of medicines and on health related products like cosmetic products, tattooing products, etc. The agency participates in the application of laws and rules to the different commercial processes of health and cosmetic related processes.

Germany

On the political side the main stakeholders are the Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Economics and Technology (BMWi). ICT research is a domain in which both ministries have a leading position.

The Fraunhofer research institutions have formed a "Fraunhofer alliance" of six institutes under the heading "Ambient Assisted Living".

In the mid of the year 2007 the German Federal Ministry of Education and Research (BMBF) published a call for proposals for "technology and services for the demographic change"[89]. In 2008 the BMBF launched a call directly addressing AAL topics. The selected projects are currently in the evaluation phase. Other highly visible research projects in the tele-medicine area are funded by the BMWi programme Next Generation Media of the BMWi.

Germany is a main player within the Ambient Assisted Living joint programme. The core of the German participation within the Ambient Assisted Living joint programme stems from the technology research programme "Microsystems Technologies"[90], also run under authority of the BMBF where collaborative industry-research projects mostly follow a technological approach, e.g. for a range of new medicine technology applications.

Besides a vast number of university institutes underway in research activities, the Generation Research Programme (GRP), carried out by the Luwig-Maximilians-University in Munich, is concerned with fundamental research which concern all ages, the application of knowledge from the field of medicine, and the conception of innovative technologies.

Greece

In Greece research and development is highly funded by the EU-R&D framework and supplemented by the responsible state departments. Several pilot projects mainly in the field of health and care are currently running in the scope of the EU framework programme.

The initiative "Digital Local Authority" was launched with a total budget of 60 m Euro. Its objective is to develop digital services at the municipal and regional level, across all Greece. Such digital services are intended to facilitate the interaction of citizens with local authorities by utilizing the power of IT and the internet.

A project for the provision of eHealth home-based rehabilitation, follow up and home hospitalisation services in patients with advanced stages of chronic diseases was performed by the eHealth Unit of Sotiria Hospital, Athens.[91]

The main research institutions involved in the development of ICT for elderly and disabled are the Centre for Universal Access and Assistive Technologies of the Institute of Computer Science, Foundation for Research and Technology – Hellas

88 Wikipedia (2008), Institut National de la Santé et de la Recherche Médicale:
    http://en.wikipedia.org/wiki/Institut_National_de_la_Sant%C3%A9_et_de_la_Recherche_M%C3%A9dicale, last visit 08/14/2009.
89 Bundesministerium für Bildung und Forschung (2007). Bekanntmachung von Richtlinien zur Förderung von Forschung und Entwicklung auf dem Gebiet „Technologie und Dienstleitungen im demographischen Wandel", June 20th, 2007.
    http://pt-ad.pt-dlr.de/Dateien/BEK-Technologie-DL-Demografie.pdf, last visit 08/14/2009.
90 http://www.mstonline.de/funding, last visit 08/14/2009.
91 Doupi, Persephone (2005). eHealth strategy and implementation activities in GREECE – Report in the framework of the eHealth ERA project. eHealth ERA. http://www.ehealth-era.org/database/documents/ERA_Reports/Greece_eHealth-ERA_Country_Report_Final_21-05-2007.pdf, last visit 08/14/2009.

(ICSFORTH)[92], the Department of Informatics and Telecommunications of the University of Athens[93], the Department of Product & Systems Design Engineering of the University of the Aegean[94], the Department of Computer Engineering and Informatics of the University of Patras[95], the Institute of Language and Speech Processing – ILSP[96] and the National Centre for Social Research (EKKE)[97], which created the Greek Social Data Bank (GSDB), to support and promote social empirical research in Greece and disseminate results.

Hungary

In Hungary there are some activities for developing and implementing Ambient Intelligence Systems into every-day life. Most of them are executed by the National Office for Research and Technology, which is supervised by the Ministry of Economy and Transport. It is responsible for implementing the government's science and technology policy.

Calls published in 2008 shall incorporate dedicated thematic areas. This also includes Ambient Assisted Living. The approach to implement the governmental programme regarding the realisation of a long and independent life by means of technical aids as well as ICT led to the foundation of AAL international (AAL= Ambient Assisted Living). Hungary was one of the 14 founder members.

Ireland

By the National Development Plan (NDP) for 2000-2006, the Irish government allocated a substantial investment in Research Technological Development and Innovation (RTDI). Although ICT for independent living is not defined or mentioned as a key objective of innovation and R&D policy in Ireland, there are several initiatives and projects in this field that have been funded or initiated by state agencies in cooperation with companies and/or universities and research institutes.

The TRIL Centre[98] was set up in 2007 by the Intel Corporation[99] and is supported by the Industrial Development Agency (IDA)

of Ireland. The centre is a coordinated collection of research projects addressing the physical, cognitive and social consequences of ageing. The TRIL Centre's mission is to discover and deliver technology solutions which support independent ageing, ideally in a home environment.

Strategic Research Clusters (SRCs) are funded by the Science Foundation Ireland primarily in the ICT and Biotech sectors to link scientists and engineers in partnerships across academia and industry.

In 2008 a Strategic Research Cluster on "Efficient Embedded Digital Signal Processing For Mobile Digital Health" has been awarded.

The Dublin Institute of Technology launched a master's degree in Computing (Assistive Technology) in January 2008. The course will be taught in conjunction with the Central Remedial Clinic and the Central for Excellent in Universal Design, at the National Disability Authority.

Italy

The innovation policy objectives set by the national government have been documented by two main documents: the Science & Technology policy guidelines (2003-2006) and the National Research Plan (2005-2007), authorised by the Ministry of Education, University and Research (MIUR). The Science and Technology policy guidelines also include further development of ICT as well as basic research on health care.

From 2001 some important initiatives have been carried out on Ambient Assisted Living, concerning the development of smart homes for elderly and disabled people. In July 2005 a call by the MIUR was launched to promote new research projects to major objectives as e. g. quality of life (health, safety, environment).

Agreements between universities, public institutions and industries enabled the creation of Research Centres on AAL technologies (Laboratori di Domotica) in Modena, Milano,

[92] http://www.ics.forth.gr/hci/ua_at_centre.html, last visit 08/14/2009.
[93] http://www2.di.uoa.gr/en/, last visit 08/14/2009.
[94] http://www.syros.aegean.gr/en/default.htm , last visit 08/14/2009.
[95] http://www.ceid.upatras.gr/en/ , last visit 08/14/2009.
[96] http://www.ilsp.gr/, last visit 08/14/2009.
[97] http://www.ekke.gr/, last visit 08/14/2009.
[98] http://www.trilcentre.org, last visit 08/14/2009.
[99] http://www.intel.com/healthcare/, last visit 08/14/2009

Trento, Pisa and Rome. In these Laboratories researchers and industries cooperate in order to implement new AAL innovations and to transfer technologies. For further information see the AAL Country Report Italy[100]. E. g. the Imagelab Laboratory[101] at the Engineering Faculty of the University of Modena and Reggio Emilia is working in this field. An important project called "Domotica per disabili" and other AAL related initiatives have been carried out, financed by the Foundation Cassa di Risparmio di Modena. EZ-Lab[102] Pisa is a Research Centre focused on the design, development and use of technologies and services to assist aging people to remain functional to their communities. CREATE-NET Trento together with the Georgia Tech work on the project "The Living Space - An Aware Environment for Improving the Quality of Life".

Latvia

About 50% of the funding available for R&D in Latvia comes from public funds. It is distributed by the Ministry of Education and Science and by the Ministry of Economy.

Currently no information on special funding schemes for R&D and Innovation in eHealth and ICT for independent living could be found. Minor activities in eHealth and eInclusion were funded by the Ministry of Health and the Ministry of Welfare.

Lithuania

The Ministry of Education and Science in collaboration with the Science Council of Lithuania is responsible for the State RTD policy and for the distribution of the state budget subsidies.

In the context of eHealth policy several research initiatives and projects in tele-medicine have been funded in the past years. Most of these activities are clustered around the Telemedicine Centre of the Kaunas University of Medicine.

Luxembourg

The research landscape in Luxembourg is well-established. A key player is the CRP-Santé (Institute for Research in Health care, Public Health & Biotechnology).[103]

The Centre de Recherche Public Henri Tudor (Public Research Centre Henri Tudor) operates different departments dedicated to fulfilling missions in the area of health care and social security. One of these departments is the Resource Center for Healthcare Technologies (CR SANTEC) with the role to be a neutral center of competences and expertise in service of all the health care actors.[104] The primary objective of the CR SANTEC is to help health care professionals in the Health Care & Social Security sectors.

In addition to the Public Research Centre Henri Tudor there is an initiative called Luxinnovation GIE (National Agency for Innovation and Research) which is a contact point for information and advice on innovation, research and development (R&D) in Luxembourg.

Malta

The International Institute on Ageing is funded by the United Nations and the Government of Malta[105]. The main objective is the implementation of the Vienna International Plan of Action on Ageing. The institute provides multi-disciplinary education and training in specific areas related to Ageing.

The University of Malta is a multidisciplinary teaching and research institution with eleven faculties[106]. A special research focus in the faculty of Medicine & Surgery is Public Health, addressing the demands of planners in Health. Furthermore the Institute of Health Care is involved in transnational research projects according Health Services Management, Nursing and Communication Therapy.

Actually there are no activities in the research area of ICT for Elderly ongoing in Malta. All identified projects are more oriented in overall social aspects.

[100] Marletta, Giovanni; Delfino, Germano; Delle Site, Vincenzo (2005). AAL Country Report Italy. Final Version (23.03.2005). p. 6.
[101] http://imagelab.ing.unimore.it/imagelab/, last visit 08/14/2009.
[102] http://www-arts.sssup.it/EZLab/, last visit 08/14/2009.
[103] Med-e-Tel (2006). Med-e-Tel, the International Conference and exhibition for eHealth, Telemedicine and Health ICT, Announces Highlights of 2006 Event. Press release. 28 February 2006. Luxembourg. http://www.medetel.lu/download/2006/press_release_2006-02-28-en.pdf, last visit 08/14/2009.
[104] Public Research Centre Henri Tudor. http://www.tudor.lu/, last visit 08/14/2009.
[105] For details see http://www.inia.org.mt, last visit 08/14/2009.
[106] For details see http://www.um.edu.mt, last visit 08/14/2009.

The Netherlands

ICT is one of three priority areas for scientific-technological development of the Dutch government. The coalition agreement of 2007[107] emphasises the urgent promotion of ICT, especially concerning a fast introduction of electronic patient and medication file by the year 2009. Electronic patient and medication files are being developed in co-operation with the national IT Institute for Healthcare NICTIZ and tested in 12 front runner regions.

The Dutch ministers of Research, Culture and Sciences and of Economic Affairs have established a steering body for ICT research and innovation. The new national ICT research agenda NOAG-i 2005-2010 is currently being developed and the Netherlands Organisation for Scientific Research (NWO) has already defined four new, additional ICT research programmes: GLobAl computer scieNCE (GLANCE), Visual Interactive Effective Worlds (VIEW), Continuous Access To Cultural Heritage (CATCH) and reinFOrcing CompUter Science (FOCUS)[108]. The IT & Innovation Steering Group consists of the Ministry of Health, Welfare and Sport, NICTIZ, health care providers, patients and insurers.

On the Dutch online research platform onderzoekinformatie[109] 228 items can be found that are related to ICT and Medicine and health science: one funding programme "ToKeN – Access to knowledge and its Enhancement Netherlands), and five programmes concerning pharmacoepidemology and drug policy; medical informatics; complicatieregistration; eHealth – ICT in health care; image generation, transfer, storage and processing in medicine. The programmes "eHealth – ICT in Healthcare" and "Innovation in the care for the elderly" force research with respect to the specific infrastructural requirements and designs, such as networks around the human body; networks within the home; and bridging the distance between patient and care provider by supporting innovative health care processes.

Poland

The main public players in the fields of health and R&D policies are the Ministry of Health and Ministry of Science and Higher Education. There also are other stakeholders like the Ministry of Interior and Administration (responsible for Information Society and eGovernment) and the Ministry of Labour and Social Policy, but they focus mainly on other areas than research.

