EASYREACH is a Project of the
AAL Program (Call 2009-2)

FOSTERING SOCIAL INTERACTION OF HOME-BOUND AND
LESS EDUCATED ELDERLY PEOPLE

# EasyReach International Workshop

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| Deliverable No. | | **D7.3** | |
| Work Package No. | **WP7** | Workpackage Title | **Dissemination and exploitation** |
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| Status (F: final; D: draft; RD: revised draft): | | **F** | |
| File Name: | | **EASYREACH Deliverable D7.3 vers 1.doc** | |
| Project start date and duration | | **01 November 2010, 35 Months** | |

# Contents

# INTRODUCTION

The EASYREACH Consortium decided to held its 1st International Workshop in parallel with the most important event in the Assistive Technology sector, i.e. the AAL Forum that in 2012 was organized in Eindhoven (September 2012).

It gave the opportunity of enriching the workshop with a significant participation of EasyReach and its Partners to the Scientific Program of the Forum and with demos of the EasyReach solutions given in a large booth of the Exhibition Area of the event.

This deliverable is split into three chapters:

- The Chapter 1 reports on the EasyReach demos and on the feedbacks received by the visitors;
- The Chapter 2 give a summary of the special session organized by EasyReach (title: "Designing for older adults – Lessons learnt and recommendations from past experiences") in cooperation with the NETCARITY project and report on the presentations given there;
- Finally in the third chapter we summarize the presence of the EasyReach Partners in the other sessions of the Scientific Program of the AAL Forum including 4 papers.

The full text of two of these papers are reported in the Annex 1 of this deliverable.

# 1. The 2012 AAL Forum

The 4th edition of the Ambient Assisted Living annual event, the AAL Forum, was held on September 24-26, 2012.


Eindhoven – where the event was held - is called the "research capital of The Netherlands" and is a "real hot spot for technology and design". Also the location, the Evoluon, was appropriate; it was built by Philips as a permanent exhibition space for the general public to allow the visitors to learn more about science and technology and "for everyone to get inspired".

During its four days the AAL Forum attracted hundreds of visitors coming from all the parts of Europe (and not only) and interested to hear about the latest developments in the technology for supporting health and social care; the event stimulated networking and community building and allowed to establish first contacts with investors and links with relevant EU programs.

It included a Scientific Program with several sessions devoted not only to the technology but also to the business-related aspect of the ICT for Ageing Well sector, an Exhibition, some focused Workshops and the AAL Forum Award 2012.

This year's AAL Forum was enriched by the participation in the various sessions of almost 200 final users i.e. the older adults; they met the researchers, gave them useful feedbacks and share their feeling about the various topics related to ICT & Ageing.

The title of this year event *("Tomorrow in sight: from design to delivery")* highlights the special attention given to bring the new research developments to real business and to make available the developed solutions to the senior citizens.

"We like the AAL Community in Europe to bring and get the five I's: Information, Inspiration, Imagination, Interaction and Innovation", Ad van Berlo, chairman of the AAL Forum 2012, said.

The *EasyReach* project had an extensive presence at the AAL Forum 2012:

- a *EasyReach* booth was built in the Ring 2 of the Exhibition Area,
- *EasyReach* Partners gave their presentations in various sessions and

- a special Workshop was organized on Monday September 24 jointly with the NetCarity project.

## 1.1 AN INNOVATIVE SOLUTION DEMONSTRATED IN THE *EASYREACH* BOOTH

In its booth in the 2nd Ring of the Evoluon, the *EasyReach* Partners presented the project and gave demos of its integrated solution designed to provide a comfortable experience of *on line* social networking through the use of familiar devices such as a TV set, a set top box and an intuitive and friendly remote control.
The visitors had the opportunity to familiarize with the *EasyReach* remote control and to enjoy the *EasyReach* applications.

The *EasyReach* booth was visited not only by experts and researchers but also by the real users, the elderly persons and around 50 demos were given during the two days of exposition (Tuesday 25 and Wednesday 26).

"We reported very positive feedbacks – said Giannis Giakas of CERETETH in Greece, a Partner of the *EasyReach* Consortium – and very useful suggestions. For all the older adults visiting the booth, EasyReach represents a "new and smart approach" for promoting the use of Internet by the people with a poor familiarity with technology".

While there is little in the area of socialization applications for unskilled elderly people, Internet offers many applications geared towards older people. The problem with all these applications and with any future internet application is that they rely on a basic core of knowledge and skills that is not widespread in the community of less educated elderly people (i.e. the "pre digital-divide population").
*EasyReach* progresses beyond the state-of-the-art because it brings the power of network-based socialization to the level of a very simple appliance like the TV.
As indicated by Matteo Dominoni of the University of Milano Bicocca, Coordinator of the Project, *"EasyReach* brings an advancement of knowledge in three areas: breaking the remote control usability barrier by going beyond on/off, changing channels and volume controls, devising new ICT social interaction models and investigating automatic ways of supporting user interaction".

**The *EasyReach* Remote control, a fascinating device to interface with the system**

The remote control designed in *EasyReach* is similar to a TV remote control unit but it has just few buttons; furthermore it is capable of recognizing user's gestures, can be pointed to objects and activate its camera to take a picture or to capture a short live video.
The elderly user can annotate the picture by adding a voice message.

*"This is amazing ! The remote control seems aware of its position and of how I handle it. Look ! ... If I point to an icon on the screen I can activate the related action. It's magic ! "* said John, an enthusiastic 75 year old visitor of the EasyReach booth.

Not only John, but several other visitors of the *EasyReach* booth enjoyed to experience how it is easy to move the remote control around the screen and to activate functions, to go through a menu and to give direct command through simple gestures.

The same remote control can be used to control the TV set: the TV channels are accessed with the same style of interaction of a typical remote control (up and down arrows to change channel, up and down volume, on-off). Just through the touch of a button the user can switch from the standard TV mode to the *EasyReach* one where he can access the new *EasyReach* services.

**The EasyReach applications**

As it was explained by Orkunt Sabuncu of the University of Potsdam and by Stefanos Kokkorikos of iKnowHow – "in *EasyReach* social exchanges are managed and aided by a "social interaction agent" that "looks" at all the interactions and commands from the user. Social interaction agents can go on the net and query other agents on behalf of user's wishes or simply to fulfill the goal of improving the quality and breadth of user's interactions. He can send and receive messages to/from his friends, relatives and from new friends joining *EasyReach*".

Other services allow the elderly users:

- to organize groups;
- to be in touch with existing organizations, e.g. a church, the Senior Centre, when he/ she is forced to stay at home;
- to participate to help sessions where a skilled user can help or train other users;
- to be alerted when a message arrives or when a new event in the area of interest is running.

In *EasyReach* "we use the "square metaphor" – explained Raffaele Nicolussi of the Fondazione Ugo Bordoni, a Partner of the Project - "on his TV screen the elder will have his social network represented as a square. The Personal Assistant (PA) of EasyReach will select which items should be shown at the Square (users and/or groups) and this intelligent selection follows some inherent preferences".