There are some medical institutions and private companies that carry out projects in the domain of eHealth or supportive technologies. The initiatives on developing ICT applications for health and care sector are characterised by bottom-up approach and have rather local impact. The relevant R&D projects rather concentrate on hospital applications and not so much on the individual care approach or Independent Living issues. At the moment, tele-cardiology is the most advanced branch of tele-medicine in Poland. There are local centres of cardiologic tele-monitoring, like Kardiofon[110] and Kardiotel[111].

Portugal

Portugal is strongly committed to the development of an inclusive information society. Several approaches in the sector of eHealth can be found. The Knowledge Society Agency (UMIC) is the Portuguese public agency operating within the Ministry of Science, Technology and Higher Education. The Knowledge Society Agency mission is a keystone of the Government's economic policy and is characterised as follows: "to mobilise Portugal for the information society; to provide a new stimulus to entrepreneurial innovation; to promote scientific and technological development; and to qualify human resources"[112]. Besides, at the end of July 2005 the Portuguese government launched the Connecting Portugal Programme, an action plan for implementing the Technological Plan for the information society.

One approach consists in the cooperation between German research institutes and the FCT. In April 2007 the German Fraunhofer-Society signed a Memorandum of Understanding, together with the FCT and with the approval from the German Ministry for Education and Research (BMBF). The memorandum includes suggestions for a better cooperation between German and Portuguese research institutes and a plan to found an institute of the FHG in Portugal, which is specialist in the sector of "Ambient Assisted Living". The Institute is

[107] http://www.government.nl/dsc?c=getobject&s=obj&objectid=94058, last visit 08/14/2009.
[108] http://www.onderzoekinformatie.nl/en/oi/ict/overict/, last visit 08/14/2009.
[109] http://www.onderzoekinformatie.nl/en/, last visit 08/14/2009.
[110] www.medserwis.pl, last visit 08/14/2009.
[111] www.kardiotel.pl, last visit 08/14/2009.
[112] UMIC – The Knowledge Society Agency. Ministry of Science, Technology and Higher Education. http://www.infosociety.gov.pt/,
        last visit 08/14/2009.

designated to focus on ICT products and projects to support the aging society.

Romania

Romanian research on ageing is currently being performed by a large number of higher education universities[113] and public health research institutes[114]. R&D on ICT is undertaken by business sector, specialized institutions and universities. Research co-ordinators are the Ministry of Education and Research, Ministry of Communications and Information Technology, Romanian Academy, other ministries and agencies. A special role was played by the National Institute for R&D in Informatics (ICI) that in a consortium with several universities supervised a national research programme called INFOSOC.

The Ministry of Health is one of the main stakeholders for research funds in Romania. It currently provides a national programme dealing with ageing in society named "The National Programme on Geriatrics". Funds for ageing issues are designated to support activities of the National Institute of Gerontology and Geriatrics "Ana Aslan". "Ana Aslan" International Foundation (AAI) is a non-profit international organisation, established in Romania, with international branches.

Slovak Republik

The Slovakian Academy of Sciences is one of the most important players within the R & D landscape. It consists of altogether 54 research institutions. These organisations are divided into three sections: Physical, Space, Earth and Engineering Sciences; Life, Chemical, Medical, and Environmental Sciences; Social Sciences, Humanities, Arts and Culture[115]. The national innovation policy objectives have been summarised in the "Competitiveness Strategy" and include e. g. education policy, information society, business environment and innovation policy.

The European Community Programme eTen has been established in the Slovak Republic as well. It primarily focuses on applications and developments for bringing health and public health information networks to a Trans-European level, facilitating greater access to accurate data and informing patients,

in order to allow a better treatment wherever it is provided in the EU. Thus it promotes the use of electronic health care and insurance cards, extends the advances in tele-medicine to the health care sector (through homecare), and expands health management systems and capacity planning, and related preventive services.

Slovenia

The premier policy body responsible for science and technology policy is the National Science and Technology Council, with representatives both from science and business. A technology foresight study in Slovenia was commissioned by the Ministry of Education, Science and Sport and the Ministry of the Economy. 8 thematic fields were chosen, among them "Information and communication technologies" and "Medicine - care for the elderly" but concrete steps towards the realisation of these topics could not be research within the study at hand.

Spain

Spanish research policy is mainly situated in three ministries: the Ministry of Science and Technology, the Ministry of Education and Science, which plays an important role in designing the national R&D&I-plan, and the Ministry of Industry, Tourism and Trade, which is involved in R&D policies oriented towards the production sector.

The Spanish participation in the AAL Initiative is being managed by two Spanish programme owners, the Instituto de Salud Carlos III (affiliated to the Ministry of Health and Consumption) and the Dirección General para el Desarrollo de la Sociedad de la Información (affiliated to the Ministry of Industry, Tourism and Trade).

The Institute of Health Carlos III is a national public research and scientific support organisation founded as an autonomous body under the Ministry of Health and Consumption. It is responsible for the promotion of biomedical and health science research designated to develop and provide high quality scientific-technical services to the National Health care System and to the Spanish society in general. In 1994 the Healthcare

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[113] i.e. Public Universities of Medicine and Pharmacy and some other Universities with Faculties of Medicine and Faculties or Departments of Social Assistance.

[114] e.g. "Ana Aslan" National Institute of Gerontology and Geriatrics, "Victor Babes" National Institute of Research and Development in Pathology and Biomedical Sciences, "C .I. Parhon" Institute of Endocrinology

[115] www.sav.sk, last visit 08/14/2009.

Technology Evaluation Agency was created as a part of the Carlos III Healthcare Institute in order "to meet the consulting needs of the National Healthcare System for defining its Healthcare Policies in the major line of socially advanced Healthcare Systems".[116]

"The Dirección General para el Desarrollo de la Sociedad de la Información (DGDSI) is the Directorate-General of the Ministry of Industry, Tourism and Trade (MITYC) legally responsible for promoting the business R&D in the field of Information and Communication Technologies (ICT), and specifically in the area of e-inclusion and e-care.[117]

The CDTI programme and I³ Programme address health-oriented tasks in parallel with several other technologies.

Within the Programme to Encourage Technical Research (PROFIT) so-called "Tractor" projects are financed. These projects focus on themes and research disciplines as well as on services for the Information society like e-contents, e-inclusion and e-assistance. Resulting Strategic Actions aim at integrating ICT solutions directed to disadvantaged groups with specific needs like elderly people, people with disabilities, immigrants, patients, etc.

Sweden

On national level most of the general guidelines for innovation policy in Sweden are formulated by the Ministry of Enterprise, Energy and Communications and the Ministry for Education and Research. The Swedish Council for Working Life and Social Research offers financial support for research on the elderly and ageing.[118]

Specific funds to support the development of technology for elderly people do exist. According to the Ministry of Health and Social Affairs 2.4 million Euro p.a. will be allocated between 2007 and 2009 in order to stimulate the development of assistive devices and services for the elderly. The goal is to improve information and accessibility of practical assistive devices and services.

To address opportunities and challenges of demographic change VINNOVA, the major Swedish innovation agency, has started an interdisciplinary programme called "The Elderly". The focus of this cross-sector activity is the development of new innovative services and products supporting the living environment of elderly.[119]

Sweden has a long tradition of developing and applying telemedicine. Challenges Sweden still has to face in the field of telemedicine exist mainly on organisational level (e. g. the integration of electronic health records into the system). On national level, Sweden has adopted an IT strategy for health services in 2006. A new legal act for IT in health services is proposed and expected to be approved by the parliament in 2008.[120]

United Kingdom

The main focus for the UK system of R&D governance is the new Department for Innovation, Universities and Skills. In April 2006, the new Office of Science and Innovation (OSI) was established within the former Department of Trade and Industry (DTI), merging the Office of Science and Technology (OST) and the former DTI Innovation Group (which includes the Technology Strategy Board).

The importance of assistive technologies has already been recognized by policy makers in the UK at an early stage in the 90s and has been a major research objective since then. In January 2006 the Government published a white paper on health and social care outside hospitals called 'Our health, our care, our say: a new direction for community services'. The paper recognises the importance of assistive technology in supporting people to live safely in their homes and highlights the potential of tele-care and tele-health services. In February 2006 the Department of Health announced that the £80 million Preventative Technologies Grant is to be divided amongst local authorities over two years, as part of its efforts to help older people stay in their own homes for as long as possible. Further progress was made in 2007 with the whole system long-term conditions demonstrator programme including some

[116] for details see: http://www.isciii.es/htdocs/en/index.jsp, last visit 08/14/2009.

[117] for details see: http://www.aal-europe.eu/Published/pres2103, last visit 08/14/2009.

[118] Ministry of Health and Social Affairs (2007). Care of the elderly in Sweden, Fact Sheet No. 18, Sept. 2007. Policy for the elderly.
       http://www.sweden.gov.se/sb/d/2197/a/15498, last visit 08/14/2009.

[119] for details see: The Elderly – An interdisciplinary programme at VINNOVA.
       http://www.vinnova.se/In-English/Activities/Cross-sectoral-issues/The-elderly/, last visit 08/14/2009.

[120] Strateqo consortium (2008). Telehealth 2007: Telemedicine and innovative technologies for chronic disease management.
       http://ec.europa.eu/information_society/events/telehealth_2007/docs/2007th-conf-rep_final.pdf, last visit 08/14/2009;
       Olsson, Silas (2007). Statement at the Telehealth Conference December 11, 2007. Brussels.

large-scale integrated care and assistive technology pilots. Similar tele-care programmes were launched in different parts of the UK, i.e. in Scotland the National Telecare Development Programme in 2006. A comprehensive overview of assistive and tele-care related research projects in the UK is given in a database by the Foundation for Assistive Technology (FAST)[121].

10.2 AAL-related Research Programmes in short form

In the following AAL-related European Union funding instruments will be listed and presented in short form by only giving the name of the programme and its internet address : This information extends the former study version and is taken from an up-to-date information source.

▶ European Commission: DG REGIO – Structural Funds: http://es.europa.eu/employment_social/families/docs/eul_1414_family_081023_web_en.pdf, last visit 09/29/2009

▶ European Anti Poverty Network: Manual on the Structural Funds, a guide for NGOS (EAPN): http://www.eapn.eu/images/docs/manual%20pdf_en.pdf, last visit 09/29/2009

▶ European Social Fund (ESF): http://ec.europa.eu/employment_social/esf/discover/esf_en.htm, last visit 09/29/2009

▶ European Regional Development Fund (ERDF): http://ec.europa.eu/regional_policy/funds/prord/prord_en.htm, last visit 09/29/2009

▶ INTERREG IV C: INTERREG IV C: http://www.interreg4c.net, last visit 09/29/2009

▶ URBACT II: http://urbact.eu/, last visit 09/29/2009

▶ The LEADER+ Approach - Rural Development Policy 2007 – 2013: http://ec.europa.eu/agriculture/publi/fact/leader/2006_en.pdf, last visit 09/29/2009

▶ European Urban Knowledge Network (EUKN): http://www.eukn.org/eukn, last visit 09/29/2009

▶ JESSICA (Joint European Support for Sustainable Investment in City Areas): Sustainable development for urban areas: http://www.jessica.europa.eu, last visit 09/29/2009

▶ JASPERS (Joint Assistance to Support Projects in European Regions): http://www.jaspers.europa.eu, last visit 09/29/2009

▶ DG Employment and Social Affairs: PROGRESS Transnational Exchange Programme: http://ec.europa.eu/social/main.jsp?catId=327&langId=en, last visit 09/29/2009

▶ DG Research: The Seventh Framework Programme (FP 7) 2007 – 2013, supporting ageing-related research: ftp://ftp.cordis.europa.eu/pub/life/docs/hansen_fp7.pdf, last visit 09/29/2009

▶ The European Strategy Forum on Research Infrastructures (ESFRI): http://cordis.europa.eu/esfri/roadmap.htm, last visit 09/29/2009

▶ DG Education and Culture: The Leonardo da Vinci Programme for projects on vocational learning: http://www.leonardodavinci-projekte.org/prj/1740/project_1740_en.pdf, last visit 09/29/2009

▶ The GRUNDTVIG Programme: GIVE (Grundtvig Initiative on Volunteering in Europe for Seniors): http://ec.europa.eu/education/grundtvig/doc872_en.htm, last visit 09/29/2009

▶ The Transversal Programme [for promoting policy co-operations on ageing]: http://ec.europa.eu/education/lifelong-learning-programme/doc90_en.htm, last visit 09/29/2009

▶ Europe for Citizens Programme: http://ec.europa.eu/citizenship/index_en.htm, last visit 09/29/2009

▶ DG Energy and Transport: The Intelligent Energy Europe (IEE) Programme: http://ec.europa.eu/intelligentenergy, last visit 09/29/2009

▶ DG Information Society: Competitiveness and Innovation Programme (CIP-PSP): http://ec.europa.eu/information_society/activities/ict_psp/index_en.htm, last visit 09/29/2009

▶ ICT Policy Support Programme (ICT PSP): http://ec.europa.eu/information_society/activities/ict_psp/index_en.htm, last visit 09/29/2009

▶ The Ambient Assisted Living (AAL) Joint Programme: http://www.aal-europe.eu, last visit 09/29/2009

▶ DG SANCO: European Public Health Programme2008 – 2013: http://ec.europa.eu/health/ph_programme/documents/prog_booklet_en.pdf, last visit 09/29/2009

▶ DG Justice, Freedom and Security: DAPHNE III Programme to combat elder abuse and neglect: http://ec.europa.eu/justice_home/funding/daphne3/funding_daphne3_en.htm#part_3, last visit 09/29/2009

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[121] www.fastuk.org, last visit 08/14/2009.

11 Selected Data from the Database

11.1 Overview on Organisations

Austria (AT)

▶ ABATEC Electronic AG
▶ AKG Acoustics GmbH
▶ Austrian Research Centers GmbH - ARC
▶ Bartenbach Light Laboratory (Bartenbach LichtLabor)
▶ Central European Institute of Technology (CEIT)
▶ Compass Sozial- und Gesundheitsverein
▶ CURE - Center for Usability Research & Engineering
▶ Emporia Telecom Produktions- und Vertriebs GesmbH & Co KG, Austria
▶ Eurospiel: Seniorenshop für aktive Senioren, CO-MA Einrichtungs- und Verkaufsges.m.b.H., Austria
▶ Johannes Kepler Universität Linz (JKU)
▶ Medzinische Universität Graz - Medical University of Graz
▶ Plejaden Communications Gmbh & Co.KG
▶ Technische Universität Wien
▶ The Austrian Academy of Sciences - Die Österreichische Akademie der Wissenschaften
▶ Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)
▶ University of Applied Sciences Vorarlberg (Fachhochschule Vorarlberg GmbH)
▶ Verein für neues Lehren und Lernen / Institute for Future Studies (IFS)
▶ Vienna Institute of Demography (VID)
▶ Vienna University of Technology - Institute 'integrated study' / Technische Universität Wien - Institut "integriert studieren" (is-TU Wien)
▶ Volkshilfe Steiermark - gemeinnützige Betriebs GmbH, Austria
▶ Zydracon, Austria

Belgium (BE)

▶ AGE – the European Older People's Platform
▶ Androme N.V.
▶ Association Nationale pour le Logement des Personnes Handicapées (ANLH Asbl)
▶ belgacom
▶ Belgian Building Research Institute (BBRI)
▶ Center of Research in Public Economics and Population Economics (CREPP) – University of Liège
▶ CETIC – Centre of Excellence in Information and Communication Technologies
▶ Cochlear Benelux NV
▶ Dienstencentrum GID(t)S

▶ Health Information Management S.A. (HIM) – Belgium
▶ HMC International NV
▶ IBBT
▶ IMEC-NL
▶ In-HAM vzw
▶ MediBridge
▶ Mind Media B.V.
▶ Mindfit, Belgium
▶ National Federation of Christian Mutuality (Landsbond der Christelijke Mutualiteiten, LCM)
▶ Scientific Institute of Public Health
▶ Sensotech N.V., Belgium
▶ Televic
▶ Universiteit Antwerpen / University of Antwerp
▶ University of Antwerp
▶ University of Leuven – Katholieke Universiteit Leuven
▶ Vlaams Innovatienetwerk
▶ Vrije Universiteit Brussel – Free University of Brussels
▶ West-Vlaamse Intercommunale – dienstverlenende vereniging (WVI)

Bulgaria (BG)

▶ Internet Society (ISOC)

Cyprus (CY)

▶ Cypcana Alarms Ltd.
▶ Cyprus Association of Cancer Patients and Friends (PASYKAF)
▶ University of Cyprus

Czech Republic (CZ)

▶ Charles University in Prague / Univerzita Karlova v Praze (UK Praha)
▶ Czech Technical University in Prague
▶ IMA s.r.o. - Institute of Microelectronic Applications
▶ Masaryk Memorial Cancer Institute
▶ Zivot 90

Germany (DE)

▶ A.GE – Agentur für Generationen Marketing
▶ Access Technologies Group
▶ agentscape AG
▶ Aipermon GmbH & Co. KG

- ambient assisted living GmbH
- ARAMARK Holdings GmbH & Co. KG
- AWO Arbeiterwohlfahrt Bundesverband e.V.
- B.A.D Gesundheitsvorsorge und Sicherheitstechnik GmbH
- Barmer Ersatzkasse
- Berliner Institut für Sozialforschung (BIS)
- BG Immobilien Projektmanagement GmbH
- Binder-Elektronik GmbH
- Bosch BKK
- Brandenburgische Technische Universität Cottbus
- Bundesministerium für Bildung und Forschung (BMBF)
- Bundesministerium für Familie, Senioren, Frauen und Jugend
- Bundesministerium für Wirtschaft und Technologie
- Bundesverband freier Immobilien- und Wohnungsunternehmen e.V. (BFW)
- Buschmann Labor- und Medizintechnik
- CARDIOSIGNAL GmbH + Co. KG
- Carl-von-Ossietzky-Universität Oldenburg – University of Oldenburg
- CAS Software AG
- Charité
- Corscience GmbH & Co
- Cycos AG
- DAI-Labor
- Deutsche Postbank AG
- Deutsche Telekom AG, Laboratories
- Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)
- DFKI-Lab Safe and Secure Cognitive Systems
- Diakonie Neuendettelsau
- Dr. Hein GmbH
- Drägerwerk AG
- Drees & Sommer AG
- Dresden International University
- Eberhard-Karls-Universität Tübingen
- Elastic Textile Europe GmbH
- ELOVIS GmbH Electronics . Optics . Solutions
- empirica
- Energy-Lab Technologies GmbH
- Erlau AG
- etp electronics trading and production e. K.
- European Microsoft Innovation Center (EMIC)
- European Prevention Center – EPC Berlin
- feddersenarchitekten
- Fern-Universität Hagen
- Finanzministerium Rheinland-Pfalz
- FONIUM Deutschland GmbH
- Forschungsinstitut Technologie und Behinderung
- Fraunhofer IESE – Institut Experimentelles Software Engineering
- Fraunhofer IGD – Institut Graphische Datenverarbeitung
- Fraunhofer IIS – Institut Integrierte Schaltungen

- Fraunhofer IMS – Institut Mikroelektronische Schaltungen und Systeme
- Fraunhofer Insitut Biomedizinische Technik (IBMT)
- Fraunhofer ISST – Institut Software- und Systemtechnik
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
- Fraunhofer-Institut für Angewandte Informationstechnik (Fhg-IFT) – Fraunhofer Institute for Applied Information Technology
- Fraunhofer-Institut für Arbeitswirtschaft
- Friedrich-Alexander-Universität Erlangen-Nürnberg
- FutureCamp GmbH
- FZI Forschungszentrum Informatik
- Geberit Vertriebs GmbH
- Gemeindliche Siedlungs-Gesellschaft Neuwied mbh
- Gemeinnützige Baugesellschaft Kaiserslautern Aktiengesellschaft
- Gemeinnützige Beugenossenschaft Speyer (GBS)
- Generation Research Programme der Ludwig-Maximilians-Universität München
- GERA-IDENT GmbH
- Getemed
- GfaI – Gesellschaft zur Förderung angewandter Informatik e.V.
- Giegling & von Saal GbR
- Heinrich-Heine-Universität Düsseldorf / University of Duesseldorf
- Herbert Waldmann GmbH & Co. KG
- HomeMatic
- HOME-Systems Gebäudesteuerung und Informationstechnik
- HörTech gGmbH
- Hörzentrum Oldenburg GmbH
- HWG eG
- Ingenieurbüro Steinbrück & Jergus
- inHaus-Zentrum der Fraunhofer-Gesellschaft
- Institut für Mikro- und Informationstechnik der Hahn-Schickard-Gesellschaft für angewandte Forschung e.V. (HSG-IMIT)
- Institut für virtuelles und reales Lernen in der Erwachsenenbildung an der Universität Ulm (ILEU)
- Institute of Automation – Universität Bremen
- InterComponentWare AG
- InTraCoM GmbH
- Ipsos GmbH
- ISA GmbH
- Johannes Gutenberg-Universität Mainz
- Josias Löffler Diakoniewerk Gotha GmbH
- Julius-Maximilians-Universität Würzburg
- KAPPLER ARCHITEKTEN gesamtplaner gmbH
- Koordinierungszentrum für Klinische Studien Leipzig (KKSL) – Universität Leipzig
- Küchen-Quelle GmbH

▶ LEG Landesentwicklungsgesellschaft NRW GmbH

▶ Mannheim Research Institute for the Economics of Aging (MEA)

▶ MCC Gesellschaft für Diagnosesysteme in Medizin und Technik mbH & Co. KG

▶ Medical Technology-Promedt Consulting GmbH

▶ Meditrainment GmbH

▶ MetraLabs GmbH – Neue Technologien und Systeme

▶ Metrax

▶ Motorola GmbH – Physical Realization Research Center-Europe

▶ OFFIS Oldenburger Forschungs- und Entwicklungs-Institut für Informatikwerkzeuge und –systeme

▶ OMRON Medizintechnik

▶ PASIFE GmbH

▶ Philips Medical Systems

▶ Planungs- & Entwurfsbüro Dipl.Ing. Axel Weber

▶ ProSyst Software

▶ Rehavista

▶ Rheinisch-Westfälische Technische Hochschule Aachen

▶ Robert Bosch GmbH

▶ Robert-Bosch-Krankenhaus

▶ Ruhr-Universität Bochum – University of Bochum

▶ Schwarzer GmbH Messgeräte für die Medizin

▶ seca GmbH & Co. KG

▶ Secal Sicherheitstechnik GmbH

▶ serwo GmbH & Co. KG i.Gr.

▶ SevenSenses GmbH

▶ Siemens AG

▶ soleo* GmbH Beratung und Planung

▶ Sozial-Holding der Stadt Mönchengladbach GmbH

▶ Sozialwerk St.Georg e.V.

▶ Stollmann GmbH

▶ suprima GmbH

▶ Technical University Kaiserslautern

▶ Techniker Krankenkasse (TK)

▶ Technische Universität Berlin

▶ Technische Universität Dresden (TUD) – University of Technology Dresden

▶ Technische Universität Ilmenau

▶ Technische Universität München

▶ Thoss & Partner GmbH

▶ T-Mobile

▶ Tyco Fire & Integrated Solutions – TOTAL WALTHER GmbH

▶ ubitexx – Mobile Business

▶ Universität Bremen / University of Bremen

▶ Universität der Künste Berlin

▶ Universität Passau / University of Passau

▶ Universität Ulm

▶ Universitätsklinikum Aachen / University Hospital Aachen

▶ University Stuttgart, Institute for Human Factors and Technology Management (IAT)

▶ VDI/VDE Innovation + Technik GmbH

▶ Villeroy & Boch AG

▶ Vitaphone GmbH

▶ Vitaris GmbH

▶ Vivantes Netzwerk für Gesundheit GmbH

▶ Vodafone Group R&D Germany

▶ W. Zimmermann GmbH & Co. KG

▶ Weinmann Geräte für Medizin GmbH + Co. KG

▶ Westpfalz-Klinikum

▶ WIK Wissenschaftliches Institut für Infrastruktur und Kommunikationsdienste GmbH

▶ Wohlfahrtswerk für Baden-Württemberg

▶ Wohnbau Mainz GmbH

▶ Zentrum für Graphische Datenverarbeitung e.V. (ZGDV)

▶ Zentrum für Telematik im Gesundheitswesen (ZTG)

▶ ZMD GmbH

Denmark (DK)

▶ Danish Institute of Rural Research and Development

▶ Doro AB, Sweden

▶ Funen Hospital

▶ GITS A/S

▶ GN Resound A/S

▶ INDEX:, Denmark

▶ In-Jet ApS

▶ Lanzer of Denmark

▶ MedCom International

▶ Odense Kommune - Odense Municipality

▶ Odense University Hospital

▶ Region Syddanmark

▶ RTX - Wireless Technology, Denmark

▶ Technical University of Denmark (DTU)

▶ University of Southern Denmark (SDU) / Syddansk Universitet

Greece (EL)

▶ Altec

▶ Athens Information Technology (AIT)

▶ ATKOSoft

▶ Democritus University of Thrace

▶ e-ISOTIS (Information Society Open To ImpairmentS)

▶ Epimorfotiki Kilkis Ltd., Greece

▶ Exodus S.A.