# 2. A SPECIAL EASYREACH SESSION AT THE 2012 AAL FORUM (EINDHOVEN, THE NETHERLANDS)

A large number of researchers, experts and end users attended the special session titled "**Designing for older adults – Lessons learnt and recommendations from past experiences"** and chaired by Dr. Amedeo Cesta of CNR (Italian National Research Council) and by Prof. Udo Weimar of the University of Tuebingen in Germany.

As the two organizers (Silvio Bonfiglio of the *EasyReach* project and Sandra Evans of the NETCARITY one) indicated in the presentation of the session "to design products and services for older users is not an easy task. The older population is characterized by a wide variation in cognitive abilities (which diverge with increasing age profile), a generally cautious outlook with which older people view technology (and ICT in particular) and the gap between the experiences of the developers and those of the users they are designing for. Furthermore there are cultural differences and ethical issues to be considered".
The session intended to address some of these challenges from a practical perspective, by sharing the experiences and the lessons learnt in conducting research work for and with senior citizens.

Two AAL JP Projects (*EasyReach* and NOBITS) both fostering the social inclusion of the senior citizens are adopting a participatory design methodology specifically adapted to the elderly users.
A large-scale collaborative project, NETCARITY, was just recently completed and it can be considered a successful project.

The speakers presented the experience made and the insights gained; they could provide useful suggestions to current and future projects and allow them to overcome obstacles and improve their results.
In a complex and fast changing environment, the success of a project is not only a technological issue; an integrated approach is needed where other changeling aspects such as ethical, business- and policy-related, organizational aspects have to be considered. To learn from the experiences, from the good and the bad things of past projects could represent the right starting point.

## 2.1 THE SESSION PROGRAM

September 24, 2012

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|---|---|---|
| 14:00 | Introduction by the chairs | Amedeo Cesta (CNR, Roma) and Udo Weimar (University of Tuebingen) |
| 14:15 | Understanding the needs of the elderly users – The EasyReach approach | Raffaele Nicolussi (Fondazione Ugo Bordoni, Roma) |
| 14:30 | The user as a co-developer – Lesson learnt in the NOBITS project | Luca Morganti (Istituto Auxologico Italiano, Milano) |
| 14:45 | Age-friendly environment | Ilenia Gheno (Age Platform Europe, Brussels) |
| 15:00 | Designing with older adults – Lesson learnt in the NETCARITY project | Wil Rijnen (Smart Homes, Eindhoven) |
| 15:15 | Personal data privacy and security | Bas Goossen (Smart Homes, Eindhoven) |
| 15:30 | What works and what doesn't? | Udo Weimer (University of Tuebingen) |
| 15:45 | General discussion | |

## 2.2 AN OVERVIEW OF THE PRESENTATIONS

- **Personal Data Privacy and Security**

Over the past few years we trust more and more of our privacy sensitive data to internet based services. Together with the growth the problems of this behaviour is getting visible, stories of people not able to get jobs because of information that can be googled about the persons are reaching the media. With the growing market of connected home automation and even telemonitoring services sometimes directly combined with social media this becomes a real privacy threat. Netcarity's open service platform tackle's this threat in a unique way to gain the trust of the user and insure autonomy and dignity for the clients.

- **Ethical issues**

Ethics means more than informed consent. The model developed within Netcarity identifies ethical risks, ethical principles and various levels where risks can occur when installing smart home technology and services into homes. It has proven to be a useful tool to facilitate discussion and to make ethical considerations part of the user-centred design process. The work carried out shows that small alterations really can make a difference. Several alterations were made to the design of the user interface and the workflow of the services based upon the results from the ethical focus groups. A major issue is still how to overcome the fact that halfway through the design process the system isn't running flawlessly and discussions with users tend to focus on the flaws in the system instead of ethical issues. The use of Wizard of Oz techniques could be investigated.

- **What works and what doesn't?**

From the perspective of a funding agency it is important to focus efforts on a specific dimension such as inclusion, (microsystems) technology, medicine, economics or the social sciences for instance. In order to generate real impact in the field of AAL it is nonetheless important to advance holistic solutions which essentially include all of the above dimensions. In this regard, it would make sense to question whether exiting funding schemes turn tax money into implementable outcome. With respect to technology, for instance, one of the greatest challenges is that no real universal and standardized middleware exists (hope rests on UniversAAL) based on which further products and services can be developed. Most technology-oriented projects have to "re-invent" this part, which takes a lot of time, resources and funding away from other important issues. Similarly, the EU has 27 member states with different social and welfare as well as health insurance systems which should be taken into consideration when developing universal solutions. Another set of real challenges are also not necessarily the business / policy aspects, but the organizational changes which are required with respect to operation, i.e. the transfer from traditional care to "digital care" / "care 2.0". This provides just a glimpse into the complexity of AAL accentuates the need for a holistic and ultimately sustainable solutions. Based on the Netcarity experience, suggestions for improvement will be formulated.

- **The users as "co-developers" – The Nobits case**

Luca Morganti addressed the importance of having the users as co-developers and described the experience in Nobits (Nostalgia Bits), an AAL Project of the 2009 Call.
Nobits aims at fostering social interaction between elderly and their family through capturing and sharing on line their memories; the platform allows seniors to reconnect with lost or unknown acquaintance and – at the same time – to provide valuable experiential knowledge and insight.
To design the platform the Project involved the final users; focus groups and questionnaires on the role of the reminiscence and on the reminiscence activities were organized with elders (primary users) and children (secondary users). The technical specifications of the system took into account the user needs (e.g. easy access, avoidance of possible manipulation of contents / artifacts by unknown people).
Validation tests on the usability of the system were executed by involving the users again (older adults and children); an adapted Questionnaire for User Interaction Satisfaction was used.
The Nobits experience evidenced the importance of involving the users since the first phases of the project, of getting also technical feedbacks from the users through an ad hoc methodology and of anticipating the tests by using a guided user-friendly prototype.
From a social perspective it was highlighted the user satisfaction about the exercise of reminiscing and the technology was valued as a tool for a better storage of the memories and as a source of knowledge rather than considered an obstacle.

- **Understanding the needs of the elderly users – The EasyReach case**

Raffaele Nicolussi of the Fondazione Ugo Bordoni gave a speech titled "Understanding the needs of the elderly users – The EasyReach approach", where the "User-Centred Design" methodology followed in EASYREACH was described. It was aimed at having the active involvement of the users in all the phases of the project, including the validation of the final solution.
User centred design seeks to place the user at the forefront of the design effort and as the main source of information.

The rationale for the need of following a User Centred Design (UCD) methodology in EASYREACH project was explained together with the need to adapt the available methodologies (e.g. Participatory Design) to the specificity of the users addressed by the project i.e. the older adults.

The active participation of the users to the project allows to deeply analyze and understand their requirements and to design effective solutions in line with their needs and desires.