▶ Foundation for Research and Technology, Hellas (FORTH-ICS)

▶ Health Center Vyrona, Greece

▶ Hellenic Telecoms S.A. – OTE A.E., Greece

▶ iKnowHow

▶ Institute for Language and Speech Processing / R.C. "Athena"

▶ Institute of Communication and Computer Systems (ICCS), Greece

- Institute of Language and Speech Processing (ILSP)
- Kilkis Prefecture, Greece
- Municipality of Piraeos
- National and Capodistrian University of Athens
- Net Technologies
- Panteion University Athens
- SingularLogic S.A.
- Teletel
- University of the Aegean
- ZENON S.A.

Estonia (EE)
- East Tallinn Central Hospital
- Harju County Government, Estonia
- Ministry of Social Affairs
- Mobi Solutions

Spain (ES)
- AIJU
- AITEX – Instituto Tecnológico Textil
- Aragonese Federation of Municipalities, Regions and Provinces, FAMCP – La Federación Aragonesa de Municipios, Comarcas y Provincias, Spain
- Autonomous University of Barcelona (UAB)
- Ayuntamiento de Rivas Vaciamadrid – Municipality of Rivas Vaciamadrid
- Brainstorm Multimedia S.L.
- BSH Electrodomésticos España S.A. (Bosch + Siemens)
- Centro de Estudios Monetarios y Financieros (CEMFI) /
- CodeFactory
- com & media, Proyectos y Servicios, S.L
- Corscience, Spain – corscience España
- Díaz-Bastien & Truan Lawyers (DBT)
- Eptron Grupo SA, Spain
- FAGOR Electrodomésticos, S. Coop.
- FASS – Andalusian Social Services Foundation
- Fatronik
- FLORIDA – Centre de Formació
- Fundación Instituto Gerontológico Matia – INGEMA
- Fundación Robotiker
- Fundación Vodafone España – Vodafone Spain Foundation (FVE)
- G2V Grupo de Empreses Isde Aragon, S.L.
- Gaia – Association of Industries for Electronic and Information Technologies in the Basque country
- Generalitat Valenciana – The regional government of Valencia
- Grupo Sergesa, SA, Spain
- GUIDO – Neonatology – Intensive Care

- Health and Consumer Protection Department of the Autonomous Government of Aragón (ARAGON) – Spain
- Hospital Clinic Provincial Barcelona
- Hospital Clinico San Carlos / Hospital Clínico San Carlos
- Hospital Comarcal Sant Antoni Abat de Vilanova i la Geltrú
- Hospital Consortium of Catalonia – Seu del Grup Consorci Hospitalari de Catalunya (CHC SA)
- i2CAT Foundation (Fundació i2CAT)
- Ikerlan – Technological Research Centre
- Indra Sistemas, S.A. (INDRA)
- Ingeniería de la Calidad de Vida, S.L – Icavi-Bikain
- Innovaciones Sociosanitarias S.L (ISS, Consultores Sociosanitarios)
- Instalaciones INABENSA, S.A.
- Instituto de Biomecánica de Valencia (IBV) – Valencian Institute of Biomechanics
- La Asociación Empresarial de Residencias y Servicios a Personas Dependientes de la Comunitat Valenciana (Aerte) – the Business Association of Residential Homes and Services to Dependent People in the Region of Valencia
- La Pastilla Soluciones Integrales s.l., Spain
- Laboratorios Arifarm, Spain
- Life Supporting Technologies (LifeSTech)
- MAPFRE QUAVITAE, S.A., Spain
- mediatric
- Microelectronics National Center (CNM-CSIC)
- moviquity
- Municipality of San Sebastian – Fomento de San Sebastián
- ONO
- PCI Seguridad y Tecnología, Spain
- Polytechnic University of Valencia / Universidad Politecnica de Valencia
- RGB Medical Devices
- SABIA Bioingeniería Aragonesa S.L.
- SECOT- Spanish Seniors for technical Co-operations (Seniors Españoles para la Cooperación Técnica)
- Secretary's Office for Strategy and Coordination (SEC) of the Ministry of Health of the Government of Catalonia
- SeguridadPlus
- Skill Estrategia
- Spanish National Research Council (CSIC)
- SPANISH SOCIETY OF SOCIAL AND HEALTH CARE / Sociedad Española de Asistencia Sociosanitaria (Seas)
- TB Solutions
- Tecnologías para la Salud y el Bienestar (TSB)
- Telefónica I+D
- The Institute for the Applications of Advanced Information and Communication Technologies (ITACA)
- The Municipality of Gipuzkoa
- The University of Zaragoza (Universidad de Zaragoza)
- The Valencian Office for the Information Society – Fundación OVSI

- Universidad de Málaga / The University of Málaga (UMA)
- Universidad Politécnica de Madrid (UPM) – Politecnic University of Madrid
- Universitat de Valencia / University of Valencia
- Universitat Politècnica de Catalunya / Polytechnic University of Catalonia (UPC)
- University of Coruna (Universidad de A Coruña) – Gerontology Research Group (El Grupo de Investigación en Gerontología)
- University of Salamanca
- Visual Communication and Interaction Technologies Centre (VICOMTech)

European Organisations (EU)
- CSSC - Centre for Science, Society and Citizenship
- European Blind Organisation
- European Federation of Audiology Societies (EFAS)
- IAE Inclusion Alliance for Europe / The European User Alliance for eInclusion and eHealth (EPIST)

Finland (FI)
- Academy of Finland
- Audio Riders
- City of Oulo
- Elsi Technologies
- Finnish Central Association for Mental Health
- Goodit m-health Ltd.
- Incode ltd.
- Kouvola Municipality, Finland
- Kuopio University Hospital
- LAPPSET Group Ltd.
- Laurea University of Applied Sciences
- Mawell Oy
- Municipality of Lappeenranta
- Newtest Oy
- Nokia Corporation
- Oulo University Hospital
- Oulu City Library
- PIRAMK University of Applied Sciences
- Province of Southern Finland / Etelä-Suomen lääninhallitus
- Puolarmetsä hospital
- SONECO
- TAMK University of Applied Sciences
- Tampere University of Technology
- TDC Oy, Finnland
- Tekes, Finnish Funding Agency for Technology and Innovation
- The University of Jyväskylä
- The University of Tampere
- TTS Research, Finland

- VIDERA Oy
- Vivago
- VTI Technologies Oy
- VTT Technical Research Centre of Finland
- Well Life Center

France (FR)
- Alcatel-Lucent
- Assistance Publique Hopitaux de Paris (APHP)
- Astelia
- Bazile Telecom, France
- BIRDY Technologie, France
- Centre Hospitalier Universitaire de Nice
- Centre Scientifique et Technique du Bâtiment (CSTB)
- Commissariat à l'énergie atomique (CEA)
- Communauté Urbaine de Brest
- Concours Lépine, France
- Conseil général des Alpes Maritimes (06)
- Conseil général du Finistère Penn-Ar-Bed
- Conseil Régional Midi-Pyrénées
- Conseil Régional Provence Alpes Côte d'Azur
- CyberFab
- eDevice technology
- Electricité de France (EDF)
- ESIEE Paris (École supérieure d'ingénieurs en électronique et électrotechnique)
- ESIGETEL (École supérieure d'ingénieurs en informatique et génie des télécommunications)
- Europe Assistance France SA (Société de courtage d'assurance)
- famillassist, France
- France Télécom (Orange S.A.)
- HANDICOM Lab.
- Inserm – Institut ational de la santé et de la recherche médicale
- Institut de recherche et documentation en économie de la santé (IRDES) / Institute for Research and Information in Health Economics, France
- Institut National de la Statistique et des Etudes Economiques (INSEE) / National Institute of Statistics and Economic Studies, France
- Institut National de Recherche en Informatique et d'Automatique
- Institut TELECOM
- Intervox, France
- Laboratoire d'Analyse et d'Architecture des Systèmes (LAAS)
- Laboratoire d'Informatique pour la Mécanique et les Sciences de l'Ingénieur (CNRS-LIMSI)
- Laboratoire d'Informatique, de Robotique et de Microélectronique de Montpellier (LIRMM)

- Laboratoire IBISC Informatique, Biologie Intégrative et Systèmes Complexes
- legrand SNC
- MEM-X Diffusion Sarl
- MESANGES
- Ministère de l'Enseignement supérieur et de la Recherche
- Morgan'Conseil
- Neuf Cegetel
- PERVAYA, France
- Robosoft SA
- SAXXO Technologie, France
- Senioralerte, France
- Solem Electronique, France
- Solutions Communicantes Sécurisées (SCS)
- Sorin Group France SAS
- STRATEL Automation, France
- Télé-Assistance Médicalisée du Bas-Rhin et du Haut-Rhin – Medical tele-assistance for the departments Bas-Rhin and Haut-Rhin, France
- TELECOM Bretagne: SID (innovative services for dependent people)
- Thales Group S.A.
- The National Retirement Fund of Public Social Security – Caisse Nationale d'Assurance Vieillesse (CNAV)
- TRIALOG
- Université de Bretagne Occidentale
- Université de Nice Sophia Antipolis
- University of Montpellier 2 / Université Montpellier 2 Sciences et Techniques
- Vecsys
- Vermon
- VITARIS RESPONSE, France
- Wany Hong Kong Ltd Wanchai Wany S.A

Hungary (HU)
- ALBACOMP Computers Corporation, Hungary
- Bay Zoltan Foundation for Applied Research
- Budapest University of Technology and Economics
- Computer and Automation Research Institute (MTA SZTAKI)
- Innomed Medical Developing and Manufacturing Inc., Hungary
- Meditech Ltd., Hungary
- Municipality of Györ
- National Office for Research and Technology (NKTH)
- Profitexpert Informatics Ltd. (pex)

Ireland (IE)
- ClickToGO
- Dundalk Institute of Technology
- Enterprise Ireland

- H.A.S. – Home Automation Systems
- Industrial Development Agency Ireland (IDA)
- National University of Ireland, Galway
- Telcomed Advanced Industries Ltd.
- The University of Dublin/Trinity College
- Trinity College Dublin
- University College Dublin
- University of Limerick
- Valentia Technologies Ltd.
- Work Research Centre

Italy (IT)
- AbAcus - Biomedical and Assistive Technology
- ACER Reggio Emilia (Azienda Casa Emilia Romagna della Provincia di Reggio Emilia), Italy
- Agency for the Promotion of European Research - Agenzia per la Promozione della Ricerca Europea (APRE)
- apollis - Institute of Social Research and Opinion Polling
- Associazione Eldy onlus
- Ausilium S.r.l.
- Azienda Unita Sanitaria Locale di Bologna
- CBIM - Consorzio di Bioingegneria e Informatica Medica
- Città di Torino - The City of Torino
- CNR Institute for Microelectronics and Microsystems (IMM)
- Consiglio Nazionale delle Ricerche - Istituto per le Tecnologie della Costruzione / Italian National Research Council - Construction Technologies Institute (ITC-CNR)
- CONSORZIO PISA RICERCHE - Renata CAMPUS - Segreteria Generale
- COOSS Marche Onlus
- CREATE-NET (Center for REsearch And Telecommunication Experimentation for NETworked communities)
- CSI Piemonte
- cup2000 SpA e-care
- Domus Academy
- ERVET - Emilia-Romagna Valorizzazione Economica Territorio SpA, Italy
- European Business Associates srl (EBA)
- European University Institute Florence
- Federico II University of Naples / Università degli Studi di Napoli Federico II
- Fondazione Bruno Kessler
- Fondazione San Raffaele del Monte Tabor - Milano
- Fondazione Santa Lucia IRCCS
- HELPICARE
- Istituto Nazionale Riposo Cura Anziani (INRCA)
- Milior
- MIR Medical International Research
- Provincia Autonoma di Trento
- Regione Veneto
- Scuola Superiore Sant'Anna

- Scuola Superiore Sant'Anna, Pisa - The Advanced Robotics Technology and Systems (ARTS Lab)
- Smartex
- Telbios
- TeSan (TESAN) - Italy
- The Municipality of Bologna / Comune di Bologna
- The University of Padua - Università degli Studi di Padova
- Università Ca' Foscari di Venezia - Ca' Foscari University of Venice
- Università degli Studi di Firenze / University of Florence
- Università degli Studi di Roma "Tor Vergata" / University of Rome "Tor Vergata"
- Università degli Studi di Trento - University of Trento
- Universita Di Bologna
- University of Cassino
- University of Palermo / Università degli Studi di Palermo
- University of Parma - Università degli studi di Parma
- University of Pavia - FONDAZIONE SALVATORE MAUGERI (IRCCS/FSM)
- University of Pisa / Università Di Pisa
- University of Salerno / Università degli Studi di Salerno (UniSa)
- URMET Engineering s.r.l., Italy

Lithuania (LT)
- Lithuanian Innovation Centre (LIC)
- Teltonika
- Vilnius University Hospital

Luxembourg (LU)
- Centre de Recherche Public – Gabriel Lippmann, Luxembourg
- Fonds National de la Recherche Luxembourg
- University of Luxembourg

Latvia (LV)
- Vilnius Business College / Vilniaus Verslo Kolegija - LT

Malta (MT)
- AcrossLimits (Malta)
- Government of Malta
- Ministry for Infrastructure, Transport & Communications of Malta
- Projects in motion

The Netherlands (NL)
- Academic Medical Center University Amsterdam, Experimental Audiology (AMC KNO)

- CLB – Technology with Care, The Netherlands
- Delft University of Technology
- Dialoc ID
- Erasmus Medical Center (Erasmus MC)
- Foundation for hearing impaired people, Netherlands – Viataal
- McRoberts
- MEXTAL – The Technology Company
- Noordelijke Hogeschool Leeuwarden (NHL)
- Philips Electronics Nederland B.V.
- Philips Global Headquarters
- Philips Research
- Radboud University Nijmegen Medical Centre
- simPC, The Netherlands
- Stads ontwikkeling Leeuwarden – Urban development Leeuwarden, The Netherlands
- Stichting Smart Homes
- Stichting Verzorging & Verpleging Eindhoven – De Archipel
- Technische Universiteit Eindhoven – University of Technology Eindhoven
- Telematica Instituut
- TNO Knowledge for business
- Universiteit van Amsterdam – University of Amsterdam
- Universiteit van Tilburg / University of Tilburg
- University of Groningen / Rijksuniversiteit Groningen (RUG)
- University of Twente
- VieDome
- Vrije Universiteit Medical Centrum – VU Medical Center Amsterdam
- ZonMW
- ZonMw
- ZuidZorg

Poland (PL)
- ASM - Centrum Badań i Analiz Rynku Sp. z o.o.
- Centrum Systemów Informacyjnych Ochrony Zdrowia
- Institute of Fundamental Technological Research
- Polish Academy of Sciences - Polska Akademia Nauk
- The Jagiellonian University of Cracow / Uniwersytet Jagiellonski w Krakowie
- University of Poznan - Uniwersytet Im. Adama Mickiewicka w Pozaniu
- University of Warsaw
- Warsaw University of Technology / Politechnika Warszawska

Portugal (PT)
- AMDE – Associação de Municípios do Distrito de Évora
- Évora Town Hall – Município de Évora
- HELPPHONE – Tecnologias de Comunicação S.A, Portugal

- Instituto de Engenharia de Sistemas e Computadores do Porto (INESC)
- Primus Care – Serviços de Saúde e Assistência Domiciliária, Lda., Portugal
- Rede Comunitária do Distrito de Évora
- T-Care, Conhecimento e Saúde, Lda, Portugal
- UNINOVA
- Universidade de Évora – University of Évora
- University of Coimbra / Universidade de Coimbra

Romania (RO)
- "Ana Aslan" International Academy of Aging
- County Emergency Clinical Hospital of Timisoara
- Executive Agency for Higher Education and Research Funding - Unitatea Executiva pentru Finantarea Invatamantului Superior si a Cercetarii Stiintifice Universitare (UEFISCSU)
- Info World (INFOWORLD) - Romania
- Institute for Automation Bucharest (IPA, Romania)
- Medical Aid Foundation PROFILAXIS Timisoara, Romania
- Ministry for Health, Romania - Ministerulu Sanatatii Publice
- SC EUROGRAPH
- Technical University of Bucharest (Universitatea Politehnica Bucuresti)
- Timisoara City Hall
- West University of Timisoara - UNIVERSITATEA DE VEST DIN TIMISOARA

Slovenia (SI)
- gorenje Group
- Institute for Rehabilitation – Republic of Slovenia
- Intekom d.o.o. Integrated Technology and Communications
- Ministry of Higher Education, Science and Technology, Slovenia
- MKS Electronic Systems Ltd.y
- Ripitz d.o.o.
- SETCCE (Security Technology Competence Centre)
- Siix d.o.o.
- Smart Com d.o.o.
- ŠPICA International d.o.o.
- The Jožef Stefan Institute (Jozef Stefan Institute), Slovenia
- University of Ljubljana
- University of Ljubljana, Faculty of Social Sciences
- URBANISTIČNI INŠTITUT REPUBLIKE SLOVENIJE / URBAN PLANNING INSTITUTE OF THE REPUBLIC OF SLOVENIA
- Zavod za Ocbro na Domu Ljubljana – (Institute for home care, Ljubljana)

Slovak Republic (SK)
- Slovak Academy of Sciences (SAS)

- Slovak University of Technology
- Technical University of Kosice (Technická Univerzita v Košiciach)

Sweden (SE)
- ACREO AB
- Bergsjö Data AB
- Blekinge Institute of Technology – Blekinge Tekniska Högskola
- Blekinge Institute of Technology – School of Health Science
- Bodens kommun – The Municipality of Boden, Sweden
- Carelink
- CareTech AB
- County Council of Uppsala – Landstinget I Uppsala län
- County of Södra Dalarna
- ERICSSON AB
- Gewa AB
- Jönköping University – Högskolan I Jönköping
- KTH – Royal Institute of Technology (Kungliga Tekniska högskolan)
- Landstinget Västmanland (LTV) – Municipal of Västmanland, Sweden
- Linköping University
- Luleå kommun – The City of Lulea
- Lulea University of Technology
- Lund University
- NEAT Electronics AB
- Norrbotten County Council – Norrbottens läns landsting
- Norrbottens Läns Landsting
- PRO – Swedish National Pensioners`Organisation
- STT Condigi AB, Sweden
- Swedish Council for Working Life and Social Research – Forskningsrådet för arbetsliv och socialvetenskap (FAS)
- Swedish Institute of Assistive Technology (Hjälpmedelsinstitutet)
- TeliaSonera Sverige AB, Sweden
- The County Council of Gävleborg
- The Municipality of Hudiksvalls
- The National Association for Disabled Children and Youths (RBU), Sweden
- The Swedish Disability Federation – Handikappförbunden (HSO)
- TietoEnator Abp (Tieto), Sweden
- TietoEnator Corporation
- Umeå (Umea) municipality
- University of Uppsala – Uppsala Universiteit
- Västerbottens läns landsting
- VINNOVA – Swedish Governmental Agency for Innovation Systems
- XLENT technology

United Kingdom (UK)

▶ Accessequality Ltd.
▶ Belfast Health and Social Care Trust
▶ Brighton & Hove City Council
▶ British Telecommunications plc
▶ Brunel University
▶ Cardionetics Ltd.
▶ Chubb Community Care
▶ Derwentside District Council, UK
▶ Docobo
▶ European Framework Programme Consulting Ltd.
▶ Falkirk Council
▶ Glyndwr (Glyndŵr) University
▶ Habinteg Housing Association ltd.(HABINTEG)
▶ iti Techmedia
▶ Kent County Council
▶ King's College London
▶ Lifemax Ltd.
▶ London Borough of Newham
▶ McElwaine Group
▶ Midlothian Council
▶ Motive Technology Group
▶ National Health Services (NHS) Forth Valley
▶ Newcastle University - School of Civil Engineering and Geosciences
▶ NHS Direct- National Health Service
▶ North Lanarkshire Council
▶ OpenHub Ltd.
▶ Oxford Intelligent Machines Ltd.
▶ Rehab Robotics
▶ RNIB Scientific Research Unit
▶ RNID
▶ Scottish Council for Voluntary Organisations (SCVO)
▶ Scottish Enterprise
▶ Scottish Founding Council
▶ Sensorium
▶ Sheffield City Council
▶ Southern Health & Social Services Board
▶ Southern Health and Social Care Trust, UK
▶ Swarmteams, UK
▶ Synkronix Ltd.
▶ The Dementia Services Development Centre - University of Stirling
▶ The University of Edinburgh
▶ The University of Liverpool
▶ The University of Reading
▶ The University of Sheffield
▶ The University of Ulster
▶ Toumaz Technology Limited
▶ Trilateral Research & Consulting
▶ Tunstall Healthcare
▶ Tunstall Healthcare

▶ Tynetec Ltd
▶ University College London (UCL)
▶ University of Dundee
▶ University of Glasgow
▶ University of Hull: Department for Cardiology
▶ University of London
▶ University of Plymouth
▶ University of Southampton
▶ University of Sterling
▶ University of Strathclyde
▶ Virtual Medical World Solutions (VMW Solutions)
▶ West Lothian Council
▶ White Loop

11.2 Overview on Research Projects

The following list comprises all AAL research projects as they can also be found on the data base. The list has been assorted by countries and in an alphabetical order. First the short title is given, followed by long title and internet address.

Austria (AT)

▶ AAL-eHome (Living with supportive intelligence): http://www.ceit.at/333.html, last vist 07/02/2009
▶ AAL-eShoe (Ganganalyse, Sturzerkennung, -warnung, und -prophylaxe): http://www.ceit.at/334.html, last vist 07/02/2009
▶ AUTONOMY (Technical Assistance System): http://www.is.tuwien.ac.at/autonom/index_en.html, last vist 07/02/2009
▶ Monic@re (integriertes Kommunikations - und Informationssystem für Behinderte): http://www.arcsmed.at/EN/index.php?option=com_content&task=view&id=151&Itemid=169, last visit 07/02/2009
▶ RESORT (Remote Service of Rehabilitation Technology): http://www.is.tuwien.ac.at/autonom/download/ViewDet2001.pdf, last visit 07/08/2009

Belgium (BE)

▶ COPLINTHO (Innovative Communication Platform for Interactive eHomeCare): http://www.ibbt.be/en/project/coplintho, last visit 07/08/2009
▶ HIS65+ (Development of a set of health indicators based on the Health Interview Survey 2004 (HIS) for persons aged 65 and over): http://www.agora65plus.be, last visit 07/08/2009
▶ Human++ (realization of miniaturized, intelligent and autonomous wireless sensor nodes for body area networks): www.imec.be/human/, last visit 07/08/2009

▶ Transecare (Transparant ICT platforms for eCare): http://www.ibbt.be/en/project/transecare, last visit 07/08/2009

Bulgaria (BG)
▶ FOSS (Enhancing service delivery, social protection and livelihood support for the poor through ICT): http://www.foss.bg/, last visit 07/08/2009

Cyprus (CY)
▶ DITIS (DITIS: Networked Collaboration supporting Home Healthcare Team): http://www.ditis.ucy.ac.cy/, last visit 07/08/2009

Czech Republic (CZ)
▶ IT for continuous health care (Information technologies for development of continuous shared health care): http://www.euromise.org/research/infospol.html, last visit 07/08/2009