In the acceptance of the proposed solutions by the final users key factors are the intuitiveness and ease-of-use of the developed solutions and the awareness of the resulting benefits.
The most critical phase in the UCD process is represented by the gathering of the user requirements.
In EASYREACH a "modified approach" of the Participatory Analysis methodology was used; it was specifically adapted to the older users and was developed through four steps:
Step 1: Working with older users – Recruitment and Preparatory phase,
Step 2: Information gathering process through the generation of scenarios,
Step 3: Deeper understanding of the requirements through the use of a low-fidelity prototyping process.
Step 4: User need analysis for the definition of the technical requirements of the developed system.

- **Fostering an age-friendly environment**

Promoting age-friendly environments (AFE) is one of the most effective approaches for responding to demographic change. Creating age-friendly environments means adapting our everyday living environment to the needs of the ageing population in order to empower people to age in better physical and mental health, promote their social inclusion and active participation and help them maintain their autonomy and a good quality of life in their old age.
As an example of good practice Ilenia Gheno of the AGE Platform Europe gave a short introduction of the OASIS project of the FP7. It aimed at facilitating access to information, public services and economic promotion by grouping online services in a unified portal following a user-centered logic. Federating services in a unique environment enabled public administrations to make better use of customer and businesses information and adapt public services (e-services) so they more often meet the needs of people and businesses. The result is a set of services that are more accessible, more user-friendly, more efficiently run by public authorities and less expensive for the taxpayer. The OASIS project takes advantage of open platforms and open standards using a cloud architecture.

Ilenia Gheno gave a summary of the outcomes of three thematic seminars organized by AGE in 2012 in occasion of the European year for the " active ageing and the intergenerational solidarity"

Seminar "Age-friendly labour markets and social protection systems should…"

It was devoted to the extension of the working life of the citizens; it defined the following "conditions for healthy ageing as a prerequisite for longer working careers:
To increase the "effective retirement age" before postponing "mandatory retirement age";
To maintain skills by stimulating professional mobility and life-long-learning, anticipate and manage career-paths;
To facilitate flexibility and transition periods (for example between studies and work, between work and retirement) based on individual or collective formal agreements;
To empower employees and strengthen their capacity to adapt to the changing work environment, recognize their competencies and experiences to benefit individual workers and their companies;
To combat age discrimination in employment and stereotypes through the promotion of a positive image of older people in the media;
To enforce gender equality and address the needs of informal carers in access to social protection rights (mainly women). Do not just 'transfer' the care burden and related inequality from women to men as this will not solve the problem but redistribute the burden of care more equally across the whole society.

Seminar "The impact of the crisis on older people"

The seminar addressed various areas (healthcare, gender equality, informal care, poverty and dignity in old age, intergenerational solidarity, integration and coordination of social and healthcare services, senior citizens as an asset for the community) and concluded with the following recommendations:
To promote universal access to healthcare and ensure that services are offered according to people's needs rather than their capacity to pay;
To improve gender equality for all age groups and empower women to take a more active role in the labour market through age and gender-friendly labour markets and social protection systems (local authorities can help through an adequate offer of child and eldercare facilities);
To support informal carers, mainly women, and to formalize an EU proposal for legal provisions on carers' leave;
To develop a common EU methodology to assess poverty and dignity in old age and define criteria for an adequate income in old age based on people's individual needs;
To strengthen solidarity within and between generations at national and local level and within the community (innovative solutions are needed to allow family members of different age and population groups to 'interconnect');
To better coordinate actions between the various health and social services (A holistic approach to wellbeing and active ageing is necessary);
To give a strong voice to older people and their organizations at all levels to enable them to coproduce the solutions they need to be involved in society and to contribute to their community.

Seminar "Age-friendly environments"

It was related to the needed actions and strategies from a political perspective to realize an Age-Friendly European Union. The main recommendations were the following ones:
To promote an age-friendly environment in all relevant EU policy processes and funding programs to support action at all levels;
To build and realize a European Strategy for Active and Healthy Ageing to help Member States to achieve their Europe 2020 objective and to create smart, sustainable and inclusive growth;
To build synergies between existing EU policy processes and funding programs and the United Nations policy instruments and implementation programs on ageing to ensure that these processes will deliver better outcomes;
To create an "EU Age-Friendly Environment Network";
To create an EU Covenant on Demographic Change to gather and support local;

To ensure that regional public authorities are committed to fostering active ageing and intergenerational solidarity in their communities.

Dr. Gheno concluded by highlighting the need of "giving a voice to those who do not have a one".
It is important that older people participate in policy planning and influence policy implementation of initiatives enabling the improvement of the quality of life for older people. It is through a civil dialogue on ageing that policy measures can be developed which will better meet older people's concerns and needs.

# 3. OTHER PAPERS PRESENTED IN THE SCIENTIFIC PROGRAM OF THE AAL FORUM 2012

Various papers were presented by the EasyReach Partners.

## 3.1 SESSION C5 - VALUE NETWORK ANALYSIS AND BUSINESS MODEL OPPORTUNITIES

**Silvio Bonfiglio** of FIMI BARCO in Italy presented a paper describing the opportunities and at the same time the heavy barriers of the Assistive Technology market ( "ICT for independent living…. Is there a sustainable business?").
It was highlighted how the AAL market is still in a nascent phase with a lot of proposals, research projects, pilots but with just few mainstreamed products.
The main barriers to the uptake of the market deal with political and cultural issues; only few of them are technology- related. Some recommendations were given and among them:

a) the introduction of innovative and more effective business models with the integration in the value chain of new players such as the services aggregator, the content provider, the context provider, the mediator and with the testing of new approaches such as forms of "indirect revenue" (e.g. through advertisement or sale of anonymous data collected during the use of the EasyReach services);
b) The aggregation and cooperation between all the players even between the competitors mainly in this nascent phase of the market where the return of the investments is doubtful and in any case not in a short-medium term and therefore there is the need of sharing not only the opportunities but also the risks;
c) A stronger commitment and significant investments by the large, multinational industrial groups;
d) A better understanding of the users and the identification of different market segments each one addressing the needs of a specific category of the complex and differentiated "elderly community".

Moreover Silvio Bonfiglio gave a presentation on "A new model of social care enabled by ICT and based on a synergic mix of formal and informal care" ( coauthors: Andrea Gaggioli , Luca Morganti , Roberto Bisiani, Amedeo Cesta, Daniela D' Aloisi ).

The trend towards an ageing population has been recognized as one of the "most critical societal challenge" for Europe. The social care system needs to cope with a continuously growing demand both in terms of larger number of persons needing assistance and in terms of better quality of care requested by "better aware citizens".
From the other side – in consideration of the change of the family structure - there are serious doubts in the capability of the "informal care model" to continue to represent the predominant model for social care in Europe.

In this situation new actors can play an important role and build a network of informal carers. In this paper - in line with one of the main objectives of the AAL JP (i.e. fostering cooperation between formal and

informal carers and solutions for supporting informal carers) - we intends to propose a new model of social care based on the synergic collaboration between private entities and public institutions. , a model aiming at tackling the social and economical challenges of the ageing of the population in a more effective way and realize the "ageing in place" paradigm.
As an example the User Associations and the Senior Centers could be involved as "mediators" in facilitating the access of the elderly persons to the "digital community" or as "promoter" of the awareness about health and wellbeing among the senior citizens with a program of "education and health promotion".
All these actions need to be integrated into the "institutionalized care" system, harmonized with it and contributing to its sustainability. They could represent an effective link between the elderly citizens and the institutions and foster the physical and emotional wellbeing of the older adults through the support of the overall community and through their aggregation and social inclusion.

We think that this approach will contribute to the achievement of a better Quality-of-Life of the older citizens and at the same time to make possible a cost saving for the overall community. This combination of public and private assistance can realize a new and more sustainable equilibrium between "formal" and "informal" care able to compensate the declining involvement of the family.

In this paper we report the outcomes of a study executed in two research projects of the AAL JP Programme (EASYREACH and NOBITS) on the opportunities offered in terms of sustainability and efficiency of social and health care systems by the "mixed formal and informal care model".
ICT can contribute to the realization and the management of this strategy.
We are aware of the organizational challenges linked to the integration of the proposed service into the structures and the policies of the health- and social-care systems currently in place in the various European countries and the papers will analise them.

## 3.2 SESSION D4 – ROBOTICS

Amedeo Cesta of CNR, Italy introduced the EXCITE project ("EXCITE - Enabling Social Interaction Through Embodiment: Robot as Drug").
Robots have been fascinating objects for a long time. Positive reactions have been recorded when testing them with older adults. Obviously several things have to be improved before a robot will really become a companion.
Telepresence robots can become a beneficial tool in home care assistance and rehabilitation services by helping elderly people to remain in their homes longer. They can represent an additional means to assist older adults and facilitate social interaction by creating a support network through which nursing staff and family members can collaborate.
Amedeo Cesta described a feasibility study relatively to the use of such robots in the interaction with elderly people affected by Mild Cognitive Impairment (MCI). The presented paper aimed at assessing the psychophysiological response of such users to the presence of the robotic platform in order to use it as an indication of the level of tolerance toward the platform. To this purpose, nine healthy and eight MCI older adults were involved in the participation of an experimental study where they were asked to perform repeated interactions with and without the telepresence robot. The analysis was based on a combination of psychological tests to assess anxiety, positive/negative effects of the interaction with the robot, and physiological measurements were performed (heart rate and heart rate variability) to obtain an objective measure of the actual psychological state. Results seem to suggest that the robot presence is satisfactorily

tolerated by MCI and that it does not cause adverse effects in term of cardiovascular response, thus encouraging further investigation on telepresence robots for rehabilitation and care experimental studies.

## 3.3 SESSION E11 – DESIGNING WITH PEOPLE

Many things need to change within the AAL Community before we can unlock and create a vibrant and commercially viable market geared to meeting the needs of our ageing populations. One of the first hurdles we need to scale is the way we perceive, think, talk to and engage with adults older than ourselves. More often than not we speak at older adults, thinking we understand their lives, feelings, motivations and needs. We rarely ascribe wishes and aspirations to them. What we understand are our lives not theirs.
This session will explore some of the engagement methods used within projects to overcome the issues highlighted above. Speakers will give an overview of their experiences, methods and actual contact with people brought greater insight and understanding into how we can actually develop and commercial life enhancing technologies.

**Silvio Bonfiglio gave a presentation titled "**Understanding the psychological profile and motivations of the elderly users" (co-author: Giovanni Pioggia of CNR Italy). The paper describes how the "psychological profile" was included in the design of elderly addressed services in four research projects devoted to the senior citizens: OASIS of the FP7-ICT Program, EASYREACH and NOBITS of the AAL JP Program and i-MOTION, a project co-financed by the Regione Lombardia in Italy.
It has been proven that people often resign from following lifestyle adoptions due to a lack of self motivation.
Therefore it is justified the attention given to the motivational aspects when designing for elderly.

**Luca Morganti** presented the paper "Applying User-Centred Design approach in AAL projects : challenges and achievements" (co-authors: S. Bonfiglio, A. Gaggioli, F. Papa)

This paper reports the experience of two projects of the AAL JP Program (EASYREACH and NOBITS) with regard to the involvement of the elderly users in research activities addressing their needs in terms of independent living, socialization, physical and emotional wellbeing.
We applied a user-centred design approach with the objective of bridging the gap between the expectations and motivations of AAL developers and the real needs of the population they are designing for. Although different user-centered methodologies are available (e.g. Participatory Design), these need to be adapted to the specific characteristics of the target group.
Senior citizens are a very differentiated group in terms of age, physical and cognitive capabilities, familiarity with technology, motivation, social background, language and culture. To address these differences, we introduce a "modified approach" of the Participatory Analysis methodology, which integrates aspects of established participatory design techniques such as USID (User Sensitive Inclusive Design), TAF (Task Analysis methodology) and PICTIVE (Plastic Interface for Collaborative Technology Initiatives through Video Exploration). In the proposed approach, users are involved in all the stages of the design process including the evaluation of the developed solutions.
Collecting and understanding the real needs and desires of elderly users is a very critical challenge. In our model this objective was addressed through a three-staged process: 1) Working with older users –

Recruitment and Preparatory phase; 2) Information gathering process via the generation of scenarios; 3) Deeper understanding of the requirements through the use of a low-fidelity prototyping process. From the application of the modified Participatory Design approach we learnt two important lessons: a) it is very important to involve a representative sample of users, by taking into account the wide spectrum of differences that characterize the target senior population; b) the mediating role of formal and informal caregivers is critical in order to promote trust, mutual respect and a genuine collaborative attitude; c) the adoption of diversified methods of qualitative data collection, is the key to promote motivation and obtain unambiguous feedback from prospect end-users. We believe that by adopting these guidelines, we can avoid that "user involvement in research projects becomes no more that a tick box activity".

In the present contribution, we describe the implementation of this methodology and report some observations and findings from our experience in the NOBITS and EASYREACH projects. In the NOBITS project, users were senior citizens living in the northern area of Milan, Italy (the Castanese Territory), where a Living Lab for Assistive Technologies was established in 2011; For the EASYREACH we had the additional contribution of a group of elderly persons living in Rome, representative of two kinds of geographical and cultural areas.