Germany (DE)
▶ AAL Demonstrationswohnung des FTB (Technische Infrastruktur in der Demonstrations- und Versuchswohnung des FTB): http://www.ftb-net.de/smarthome.html, last visit 07/08/2009
▶ Age Explorer: Feeling 70 (Suit to simulate the life of an elderly): http://www.mhmc.de/HTML/das_system.html, last visit 07/08/2009
▶ Assisted Living (Assisted Living and its importance concerning adequate living for elderly): http://www.eit.uni-kl.de/litz/assisted_living/index.htm, last visit 07/08/2009
▶ Diakonisches Altenzentrum Sarepta (Hausgemeinschaft mit intelligenter Technik - Umstrukturierung eines Heims.): http://www.baumodelle-bmfsfj.de/Baumodelle/39_Waltershausen/39_Waltershausen_F.html, last visit 07/08/2009
▶ Fit4Age (Improving the life of elderly – 4 subprojects): www.fitforage.de, last visit 07/08/2009
▶ Generation Research Programme (GRP) (Generation Research Programme): http://www.grp.hwz.uni-muenchen.de/index.html, last visit 07/08/2009
▶ I2Home (I2Home - Intuitive Interaction for Everyone with Home Appliances based on Industry Standards): http://www.i2home.org/Default.aspx, last visit 07/08/2009
▶ ideAAL Showroom (Showroom for integrated development environment for Ambient Assisted Living): http://inter.offis.de/front_content.php?changelang=1, last visit 07/08/2009

▶ InPriMo (Individualisierte Prävention mit mobilen Endgeräten): www.inprimo.org, last visit 07/08/2009
▶ KONMEVIT (Continuous Measuring and Evaluation system for Vital parameters): http://www.mstonline.de/foerderung/projektliste/detail_html?vb_nr=V3PMM010, last visit 07/08/2009
▶ Living Model "The Village" (Wohnmodell 'Das Dorf'. Neue Formen des Wohnens - Praxisorientierte Technik für mehr Lebensqualität im Alter.): http://www.baumodelle-bmfsfj.de/Baumodelle/36_Moenchengladbach/36_Moenchengladbach_S1.html, last visit 07/08/2009
▶ MµGUARD (Micro-Monitoring for a holistic interception of cardiologic high-risk patients with integrated early defibrillation): http://www.fzi.de/competence/hc3/eng/projekte.php?id=288, last visit 07/08/2009
▶ NutriWear (Textilintegriertes, intelligentes System zum Ernährungs- und Wasserhaushaltsmanagement): http://www.mstonline.de/foerderung/projektliste/detail_html?vb_nr=V3TEX010, last visit 07/08/2009
▶ Partnership for the Heart (telemedical applications for elderly): http://www.partnership-for-the-heart.de/, last visit 07/08/2009
▶ Pflege 2020 (future trend-setting strategies and concepts for nursing and care): http://www.pflege2020.de/EN/index.jsp, last visit 07/08/2009
▶ PRECARE (Preventive Identification of Cardiovascular Diseases): http://www.pmm-precare.de, last visit 07/08/2009
▶ Senior Life & Care (new technology and application solutions in residential and commercial properties): http://www.inhaus-zentrum.de/site_en/index.php, last visit 07/08/2009
▶ sentha (technology to help older people maintain an independent household): http://www.sentha.tu-berlin.de/index_e.html, last visit 07/08/2009
▶ SerCHo (Service Centric Home): http://130.149.154.94/index.php?id=12, last visit 07/08/2009
▶ Silberdienste (A Project for the building up of district-oriented services for the elderly in North Rhine-Westphalia): http://www.silberdienste.de/xd/public/content/index.html?pid=37, last visit 07/08/2009
▶ SmarterWohnen (SmarterWohnen North Rhine-Westphalia): http://www.smarterwohnen.net/deutsch/startseite/index.html, last visit 07/08/2009
▶ ZiWiB - Zukunftsinitiative Wohnen im Bestand (Initiative for the future living of elderly people): http://www.ziwib.de/index.html, last visit 07/08/2009

Denmark (DK)
▶ R-Bay (establishing an online eMarketplace within the field of radiology): www.r-bay.org, last visit 07/08/2009

Greece (EL)

▶ The Rise Project (Telematics for the Disabled & Elderly): http://www.atkosoft.com/Projects/rise, last visit 07/08/2009

Estonia (EE)

▶ Electronic Health Record Project (Electronic Health Record Project of Estonia. Nation-wide Integrated eHealth Services): http://www.riigikantselei.ee/3qc/docs/ehealth/E_tervishoid_J_Parre_020904.ppt, last visit 07/08/2009

Spain (ES)

▶ Aid-Vida (a new generation of tele-assistance systems to provide the elderly and handicapped at home): http://www.tsb.upv.es/soluciones/resultados/svi/aidvida/Default.aspx, last visit 07/08/2009

▶ ALIADO (Alzheimer Intelligent Ambient Domotic system): http://bisite.usal.es/index.php?option=com_content&task=view&id=134&Itemid=131&lang=en, last visit 07/08/2009

▶ e-SENIOR (ICT applications to develop entertainment activities to improve the quality of life of the eldery): http://www.brainstorm.es/pages/e-senior.php, last visit 07/08/2009

▶ FIK Research (a private scientific-technological research initiative aimed at ageing and disability): http://www.fikresearch.com/index_archivos/FIK_eng.htm a private scientific-technological research initiative aimed at ageing and disability, last visit 07/08/2009

▶ INGERAS e-SENIOR (Solutions for the safety of elderly persons in their everyday-activities): http://www.ingema.es/ingles/interior/proyectos/index.php?seccion=proyectos&subseccion=proyectos&finalizado=no&id=69, last visit 07/08/2009

▶ ROBOKIDE (Assistive robot for elderly people living alone): http://www.ingema.es/ingles/interior/proyectos/index.php?seccion=proyectos&subseccion=proyectos&finalizado=si&id=56, last visit 07/08/2009

▶ SASTEC (technology-based assisting system to improve the autonomy of elderly people with cognitive disfuntions): http://www.vicomtech.es/castellano/html/noticias_anteriores/, last visit 07/08/2009

▶ SIG-RESIDENT (The development of a system to assist the integral management of homes for elderly people in dependent situations): http://www.ingema.es/ingles/interior/proyectos/index.php?seccion=proyectos&subseccion=proyectos&finalizado=si&id=61, last visit 07/08/2009

European projects (EU)

▶ AALIANCE (The European Ambient Assisted Living Innovation Alliance): http://www.aaliance.eu/public/, last visit 07/08/2009

▶ ACROBOTER (Autonomous collaborative robots to swing and work in everyday environment): http://www.acroboter-project.org/, last visit 07/08/2009

▶ ALADIN (Ambient Lighting Assistance for an Ageing Population (ALADIN)): http://www.ambient-lighting.eu/10-0-aims.html, last visit 07/08/2009

▶ AMIE (Ambient Intelligence for the Elderly): http://www.amieproject.com/, last visit 07/08/2009

▶ ASK-IT (Ambient Intelligence System of Agents for Knowledge based and Integrated Services for Mobility Impaired Users): http://www.ask-it.org/, last visit 07/08/2009

▶ Attentianet (Advanced TeleassisTance convErgent NeTwork for chronIc diseAse patieNts and Elders projecT): http://www.attentianet.eu/index.html, last visit 07/08/2009

▶ Avert-IT (Advanced Arterial Hypotension Adverse Event prediction through a Novel Bayesian Neural Network): http://labserv.nesc.gla.ac.uk/projects/avert-it/index.html, last visit 07/08/2009

▶ Baltic eHealth (Baltic eHealth): www.baltic-ehealth.org, last visit 07/08/2009

▶ Better Breathing (a new model for continuous care of chronic patients): http://www.betterbreathing.org/home.html, last visit 07/08/2009

▶ CAALYX (Complete Ambient Assisting Living EXperiment): http://caalyx.eu/index.php?option=com_content&task=view&id=1&Itemid=2, last visit 07/08/2009

▶ COGKNOW (Helping people with mild dementia to navigate through their day): http://www.cogknow.eu, last visit 07/08/2009

▶ CommRob (Advanced Robot behaviour and high-level multimodal communication): http://commrob.zenon.gr/UserPages/Home.aspx, last visit 07/08/2009

▶ COMPANIONABLE (Integrated cognitive assistive and domotic companion robotic systems for ability and security): http://www.companionable.net/, last visit 07/08/2009

▶ CONFIDENCE (Ubiquitous care system to support independent living): http://www.confidence-eu.org/, last visit 07/08/2009

▶ DIADEM (Delivering Inclusive Access for Disabled or Elderly Members of the community): http://www.project-diadem.eu, last visit 07/08/2009

▶ eAbilities (A virtual platform to enhance and organise the coordination among centres for accessibility resources and support): http://www.ftb-net.de/eabilities2.html, last visit 07/08/2009

- EASY LINE+ (Low cost advanced white goods for a longer independent life of elderly people (EASY LINE+)): http://www.arenque-ks.com/easynet/, last visit 07/08/2009
- eHealth Living Lab (real environments to test ICT's in Health): http://www.cdt.ltu.se/main.php/ENoLL2_Leaflet_Spain_eHealth-Granada.pdf?fileitem=1511434, last visit 07/08/2009
- eInclusion@EU (Strengthening eInclusion & eAccessibility across Europe): http://www.einclusion-eu.org/default.asp?MenuID=8, last visit 07/08/2009
- ElderGames (research on the effects of play in old age): http://www.eldergames.org, last visit 07/08/2009
- EMERGE (Emergency Monitoring and Prevention (EMERGE)): http://www.emerge-project.eu/index.htm, last visit 07/08/2009
- ENABLE (A wearable system supporting services to enable elderly people to live well, independently and at ease): http://www.ist-world.org/ProjectDetails.aspx?ProjectId=a51f55ddaa4841be9998cef5e12b2133&SourceDatabaseId=7cff9226e582440894200b751bab883f, last visit 07/08/2009
- EPAL (Extending professional active life): http://www.uninova.pt/~epal/, last visit 07/08/2009
- EPIST (Enhanced Participation in IST projects related to eHealth and eInclusion): www.epist.org, last visit 07/08/2009
- ERA-AGE (European Research Area in Ageing): http://era-age.group.shef.ac.uk/, last visit 07/08/2009
- eUSER (Evidence-based support for the design and delivery of user-centred online public services): http://www.euser-eu.org/Default.asp?MenuID=8 , last visit 07/08/2009
- H@H (Hearing at Home): http://www.hearing-at-home.eu/, last visit 07/08/2009
- HEALTH OPTIMUM (Telemedicine project promoting the constitution of telematic and transeuropean networks): www.healthoptimum.info, last visit 07/08/2009
- HEARCOM (Hearing in the communication society): www.hearcom.eu, last visit 07/08/2009
- HeartCycle (closed-loop disease management solution to serve Heart Failure and Chronic Heart Disease patients): http://heartcycle.med.auth.gr/, last visit 07/08/2009
- HEBE (Mobile monitoring and automatic fall detection device for elderly people living alone.): http://www.zenon.gr/zenon/english/r_and_d/full_story_html?dr_subsection=systemSectionRandD_Informatics_R_and_D&dr_type=systemType_R_and_D&dr_url=/docs/R_and_D/Informatics/HEBE&dr_subsection2=systemSectionInformaticsRandD_Recent, last visit 07/08/2009
- Hermes (Cognitive Care and Guidance for Active Ageing): http://www.ait.gr/news/news_data.asp?news_id=254 last visit 07/08/2009