# APPENDIX 1 – SOME OF THE PRESENTED PAPERS

## A1.1 UNDERSTANDING THE PSYCHOLOGICAL PROFILE AND MOTIVATIONS OF THE ELDERLY USERS

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**Abstract**

Some of the products designed for the elderly users aim at interacting with them by providing feedbacks and advices and foster better motivation towards a healthier lifestyle and better suited habits.
It has been proven that people often resign from following lifestyle adoptions due to a lack of self motivation.
Therefore it is justified the attention given to the motivational aspects when designing for elderly. The efforts done have shown up to now a lack of effectiveness due to a poor focus on personalization; the solutions have been too generic and neglecting the psychological specificity of the individual user and therefore unable to adopt accordingly the most suited approach fostering a behavior change.
This paper describes how the "psychological profile" was included in the design of elderly addressed services in four research projects devoted to the senior citizens: OASIS of the FP7-ICT Program, EASYREACH and NOBITS of the AAL JP Program and i-MOTION, a project co-financed by the Regione Lombardia in Italy[1].

### Introduction

It has been proven that general health conditions of the people and specifically of the senior citizens can be enhanced through lifestyle interventions and risk factor modifications.
Therefore some of the applications/services provided to the senior citizens (e.g. Health Education, Activity Coach, Nutritional Advisor, Social Inclusion) aim at interacting with the users by giving them feedbacks and guidelines.
At the same time it is well known that people and mainly older adults often resign from following lifestyle adoptions due to a lack of self motivation.
Therefore it becomes important in a strategy addressed to the older population to consider the motivational aspects.

[1] OASIS ( Open architecture for Accessible Services Integration and Standardization) is an Integrated Project of the EC Framework Program 7 (Grant Agreement: # 215754; Strategic Objective: ICT and Ageing – Starting date:1 January 2008; ending date: 31 December 2011) – www.oasis-project.eu;
EASYREACH (Fostering social interactions of home-bound and less educated elderly people) - www.easyreach-project.eu - and NOBITS (Nostalgia Bits) are two running projects of the Call 2 (2009) of the Ambient Assisted Living (AAL) JP; both projects are expected to be completed during 2013.
i-MOTION is an Italian Research Project co-financed by the Regione Lombardia in the Health sub-program and is related to the monitoring of older adults living alone at home through non-invasive and innovative technologies. The project (15 months long) will be completed in the first half of 2013 – www.imotion-project.it.

We notice in the solutions currently available a lack of effectiveness due to a poor focus on personalization; they are too generic and neglect the specificity of the individual user.
The assessment of the Psychological Profile of the elderly person allows to identify the *"motivation model"* characterizing the specific user and to define accordingly the most suited approach fostering his behavior change.

**Methods**

The Psychological Profile we introduced has a multi-parametric structure with each element assessing a specific aspect of the psychological status of the elderly person.
In its complete structure it includes the following parameters:

| Indicator | Description / Notes |
|---|---|
| Motivation | It defines the level of self motivation of the user |
| Psychological stability | It defines the variability of the psychological status |
| Life satisfaction | the willingness of enjoying the life even if in presence of constraints ( e.g. unsatisfactory health status). |
| Self esteem | Evaluated according to specific metrics (e.g. the Rosenberg Self-Esteem Scale (Italian Version by Prezza)) |
| Depression | Evaluated according to specific metrics |
| Perceived health status | It defines how his own health is perceived by the user regardless of the objective health conditions |
| Perceived extension of the zone of desired control | Or perceived locus of causality i.e. perception of controlling the situation, of having choices (the contrary of a perception of being under surveillance, of inability to control the events) |
| Mindfulness or mindlessness | interest in new thinks, open mind (on the contrary perception of the new as a threat) |
| Task orientation or goal orientation | orientation of doing everything in the right way, as it must be done regardless if the outcomes (on the contrary focus on achieving the objective regardless of how) |
| Activeness in everyday behaviors | independence and autonomy, willingness of being active continuously |
| Perception of loneliness | intensity of the perceived link with other people; to measure it the Italian Loneliness Scale (Zammuner), mainly adapted from UCLA Loneliness Scale was used. |

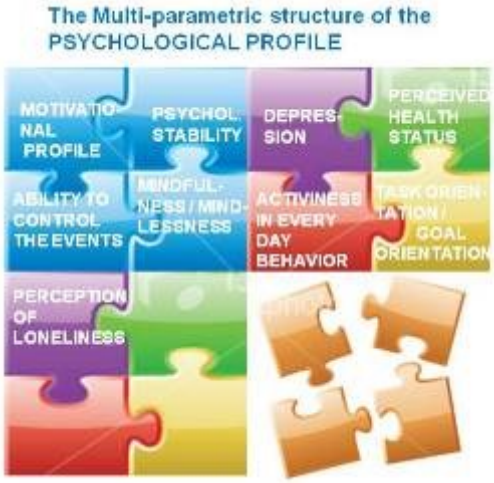


Fig. 1 – The various elements of the psychological profile

For the purpose of the services designed in the above mentioned projects the focus was on motivation, psychological stability and on the perception of loneliness.

- Motivation

We adopted the theory developed by Deci and Ryan [1] and adapted to the older adults by R.J. Vallerand and B. P. O'Connor [2] where four levels of motivation are identified: intrinsic motivation, self-determined extrinsic motivation, non self-determined extrinsic motivation and "amotivation":

a. Intrinsic motivation: no reward, no constraint; just the inherent pleasure derived from doing so;
b. Self-determined extrinsic motivation: own perception of a benefit in doing so, not driven by someone else;
c. Non self-determined extrinsic motivation: actions done in view of a reward from someone else or in order to avoid a punishment;
d. Amotivation: no perception of any link between own behavior and outcomes; simply a non-motivated behaviour.

These levels represent a continuum from high to low level of self-determination.

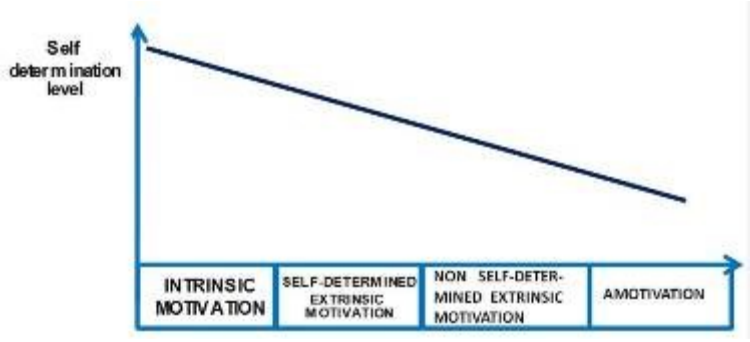


Fig.2 – The four levels of motivation

- Psychological stability

The psychological status of the elderly changes over time often highly influenced by external factors; this parameter intends to measure this variability.

- Perception of loneliness

It measures the intensity of perceived connections with other people (friends, relatives). Typically the UCLA Loneliness Scale is used for its measurement; we adopted the Italian Loneliness Scale (Zammuner) derived from it.