- ICT4T (ICT Training for Trainers - Meeting Senior Learner Needs): http://www.ict4t.net/?q=node/13, last visit 07/08/2009
- INHOME (An Intelligent Interactive Services Environment for Assisted Living at home (INHOME)): http://www.ist-inhome.eu/, last visit 07/08/2009
- IntelliDrug (Intelligent intraoral medicine deliver micro-system to treat addiction and chronic diseases): http://www.intellidrug.org/about_us, last visit 07/08/2009
- LivingAll (Free Movement and Equal Opportunitites for All): http://www.livingall.eu/index.php, last visit 07/08/2009
- MOBILE (Intelligent Mobility and Transportation Aid): http://prt.fernuni-hagen.de/pro/mobil/main.html, last visit 07/08/2009
- MOBINET (Mobile Robotics Technology for Health Care Services Research Network): http://www.ftb-net.de/mobinet.html, last visit 07/08/2009
- MonAMI (Mainstreaming on Ambient Intelligence): http://www.hi.se/templates/Page____2710.aspx, last visit 07/08/2009
- MPOWER (Middleware platform for empowering cognitive disabled and elderly): http://www.sintef.no/content/page12____13218.aspx, last visit 07/08/2009
- MyHealth@Age (Improved Health, Safety and Well being for Elderly people): http://www.myhealth-age.eu/, last visit 07/08/2009
- MyHeart (Intelligent Biomedical Clothes for monitoring, diagnosing and treatment): http://www.hitech-projects.com/euprojects/myheart/home.html, last visit 07/08/2009
- NETCARITY (Ambient technology to support older people at home.): http://www.netcarity.org, last visit 07/08/2009
- OLDES (development of a very low cost and easy to use entertainment and health care platform): http://www.oldes.eu/, last visit 07/08/2009
- PERSONA (Perceptive spaces promoting independent aging): http://www.aal-persona.org/index.html, last visit 07/08/2009
- SAPHIRE (Intelligent Healthcare Monitoring based on Semantic Interoperability Platform): http://www.srdc.metu.edu.tr/webpage/projects/saphire/, last visit 07/08/2009
- SEN@ER (Silver Economy Network of European Regions): http://www.silvereconomy-europe.org/index.htm, last visit 07/08/2009
- SENIOR (The Social Ethical and Privacy Needs in ICT for Older People: A Dialogue for Roadmap): http://www.seniorproject.eu/, last visit 07/08/2009
- Seniorwatch (European Senior Watch Observatory and Inventory - A market study about the specific IST needs of older and disabled people to guide industry, RTD and policy.): http://www.seniorwatch.de/index.html, last visit 07/08/2009

▶ SENSACTION-AAL (SENsing and ACTION to support mobility in ambient assisted living): http://www.sensaction-aal.eu/, last visit 07/08/2009

▶ SHARE (Survey of Health, Ageing and Retirement in Europe): http://www.share-project.org/, last visit 07/08/2009

▶ SHARE-IT (Supported human autonomy for recovery and enhancement of cognitive and motor abilities using information technologies): http://www.etools4all.org/index.php?location=1&menu=1, last visit 07/08/2009

▶ SMILING (Self Mobility Improvement in the elderly by counteracting falls): http://www.smilingproject.eu/project.html, last visit 07/08/2009

▶ SOPRANO (Service oriented programmable smart environments for older Europeans): http://www.soprano-ip.org/, last visit 07/08/2009

▶ SPE (Services and Prevention for the Elderly): http://www.speproject.net/spe/, last visit 07/08/2009

▶ Tele Medicine project (Tele Medicine and the consequences for urban planning and development): http://www.telemedicine-europe.net/index.php?id=1, last visit 07/08/2009

▶ Vital (Vital Assistance for the Elderly): http://www.eptron.es/projects/vital/description.html, last visit 07/08/2009

▶ VM Vital Mind (research and development of highly cognitive brain fitness content): http://www.vitalmind-project.eu/, last visit 07/08/2009

▶ WAI-AGE (Web Accessibility Initiative: Ageing Education and Harmonisation): http://www.w3.org/WAI/WAI-AGE/, last visit 07/08/2009

▶ wel_hops (Welfare Housing Policies for Senior Citizens): http://www.welhops.net/index.asp, last visit 07/08/2009

Finland (FI)

▶ Caring TV (television as a user interface to improve the quality of life of elderly people): http://www.wlc.fi/ikaantyvat_hanke_eng.htm, last visit 07/08/2009

▶ Coping at Home (studies on the coping of elderly people at home in order to develop new media): http://www.wlc.fi/ikaantyvat_hanke_eng.htm, last visit 07/08/2009

▶ EEVA (Preventive Services for the Elderly): http://english.espoo.fi/default.asp?path=32373;37337;45340;36841;36852;56255, last visit 07/08/2009

▶ FinnSight 2015 (The individuals' overall well-being and health): http://projects.tekes.fi/opencms/opencms/Projects/FinnSight_2015_en/panel3.html, last visit 07/08/2009

▶ Health Care and Wellness Management System (Low cost disposable sensor platform for home diagnostics and health care and wellness management system): http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/en/system/projekti.html?id=8452633&nav=Project, last visit 07/08/2009

▶ Helsinki Living Lab (Helsinki Living Lab): http://www.helsinkilivinglab.fi/node/152, last visit 07/08/2009

▶ HYVITE (User-Centred Wellbeing Technology Programme): http://www.hyvite.fi/webhyvite/hyvite.nsf/, last visit 07/08/2009

▶ Independent network support for the elderly, distance services: http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/en/system/projekti.html?id=8786572&nav=Project, last visit 07/08/2009

▶ Metpro-project (Metpro-project): http://www.wlc.fi/ikaantyvat_hanke_eng.htm, last visit 07/08/2009

▶ Own patient (Own patient): http://www.wlc.fi/ikaantyvat_hanke_eng.htm, last visit 07/08/2009

▶ Rehabilitation at home in a mobile environment (Rehabilitation at home in a mobile environment): http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/FinnWell/en/system/projekti.html?id=8461337&nav=Project, last visit 07/08/2009

France (FR)

▶ Enable Wireless Safety Monitoring of Elderly (Enable Wireless Safety Monitoring of Elderly): http://edageek.com/2007/05/02/zigbee-eldercare/, last visit 07/08/2009

▶ GERHOME Project (Digital services enhancing independence of the elderly at home): http://gerhome.cstb.fr/index.php?id=45&L=1, last visit 07/08/2009

▶ PROSAFE (Supportive surveillance system for elderly people): http://www.laas.fr/PROSAFE/index.htm, last visit 07/08/2009

▶ T@PA (Tele-Assistance for the elderly): http://departements.telecom-bretagne.eu/info/recherche/sid/tapa.php, last visit 07/08/2009

Hungary (HU)

▶ A mobile AAL solution (An Ambient Assisted Living Lifestyle and Health Management System): http://www.cs.bme.hu/~dhanak/iadis_wac.pdf, last visit 07/08/2009

▶ BelAmI (BelAmI project): http://www.belami-project.org/, last visit 07/08/2009

▶ Silvergate-112 (Assistive Medical and Social Monitoring and Alarm System): http://emt.bme.hu/sgate-en/silvergate-112-project/, last visit 07/08/2009

Ireland (IE)

▶ Nestling Technology Initiative (development of a Centre of Excellence for the promotion of community-orientated models for independent living and 'ageing in place'): http://www.cardi.ie/node/3023, last visit 07/08/2009

▶ Trilcentre (collection of research projects addressing the physical, cognitive and social consequences of ageing): http://www.trilcentre.org, last visit 07/08/2009

Italy (IT)

▶ ELDY (Bringing the computer to the elderly): http://eldy.eu/, last visit 07/09/2009

▶ Home control and remote monitoring (Home control and remote monitoring): http://ee.unipr.it/ciampolini/TauLab-1.pdf, last visit 07/09/2009

▶ The Living Space (A Town-Scale Smart Environment for Research on Ambient Assisted Living Technologies): http://www.create-net.org/mise/living-space.htm, last visit 07/09/2009

Luxembourg (LU)

▶ TIVIPOL (Technologies de l'Information pour accompagner le Vieillissement de la Population Luxembourgeoise (TIVIPOL)): http://wwwen.uni.lu/research/flshase/inside/members/dieter_ferring/current_research_projects/tivipol, last visit 07/09/2009

Malta (MT)

▶ myWeb Plus (ICT Training for the Eldery): https://mitc.gov.mt/page.aspx?pageid=294, last visit 07/09/2009

The Netherlands (NL)

▶ In-HAM (Innovationcenter in Housing for Adapted Movement): http://www.in-ham.be, last visit 07/09/2009

▶ Tele Medicine and the consequences for urban planning: http://www.telemedicine-europe.net/, last visit 07/09/2009

▶ UAS (Unattended Autonomous Surveillance): http://inmove.erve.vtt.fi/ist2003/TNO-presentation.pdf, last visit 07/09/2009

▶ VieDome (TV applications and conctens for elderly people): http://www.viedome.nl/

▶ Vision on IT (Vision on IT: participation in society by using ICT (IT in Zicht: maatschappelijke participatie door ICT)): http://www.onderzoekinformatie.nl/nl/oi/biza/d16000o/OND1326438, last visit 07/09/2009

Poland (PL)

▶ TeleInterMed (TeleInterMed): http://www.teleintermed.pl, last visit 07/09/2009

Portugal (PT)

▶ MIAU (Mobile Internet Access Unit): http://www.epractice.eu/en/cases/mobileinternetaccess, last visit 07/09/2009

Slovenia (SI)

▶ IRIS Smart Home (Independent Residing enabled by Intelligent Solutions): http://www.ir-rs.si/filelib/dom-iris/english/dom-iris-eng.htm, last visit 07/09/2009

Sweden (SE)

▶ Lifeline programme (Lifeline community social and primary health care programme): http://www.mks.si/eng/about.htm, last visit 07/09/2009

▶ Design for Wellbeing (Design for Wellbeing - innovation meets people): http://www.designforwellbeing.org/, last visit 07/09/2009

▶ OLD@HOME (Technical Support for Mobile Close Care): http://www.vinnova.se/upload/EPiStorePDF/vr-05-14.pdf, last visit 07/09/2009

United Kingdom (UK)

▶ MATCH (Mobilising Advanced Technologies for Care at Home): http://www.match-project.org.uk/main/main.html, last visit 07/09/2009

▶ TRAIL Laboratory (Technologies for Rurality, Ageing and Independent Living): http://trail.ulster.ac.uk/, last visit 07/09/2009

11.3   Overview on AAL-specific Products

The following list comprises all AAL products as they can also be found on the data base. The list has been assorted by countries and in an alphabetical order. The first line gives the product title; the second line names the providing organisation.

Austria (AT)

▶ Compact +, a mobile reading device, TSB, (Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)) http://www.transdanubia.at/index.php?action=viewProduct&productClass=31, last visit 07/02/2009

▶ Demenzpräventions-Plattform - Platform for the Prevention of Dementia, (Plejaden Communications Gmbh & Co.KG) http://games.plejaden.net/templates/de/lazarus.html, last visit 07/02/2009

▶ Der Tölzer Würfel/Toelzer Dice, (Generation Research Programme der Ludwig-Maximilians-Universität München)

http://www.plejaden.net/neu/pflegende_angehoerige/index. shtml, last visit 07/02/2009

► emporiaLIFE Mobile Telephone, (Emporia Telecom Produktions- und Vertriebs GesmbH & Co KG) http://www2. emporia.at/en/products/emporialife/?resource_0=[id=1], last visit 07/02/2009

► Key board with big keys, TSB, (Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)) http://www. transdanubia.at/index.php?action=viewProduct&productClass =33, last visit 07/02/2009

► knfb Reader - Reader software for visually impaired, TSB (Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)) http://www.transdanubia.at/index.php?a=0, last visit 07/02/2009

► KogCheck, (Austrian Research Centers GmbH - ARC) http:// www.arcsmed.at/EN/index.php?option=com_content&task=v iew&id=47&Itemid=192, last visit 07/02/2009

► Looky - a mobile electronic magnifier, TSB (Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)) http://www.transdanubia.at/index.php?action=viewProduct& productClass=31, last visit 07/02/2009

► MEMOBOX, (Plejaden Communications Gmbh & Co.KG) http://www.plejaden.net/neu/geistige_fitness/index.shtml, last visit 07/02/2009

► Personal Alarm, (Eurospiel: Seniorenshop für aktive Senioren, CO-MA Einrichtungs- und Verkaufsges.m.b.H., Austria) http://www.eurospiel.at/index.php?do=angebote, last visit 07/02/2009

► Pill box with alarm function, Eurospiel, (Eurospiel: Seniorenshop für aktive Senioren, CO-MA Einrichtungs- und Verkaufsges.m.b.H., Austria) http://www.eurospiel.at/index. php?do=angebote, last visit 07/02/2009