In the above mentioned projects, a questionnaire was proposed to the users and the analysis of the answers allowed to determine their motivational profile.
The questionnaire is based on the ELDERLY MOTIVATION SCALE (EMS-72) [3] which assesses the intrinsic and extrinsic motivation of elderly individuals. It is divided in six LIFE DOMAINS (health,

biological needs (eating, sleeping, ...), relations with others (family, friends, and people in general), religion, leisure and information (news)). Each domain has three different SITUATIONS; and for each of them the user is requested to give their agreement to the same four sentences ("I choose to do it for my own good", "I don't know and I don't see what it does for me", "I do because I am supposed to do it", "I do for the pleasure of doing it").

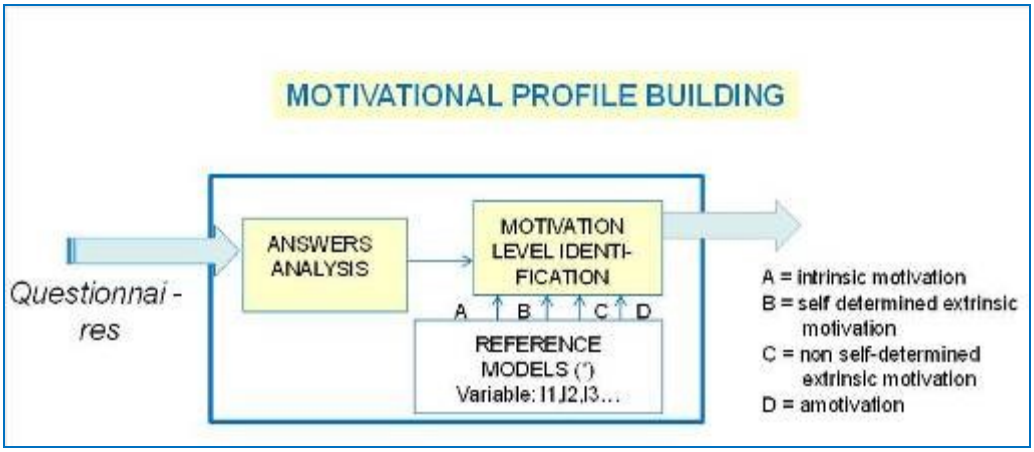


Fig. 3 – Building of the motivational profile of the elderly

Once the level of motivation of the specific elderly has been assessed, a motivation strategy can be adopted aiming at enhancing the self determination and the self responsibility of the elderly and at promoting a behavior change and a condition of "intrinsic motivation" towards better suited lifestyles.

In the applications developed in the above mentioned projects, we linked to the "motivational profile" of the elderly the way how the feedbacks / recommendations were given to him.

The psychological profile of the elderly has an evolution and the objective of some of the services addressed to them is to foster this change i.e. to produce an enhanced psychological functioning; therefore it is important to assess this profile on a periodic basis, i.e. to determine the variability of the psychological status of the elderly which often is highly influenced by external factors.

We preferred to avoid the invasiveness of a continuous and automatic assessment of the psychological status and of the mood of the elderly user through the automatic monitoring and analysis of parameters such as his voice and the speech characteristics or of some physiological parameters.

We monitored the changes of the psychological status of the older user by involving him twice a day in a simple self assessment by using a very simple tool, the *"Smiley Face Scale"* already adopted by another European project.
Twice a day (in the morning after the wake up and in the afternoon after lunch) the elderly was asked to declare his mood simply by selecting the more appropriate face.The faces are rated 1-5 with face 3 indicating a "neutral" feeling. The elder had the opportunity of entering some notes.


Fig. 4 – The self assessment through the Smiley Face Scale

The morning and afternoon mood was visualized with a graph and an algorithm allowed to calculate the daily change or the change over a defined period of time (e.g. during a week):

a. Daily change = (mood factor in the morning – mood factor in the afternoon);
b. Change in the period T = (max mood factor – min mood factor) in the considered period (by considering the values related to the same evaluation time (e.g. the morning values).

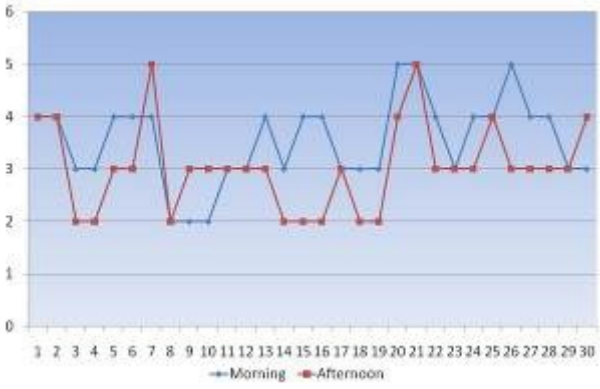


Fig.5 : Monthly graph of the elder's mood

**Results**

The above described solution was adopted in four services specifically developed for the senior citizens in the European OASIS, EASYREACH and NOBITS projects and in an Italian project co-financed by the Regione Lombardia (i-MOTION project).
The use of the "motivational profile", of the "psychological stability" and of the "perceived loneliness" indicators added a new perspective in services/ applications where the aim is to empower the older adults in the self-management of their physical and emotional wellbeing by adopting better suited lifestyles.

**Conclusions**

We tested the above mentioned applications in pilots involving hundreds of older adults:
Health Education, Nutritional Advisor and Activity Coach applications were included in the overall platform of services provided by OASIS and the "user profile" was enriched by the above mentioned "psychological" indicators.
The trials were conducted in five countries (Italy, UK, Germany, Bulgaria and Romania).
The outcomes of the pilots demonstrated the validity of the approach in terms of effectiveness of the provided services and the feedbacks received from the users (mainly related to the usability and acceptance of the proposed solutions) were positive and useful to refine the design.

In the two AAL JP projects (NOBITS and EASYREACH) and in the Italian project (i-MOTION) – still running - we will add in the psychological profile the further dimensions of "self esteem" and "perceived loneliness"; the features offered by the services will be adapted accordingly and dynamically.
We did already some preliminary field tests by getting encouraging results.

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# A1.2 AN ATTEMPT TO UNDERSTAND THE REASONS OF THE SLOW UPTAKE OF THE MARKET

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## Abstract

There is a growing interest in the business community with regard to ICT products / services addressed to the elderly; it is due to the demographic trend and to the rising expectation the older adults have in respect of the Quality of Life.
ICT could play an important role in changing the way social care services are delivered to the citizens and its economic impact could be relevant. The market potential is very appealing and there is much room for the development of solutions capable of meeting a wider spectrum of new user needs and/or meeting currently addressed needs in a more advanced and adequate manner.
Nevertheless heavy barriers are refraining the uptake of the "ICT for Ageing Well" market and the sector does not promise a fast return of the investment to the industrial / business community. As a result the sector is still technologically driven with an offer too research-oriented.
In this paper – derived from the analysis we did in two AAL Projects (EASYREACH and NOBITS[2]) - we investigate about the existing barriers limiting the effective exploitation of the outcomes of the intensive research and development work carried out in this field.