► Strix: a mobile electronic reading device, (Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)) http://www.transdanubia.at/index.php?action=viewProduct& productClass=31, last visit 07/02/2009

► Talking alarm clock, (Eurospiel: Seniorenshop für aktive Senioren, CO-MA Einrichtungs- und Verkaufsges.m.b.H., Austria) http://www.eurospiel.at/index.php?do=angebote, last visit 07/02/2009

► Various reading devices, TSB, (Transdanubia Nikolai G.m.b.H, Technik für Sehbehinderte und Blinde (TSB)) http://www. transdanubia.at/index.php?action=viewProduct&productClass =30, last visit 07/02/2009

► Videofon, Austria, (Volkshilfe Steiermark - gemeinnützige Betriebs GmbH, Austria) http://videofon.at/, last visit 07/02/2009

► Zydracon: BETAVISTA Videocare, (Zydracon) http://www. zydacron.com/index.php?id=267&L=0, last visit 07/02/2009

Belgium (BE)

► AXIO i-Tec Nurse Call System, (Televic) http://www.televic. com/html_BE/?item=145, last visit 07/02/2009

► CAREPHONE - wireless call and telephone dialer, (Televic) http://www.televic.com/html_BE/?item=328, last visit 07/02/2009

► knfbREADER & kREADER, (Sensotech N.V., Belgium) http:// www.sensotec.be/knfbReader/default.aspx, last visit 07/02/2009

► MindFit, Belgium, (Mindfit, Belgium) http://www.mindfit.be/, last visit 07/02/2009

► Multimedia Patient Terminal, (Televic) http://www.televic. com/html_BE/?item=326, last visit 07/02/2009

► Televic - Systems for dementia sufferers, (Televic) http://www. televic.com/html_BE/?item=265, last visit 07/02/2009

► Wireless Nurse Call System 'GEMINI', (Televic) http://www. televic.com/html_BE/?item=155, last visit 07/02/2009

Cyprus (CY)

► PowerMax, (Cypcana Alarms Ltd.) http://www.cypcana.com/ powermax.html, last visit 07/02/2009

Czech Republic (CZ)

► Areion - Emergency messenger, (Zivot 90) http://www. zivot90.cz/enindex.html, last visit 07/02/2009

Germany (DE)

► ActiSen, (PASIFE GmbH) http://www.pasife.de/, last visit 07/02/2009

► BUTLER, (FONIUM Deutschland GmbH) http://www.derbutler. com/, last visit 07/02/2009

► CardioMem CM 3000 - Digital Recorder, (Getemed) http:// www.getemed.net/index.php?mid=125&vid=&lang=en, last visit 07/02/2009

► Carina Home (Home Care), (Drägerwerk AG) http://www. draeger.com/MTms/internet/site/MS/internet/UK/ms/ prodserv/products/ventilation/hc/carina_home/pd_carina_ home.jsp, last visit 07/02/2009

► Dusch-WCs (Balena8000), (Geberit Vertriebs GmbH) http:// www.balena.de/geberit/inet/de/wcmsbalenade.nsf/pages/ dwc-8000-1, last visit 07/02/2009

► EvoCare, (Dr. Hein GmbH) http://www.dr-hein.com/index.php ?sec=49&sub=174&LangContent=2, last visit 07/02/2009

► GT-PC3 Large Button PC Keyboard, (Rehavista) http://www. igel.rehavista.de/gtpc3.html, last visit 07/02/2009

► Hausnotruf- und Kommunikationssystem S.A.M., (Vitaris GmbH) http://www.vitaris-gmbh.de/main.aspx?PageID=41, last visit 07/02/2009

- Homebox, (Aipermon GmbH & Co. KG) http://www.aipermon. de/eng/produkte_home_e.html, last visit 07/02/2009
- HomeFree für Pflegeheime, (Secal Sicherheitstechnik GmbH) http://www.secal-sitech.de/deutsch/Produkte/Alzheimer/ hf-klinik/body_hf-klinik.html, last visit 07/02/2009
- HomeMatic - the technology for your intelligent home, (HomeMatic) http://www.homematic.com, last visit 07/02/2009
- HOME-Screen, (HOME-Systems Gebäudesteuerung und Informationstechnik) http://www.home-systems.de/, last visit 07/02/2009
- ICW Professional Suite, (InterComponentWare AG) http:// www.icw-global.com/global/en/solutions-products.html, last visit 07/02/2009
- Mobile Medical Assistant, (Aipermon GmbH & Co. KG) http:// www.aipermon.de/eng/produkte_mobile_e.html, last visit 07/02/2009
- SENIOR PILOT, (Dr. Hein GmbH) http://www.sicare.de/, last visit 07/02/2009
- Seniorenhandy BodyPhone, (Corscience GmbH & Co) http:// www.senioren-handy.info/seniorenhandy/anbieter/corscience/ corscience.html, last visit 07/02/2009
- Serwo, (serwo GmbH & Co. KG i.Gr.) http://www.serwo.eu, last visit 07/02/2009
- SICARE LIGHT, (Dr. Hein GmbH) http://www. proinssa.com/frames_seccion/00_index_seccion. html?num=05&nom=domotica, last visit 07/02/2009
- Silver Interactive Life, (Meditrainment GmbH) www. meditrainment.com/index.php?id=32, last visit 07/02/2009
- SimpLiCo, (Siemens AG) www.fujitsu-siemens.de, last visit 07/02/2009
- The Large Button Keyboard, (GFaI - Gesellschaft zur Förderung angewandter Informatik e.V.) http://www.gfai.de/ projekte/ctrsa/flyer_en.pdf, last visit 07/02/2009
- VitaGuard VG 2100 - The Heart Rate and Apnea Monitor, (Getemed) http://www.getemed.net/index. php?mid=129&vid=&lang=de, last visit 07/02/2009
- VitaGuard VG 310 - The Pulse Oximeter, (Getemed) http:// www.getemed.net/index.php?docid=415&vid=&lang=en, last visit 07/02/2009
- VitaGuard VG 3100 - Heart, Apnea and SpO2 Monitor, (Getemed) http://www.getemed.net/index. php?mid=117&vid=&lang=de, last visit 07/02/2009
- Vitaphone 1100, (Vitaphone GmbH) http://www.vitaphone. de/medizinisches_service-center.html?&L=1, last visit 07/02/2009
- Vitaphone 1300, (Vitaphone GmbH) http://www.vitaphone. de/medizinisches_service-center.html?&L=1, last visit 07/02/2009
- Vitaphone Tele-Care-Monitor 3370, (Vitaphone GmbH) http://www.vitaphone.de/en/cardiac-arrhythmias/, last visit 07/02/2009

- Vitaphone Tele-ECG-Card 100 IR, (Vitaphone GmbH) http:// www.vitaphone.de/en/cardiac-arrhythmias/, last visit 07/02/2009
- Vitaphone Tele-ECG-Loop-Recorder 3100 BT, (Vitaphone GmbH) http://www.vitaphone.de/en/cardiac-arrhythmias/, last visit 07/02/2009

Denmark (DK)
- C-Cap – a device reminding patients to take their medication, (INDEX:) http://www.indexaward.dk/, last visit 07/02/2009
- Diabet-Cool – storage device to keep insulin cold, (INDEX:) http://www.indexaward.dk/, last visit 07/02/2009
- Lanzer - Elderly Care, Denmark, (Lanzer of Denmark) http:// www.lanzer.dk/index.php?id=20, last visit 07/02/2009
- Oticon Delta – a gadget-like hearing device with superior performance, (INDEX:) http://www.indexaward.dk, last visit 07/02/2009
- PERSONAL ALARM TRANSMITTER, (INDEX:) http://www. indexaward.dk, last visit 07/02/2009
- RTX Telehealth Monitor, (RTX - Wireless Technology, Denmark) http://www.rtx.dk/, last visit 07/02/2009
- SAM (Sound Activity Meter) – a hearing aid acclimatizing to the user's audio environment, (INDEX:) http://www. indexaward.dk, last visit 07/02/2009
- Uturn – a mobile bladder monitor for patients with incontinence, (INDEX:) http://www.indexaward.dk/, last visit 07/02/2009

Greece (EL)
- OTE - Special handsets and line for the hearing impaired, Greece, (Hellenic Telecoms S.A. - OTE A.E., Greece) http:// www.ote.gr/, last visit 07/02/2009
- OTE alert, Greece, (Hellenic Telecoms S.A. - OTE A.E., Greece) http://www.ote.gr/, last visit 07/02/2009

Spain (ES)
- Apparatus for auto-alimentation, (mediatric) http://www. mediatric.com, last visit 07/02/2009
- Arifarm: Radarform SOS, (Laboratorios Arifarm) http://www. arifarm.com/radarfarm/index.php, last visit 07/02/2009
- Avant 4100 Pulsoxímetro Bluetooth - Pulse oxymetry device with bluetooth connection, Corscience Spain, (Corscience, Spain - corscience España) http://www.corscience.es/ productos.html, last visit 07/02/2009
- Bluetooth Báscula - Automatic scales with bluetooth connection, Corscience Spain, (Corscience, Spain - corscience España) http://www.corscience.es/productos.html, last visit 07/02/2009

▶ CorBELT, Corscience Spain, (Corscience, Spain - corscience España) http://www.corscience.es/productos.html, last visit 07/02/2009

▶ maior vocce - maior domo PRO fagor, (FAGOR Electrodomésticos, S. Coop.) http://www.fagor.com/domotica/_bin/cast/maiorvoicce.php, last visit 07/02/2009

▶ MAPFRE: Teleasistencia, (MAPFRE QUAVITAE, S.A., Spain) http://www.mapfrequavitae.com/tad.html, last visit 07/02/2009

▶ PASTILLERO CON UNA ALARMA - medical dosage device with alarm, (La Pastilla Soluciones Integrales s.l., Spain) http://www.lapastilla.com/Alarmas.htm, last visit 07/02/2009

▶ PCI>Aryon, (PCI Seguridad y Tecnología, Spain) http://www.pciseguridad.es/PCIaryon/aryon.html, last visit 07/02/2009

▶ Sergesa: Terminal de Teleasistencia, (Grupo Sergesa, SA, Spain) http://www.sergesa.com/, last visit 07/02/2009

▶ Sergesa: Unidad de control remoto, (Grupo Sergesa, SA, Spain) http://www.sergesa.com/, last visit 07/02/2009

▶ Special Telephones, (SeguridadPlus) http://www.seguridadplus.com/tercera_edad_218_0.htm, last visit 07/02/2009

▶ Terminal de Sobremesa BA2100, (SABIA Bioingeniería Aragonesa S.L.) http://www.bioingenieria.es/Documentos/Ficha%20Tecnico%20Comercial%20BA2100.pdf, last visit 07/02/2009

▶ TSB SpheraCare, (Tecnologías para la Salud y el Bienestar (TSB)) http://www.tsbsoluciones.es/productos/pro5.php?desplegado=2_5, last visit 07/02/2009

▶ Unidades de control remoto BA20 y BA22, (SABIA Bioingeniería Aragonesa S.L.) http://www.bioingenieria.es/Documentos/Ficha_Comercial_%20BA20_BA22.pdf, last visit 07/02/2009

Finland (FI)

▶ Elsi ElderlyCare, (Elsi Technologies) http://www.elsitechnologies.com/?page=elderlycare&lang=en, last visit 07/02/2009

▶ Elsi HomeCare, (Elsi Technologies) http://www.elsitechnologies.com/, last visit 07/02/2009

▶ Goodit CRF Diabetes & MBO Care, (Goodit m-health Ltd.) http://goodit.jalusta.com/en/productsservices/gooditcrfdiabetesmbo, last visit 07/02/2009

▶ Goodit Home Hospital Monitoring, (Goodit m-health Ltd.) http://goodit.jalusta.com/en/productsservices/goodithomehospitalmo, last visit 07/02/2009

▶ MUKANA - computerized clothing for the visually impaired (Finland), (INDEX:) http://www.indexaward.dk/, last visit 07/02/2009

▶ Newtest Bone Exercise Monitor, (Newtest Oy) http://www.newtest.com/bonehealth/

▶ Vivago Care watch, (Vivago) http://www.istsec.fi/en.php, last visit 07/02/2009

France (FR)

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