## Introduction

The "ICT for ageing well" market is still in its nascent phase. There have been several pilot trials (e.g. of smart houses, telecare services) but these services have not yet become mainstream and there is very little usage in practice.
According to a market research [1], more than 20,000 assistive technology (AT) products are available in Europe; nevertheless their acceptance has been slower than might had been expected and the adoption of AT solutions seems to be very unevenly spread across Member States.
There are peculiar characteristics in this market segment explaining these difficulties.
In e-care the business models are different from those of the consumer sector. While in this last one the value is linked to a pure financial return, for e-care the overall context varies, as intangible elements need to be taken into consideration in addition to specific monetary terms e.g. the social benefits, such as quality of life of the elderly persons, peace of mind of the family's members.
Another specificity is represented by the financing structure in e-care which is very differentiated:
services paid by public or private insurance, by health management organizations or associations and out-of pocket payment by the users themselves or by their families as well, either in terms of co-payment or self-purchase.
Moreover the consistency and sustainability of current funding systems across Europe varies considerably, with evident disparities in terms of financing and reimbursement mechanisms, public versus private delivery mix, degree of population coverage and satisfaction.

[2] EASYREACH (Fostering social interactions of home-bound and less educated elderly people) - www.easyreach-project.eu - and NOBITS (Nostalgia Bits) are two running projects of the Call 2 (2009) of the Ambient Assisted Living (AAL) JP; both projects are expected to be completed during 2013.

Fortunately we see also encouraging elements [1]:

a. The majority of older people are showing a growing interest in more advanced solutions;
b. The use of Internet among the EU15 older population in the 65-74 years segment has more than doubled; in the same way among the 50+ citizens the availability of a PC at home increased from 36% of 2001 to 57% in 2007 and the Internet access at home from 22% to 47%;
c. The older population shows a growing "financial power": in the developed countries the over 50s own ¾ of all the financial assets and account for half of all discretionary spending power. Moreover the consumption of the 50+ people in Europe increased 3 times as fast as that of the rest of population *("I'd better have a nice life instead of saving money all the time").*;
d. The increased awareness of the problem by the Institutions, the political community and by the opinion leaders that could represent an important step forward in the uptake of the AAL market.

We notice also higher consciousness of the persons directly involved i.e. the senior citizens: they want to live longer but at the same time to live their third age in a better, more participative way. With the forecast of representing in 2050 the 30% of the overall European population, the 65+ citizens have all the rights in pretending for them a relevant role in the society and a better quality of life.
Older adults have the right to continue to represent a resource for the community rather than a problem.
From a technological perspective the situation seems very encouraging since we see a continuous advance of Information and Communication Technology in various areas fostering the social inclusion of the older adults and helping them to live as much as possible independently and autonomously. Nevertheless analysts still notice a gap between the potential benefits that the ICT infrastructure can provide and the exploitation of these benefits throughout a large part of the older population.
The forecast projecting for the coming decades an Europe less populated and older represents the major driver for the "ICT for Ageing Well" market; national healthcare and social care services will be faced with a tremendous crisis if nothing will be done to change the way how healthcare and social care services are delivered to the citizens. ICT could play an important role in the solution of this problem.

## Method

In developing a business strategy in the AT field we started with a better characterization of the addressed users (i.e. the elderly people) and we considered their "consumer-related behavior" and their attitude towards the technology.
The psychological barriers represent often the main cause refraining the older adults to learn about ICT devices / solutions and to make use of them. Several studies analyzed the aspects which influence their adoption of a product and their decision process:

- Older adults are not influenced by trends;
- The perception towards technology is changing; even if slowly, elders are adopting technology mainly when they see the benefit of it;
- The attitude towards technology is also influenced by the age ( typically 55+ elders are "technology adopters", 65+ are "showing interest", people aged 75+ "do not want to know anything about technology").

The method we used in characterizing the older population was a "gerontographic model" [2] that combines physiological, psychological and social ageing variables. On the basis of this model the elderly population was segmented into four groups according two axes related to the health status and to the social mindset (see fig.1).

Healthy indulgers enjoy life and are willing to spend; in the same way the Ailing Outgoers have self-esteem, they are socially active, like to learn new things, to preserve independence, to maintain connected, to address the problems linked to their ageing.
Often an outgoing social mindset is linked to a positive approach towards technology so – regardless of the health status – the market potential for ICT assistive devices / services is larger when addressing the "healthy indulgers" and the "ailing outgoers" that jointly – according to a market research [2] - represent the 47% of the older population.
Healthy hermits and frail reclusive have a negative attitude towards technology, little interest and have few consumer needs.
Older adults can move from a profile to another; the process – often age independent - is linked to special events in the life of the elderly (e.g. the death of a relative).

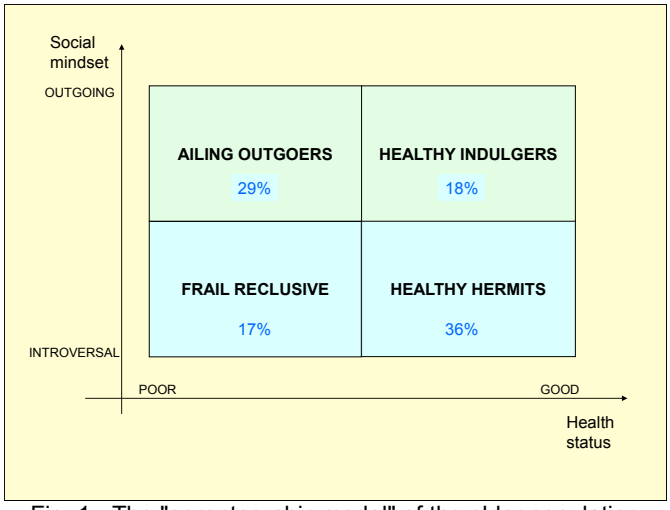
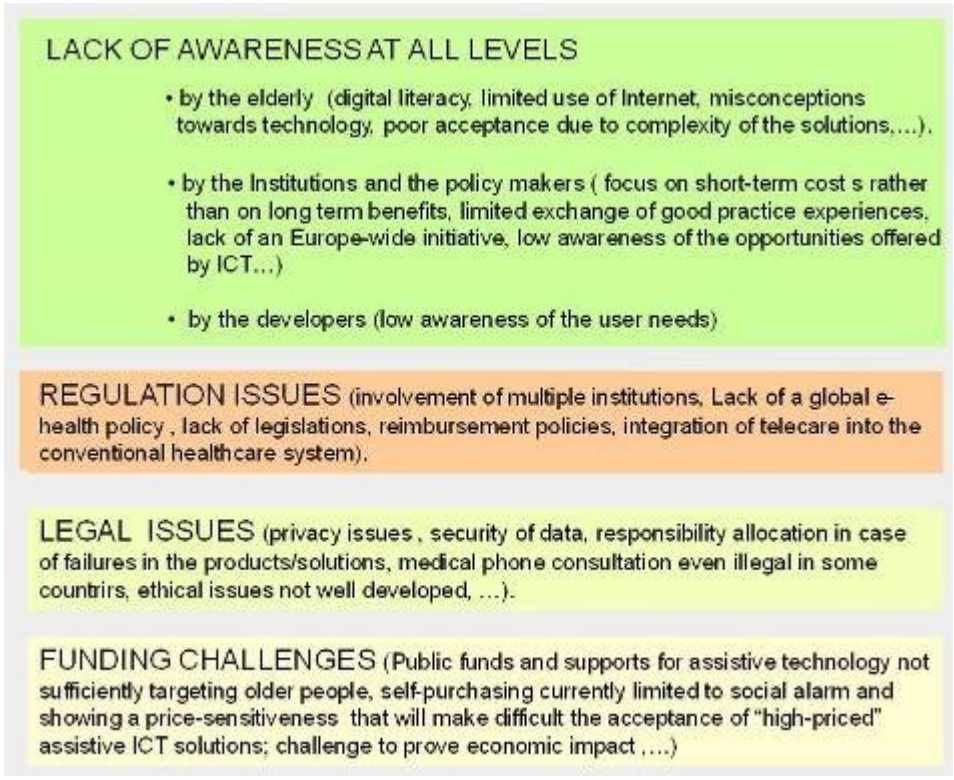


Fig. 1 - The "gerontograhic model" of the older population

According to another study (the SeniorWatch report [1]) the percentage of ICT users among the 50+ European population grew from the 40% of 2001 to 45% in 2007; in this group the "**experienced frontrunners**" (i.e. computer users with professional or advanced skills and/or using a computer at least once a week) went up from 27% to 40%, while the "**late beginners**"( i.e. computer users with less than advanced skills and using a computer less often than once a week) went down from 13% of 2001 to 5% of 2007.
Among non-users, it seems that there was not a big change between 2001 and 2007: roughly 30% of the 50+ population is against technology (**digitally challenged**) and 30% - even if they do not use ICT devices – show a certain interest and are open to learn ("**technologically open minded**").

| 50+ population | | | |
|---|---|---|---|
| | | 2001 | 2007 |
| USERS | Experts | 27% | 40% |
| | Beginners | 13% | 5% |
| | TOTAL USERS | 40% | 45% |
| NON USERS | Open mind | 28% | 27% |
| | Digitally challenged | 32% | 28% |
| | TOTAL NON USERS | 60% | 55% |
| TOTAL | | 100% | 100% |

While a lot has been done with regard to the "technologically open minded" portion of the older population, there is still a problem in reaching the "digitally challenged" segment.
Analysts put in evidence how "the match between technologies on offer and actual user needs is far from optimal". Lack of acceptance, lack of usability or even of usefulness are often diagnosed as reasons for limited technology diffusion in this area.
Functional restrictions could represent an additional barrier to older people to utilise ICT products and services for their purposes. A recent Eurobarometer survey [3] indicates that EU citizens with health problems, illnesses or disabilities are a lot less likely to have access to the Internet ( 25% compared to the global 43%).
The second step in the study we carried out in the NOBITS and EASYREACH AAL Projects was to identify the main barriers limiting the effective exploitation of the results of the intensive research and development work done in Europe in the Assistive Technology area.
From a technical perspective we noticed that some products show a lack of accessibility and usability causing a limited acceptance of ICT devices and solutions by the elderly.
To design for the older portion of the population is not an easy task: elderly people do not build up a homogeneous group; they have different degree of impairments, different level of education and computer literacy; they are characterized by a diversified and wide range of interests and needs and – across Europe – by different cultural background and languages. From a business perspective this fragmentation - which offers great opportunities to SMEs - at the same time represents an obstacle to build an economy of scale and discourages the investments of the big multi-national groups. Additional barriers – not product-related - are equally important: financial issues such as initial investments and reimbursement policies, legal and legislation issues, lack of standardization, cultural issues, not enough awareness at all the levels and lack of sustainable business models.





## Results and recommendation

As a result of the above reported analysis we elaborated a set of proposals with regard to new business models that could contribute to the sustainability and viability of the business.

We see the need of a synergic effort of all the players and of the implementation of "collaborative business models". Innovation in Ambient Assisted Living (AAL) is strongly driven by technology and technology as an enabler is adequately available to support comprehensive AAL solutions. However, as of today, there is no comprehensive solution for AAL commercially available or in operation on a wider than prototype scale. Thus, extra value can be created if the wide range of demands of the senior citizens could all be addressed by a network of enterprises, offering an "all inclusive", easy-to-use AAL solution. Therefore collaborative business models can make a valuable contribution in realizing comprehensive AAL solutions. There is another important reason suggesting a collaborative approach: to share – together with the opportunities - the risks linked to a business such that of the AAL sector characterized by an unconsolidated market in its nascent phase, unclear external environment (political, regulation, financial conditions), doubtful and long term return of the investments, etc. In the AAL market large companies and SMEs as well could play both an important role; the first due to the need of a multidisciplinary development approach and to the significant efforts to be devoted to standardization initiatives ensuring the interoperability of the solutions while the European SMEs could have enormous opportunities due to the fragmented characteristics of the market and certainly they could add values by adapting the solutions to the local context and according to the profile of the specific user.
All the solutions must be developed with a fast time to market, must be interoperable and easily integrated. A contribution to the e-care sector could be given by the focus on reference architectures for AT services. Open architectures will allow heterogeneous devices of different vendors to be interoperable and easily integrated with short development cycle and lower development costs. It will offer opportunities for a sustainable business. In such way the interest of new players and the building up of a global market will be facilitated.

## Conclusions

As evidenced by several analysts the European social care system is experiencing a critical situation and in the current context the provision of social care services using innovative ICT solutions offers the great opportunity of a containment of the costs while maintaining the expected levels of quality of care. Among the economic benefits we have to include the creation of new jobs produced by the uptake and growth of the e-care industry with an important role of the SMEs.
Sustainability and viability of the business are still to be proved and efforts are needed in the identification of effective business models. A threat could be represented by the overall economic situation and by the earning capacity of the older part of the population since it is clear that currently social care solutions have to adopt a "private" or a mixed "public-private" approach with regard to the payment of the related costs. Furthermore a negative aspect is represented by a lack of commitment by the large enterprises in this sector due to the slow uptake of the market and the doubtful return of the investments (at least in the short-medium terms). Better leveraging of the potential provided by ICT represents a challenge but at the same time an economic opportunity. It has become evident that market forces alone have been insufficient to ensure the realization of this potential [4]. Several barriers have to be removed and often they are not linked to the shortage of suitable and advanced technologies but – preponderantly – are related to political, legal and cultural issues. All the stakeholders need to find the way to cooperate in a common effort. Essentially e-care services have to create value for all stakeholders by devising appropriate supporting business models. Failing to do so will just create a situation where social care professionals and institutions would lose trust in these solutions and, as a consequence, refrain from exploiting the benefits brought by these e-care systems and solutions.

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